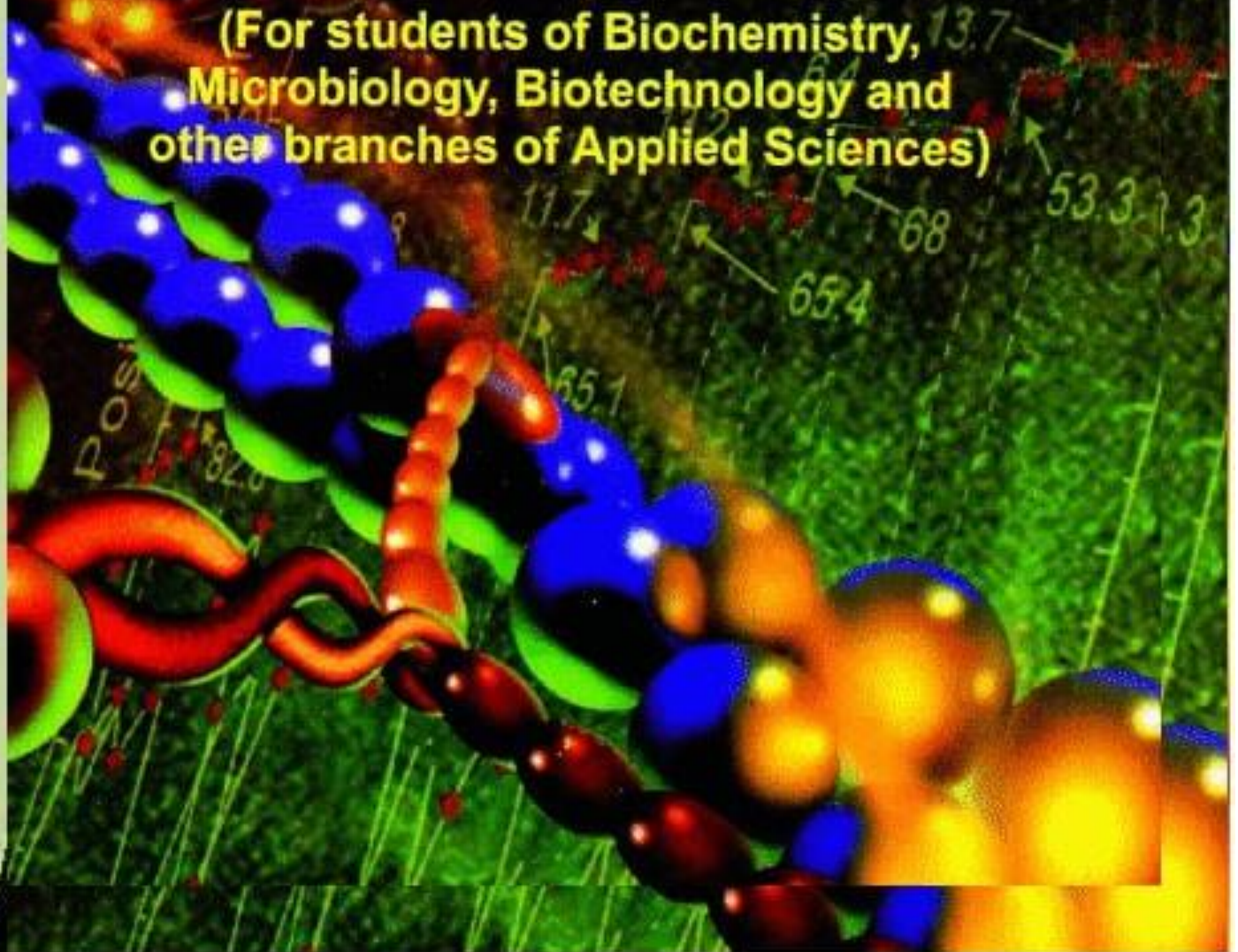


BO'RIYEVA NILUFAR G'OFUR QIZI

Practical Manual of **BIOTECHNOLOGY**

(For students of Biochemistry, Microbiology, Biotechnology and other branches of Applied Sciences)



**O'ZBEKISTON RESPUBLIKASI
OLIY TA'LIM, FAN VA INNOVATSIYALAR VAZIRLIGI**

Bo'riyeva Nilufar G'ofur qizi

BIOTECHNOLOGY

*O'zbekiston Respublikasi Oliy ta'lim, fan va
innovatsiyalar vazirligi huzuridagi Muvofiqlashtiruvchi
Kengash tomonidan darslik sifatida
tavsiya etilgan*

**QARSHI
«ILM-FAN-MA'NAVIYAT» NASHRIYOTI
2025**

UO'T: 006:631.36

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Bo'riyeva Nilufar G'ofur qizi.

Biotechnology. Darslik.

Qarshi. «ILM-FAN-MA'NAVIYAT» nashriyoti, 2025. –360 bet.

The textbook "Biotechnology" provides a comprehensive overview of the fundamental principles, methodologies, and applications of modern biotechnology. It covers key topics such as genetic engineering, molecular biology, bioinformatics, industrial biotechnology, and environmental biotechnology. The book explores cutting-edge advancements, including CRISPR gene editing, recombinant DNA technology, biopharmaceutical production, and agricultural biotechnology.

Designed for students, researchers, and professionals, the textbook presents theoretical foundations alongside practical applications, offering case studies and real-world examples. Special emphasis is placed on ethical considerations, biosafety regulations, and the role of biotechnology in addressing global challenges such as disease treatment, food security, and sustainable environmental solutions.

With clear explanations, illustrations, and problem-solving exercises, this textbook serves as a valuable resource for anyone interested in biotechnological innovations and their impact on science, medicine, and industry.

"Biotexnologiya" darsligi zamonaviy biotexnologiyaning asosiy tamoyillari, metodologiyalari va qo'llanilishiga oid keng qamrovli ma'lumotlarni taqdim etadi. Unda genetik injiniring, molekulyar biologiya, bioinformatika, sanoat biotexnologiyasi va ekologik biotexnologiya kabi asosiy mavzular yoritilgan. Kitobda CRISPR gen tahrirlash texnologiyasi, rekombinant DNK texnologiyasi, biofarmatsevtika ishlab chiqarish va qishloq xo'jaligi biotexnologiyasi kabi ilg'or yutuqlar ham muhokama qilinadi.

Talabalar, tadqiqotchilar va mutaxassislar uchun mo'ljallangan ushbu darslik nazariy asoslar bilan bir qatorda amaliy qo'llanmalar ham taqdim etadi, shuningdek, amaliy tadqiqotlar va real hayotiy misollar bilan boyitilgan. Kitobda etik muammolar, biologik xavfsizlik me'yorlari hamda biotexnologiyaning kasalliklarni davolash, oziq-ovqat xavfsizligini ta'minlash va atrof-muhitni barqaror rivojlantirishdagi roli alohida ta'kidlanadi.

Tushunarli izohlar, illyustratsiyalar va muammolarni hal qilishga oid mashqlar bilan boyitilgan ushbu darslik fan, tibbiyot va sanoatda biotexnologik innovatsiyalarning ahamiyatini o'rganmoqchi bo'lganlar uchun qimmatli manba bo'lib xizmat qiladi.

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ISBN 978-9910-552-30-9

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UNIT 1. WHAT IS BIOTECHNOLOGY?

UNIT FOCUS:

- **New Vocabulary**
- **Reading: What is Biotechnology?**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: What is Biotechnology?**
- **Speaking time.**

NEW VOCABULARY:

biotechnology

bacteria

environment

living things

technology.

fuel

organisms

vaccine

yeast

pesticides



READING.

What is Biotechnology?

Biotechnology is a type of science that uses living things, like plants, animals, and tiny organisms, to make useful products or solve problems. It mixes biology (the study of life) with technology to help people and the planet.

Examples of Biotechnology:

- **Food:** Making yogurt, bread, and cheese with helpful bacteria.
- **Medicine:** Creating vaccines to protect people from diseases.
- **Farming:** Growing stronger plants that don't need as many pesticides.
- **Environment:** Using bacteria to clean up oil spills or make cleaner fuels.

Why is Biotechnology Important?

Biotechnology makes life better in many ways:

- It helps doctors treat diseases.
- It helps farmers grow more food.
- It keeps our environment clean.

A Fun Fact:

People started using biotechnology over 5,000 years ago to make bread and wine with yeast!

Comprehension Questions:

1. What is biotechnology?
2. What does biotechnology mix together?
3. Name two examples of how biotechnology is used in food.
4. How does biotechnology help in medicine?



5. What can bacteria do to help the environment?
6. Why is biotechnology important for farmers?
7. What is an example of biotechnology from 5,000 years ago?



DOING EXERCISES:

1. Fill-in-the-Blanks (10 Sentences)

Complete the sentences with the correct word from the Word bank:

**oil, living, bacteria, plants,
vaccines, technology, diseases,
yogurt, organisms, pesticides**

1. Biotechnology is the science of using _____ things to solve problems.
2. Helpful _____ are used to make bread and cheese.
3. Farmers grow stronger _____ using biotechnology.
4. Vaccines protect people from _____.
5. Biotechnology helps clean up _____ spills in the ocean.
6. _____ is an example of biotechnology in food.
7. In medicine, biotechnology helps create _____ like insulin.
8. Tiny organisms called _____ are used in many biotech processes.
9. Using _____, farmers need fewer pesticides for their crops.
10. Biotechnology is a mix of biology and _____.

2. Match the Columns.

Match the use of biotechnology with its correct example:

A	B
1. Food	a) Cleaning oil spills
2. Medicine	b) Making vaccines
3. Environment	c) Making yogurt
4. Farming	d) Creating stronger crops
5. Technology	e) Tools used to solve problems
6. Bacteria	f) Tiny organisms used in biotech
7. Vaccines	g) Protecting people from diseases
8. Bread-making	h) An old example of biotechnology
9. Gene editing	i) Changing DNA to solve problems
10. Biology	j) Study of living things

3. True or False exercise.

Write *True* or *False* next to each sentence:

1. Biotechnology uses living things like plants and animals. True or False
2. Vaccines harm people and make them sick. True or False
3. Farmers use biotechnology to grow healthier crops. True or False
4. Bacteria can only cause diseases, not help make food. True or False
5. Biotechnology started more than 5,000 years ago. True or False
6. Bread-making is an example of biotechnology. True or False
7. Biotechnology helps make the environment dirtier. True or False

8. Vaccines are made with the help of technology. True or False

4. Sentence Completion.

Complete the sentences:

clean up.	vaccines.	yeast	stronger and healthier	environment.
bacteria	Biology and technology.	protect	100	better and easier

1. Biotechnology is a mix of _____ and _____.
 2. Vaccines are used to _____ people from diseases.
 3. Farmers use biotechnology to grow _____ and _____ plants.
 4. In the environment, bacteria can _____.
 5. Biotechnology started over _____ years ago.
 6. Tiny organisms like _____ are important in biotechnology.
 7. Bread-making uses _____ to make the dough rise.
 8. In medicine, biotechnology helps create _____.
 9. Cleaning up oil spills is a way biotechnology helps the _____.
 10. Biotechnology makes life _____ and _____ for people.
-

5. Multiple Choice Questions.

Choose the correct answer:

1. What does biotechnology use to solve problems?

- a) Computers
- b) Living things
- c) Machines

2. What tiny organism is used to make bread?

- a) Bacteria
- b) Yeast
- c) Viruses



3. How does biotechnology help farmers?

- a) It creates stronger plants.
- b) It makes food spoil faster.
- c) It stops plants from growing.

4. What is a vaccine used for?

- a) To protect people from diseases
- b) To help plants grow
- c) To clean the environment

5. What is an example of biotechnology in food?

- a) Making bread
- b) Driving cars
- c) Cleaning water

6. What does biotechnology mix with biology?

- a) Physics
- b) Technology
- c) Chemistry

7. How does biotechnology help the environment?

- a) It creates pollution.

- b) It cleans oil spills.
- c) It makes new clothes.

8. Which of these is NOT part of biotechnology?

- a) Bacteria
- b) Yeast
- c) Electricity



6. Scrambled Words. Unscramble the words

below:

1. otoeghncybilto - (Hint: A science that uses living things)
2. rceaiatb - (Hint: Tiny organisms used in yogurt-making)
3. vacnecsi - (Hint: Medicine to prevent diseases)
4. oilgyob - (Hint: The study of life)
5. tnienergymoen - (Hint: The natural world around us)
6. seadticspei - (Hint: Chemicals that kill bugs harming plants)
7. lfues - (Hint: Energy sources like gas or oil)
8. enysit - (Hint: Organism used in bread-making)

7. Odd One Out. Find the word that doesn't belong:

1. Bacteria, Virus, Bread, Yeast
2. Plants, Crops, Trees, Oil
3. Vaccine, Insulin, Bread, Antibiotic
4. Farming, Medicine, Environment, Television
5. Technology, Biology, History, Biotechnology

6. Cheese, Yogurt, Water, Wine
 7. Genes, DNA, Enzymes, Cars
 8. Pesticides, Fertilizers, Vaccines, Crops
-

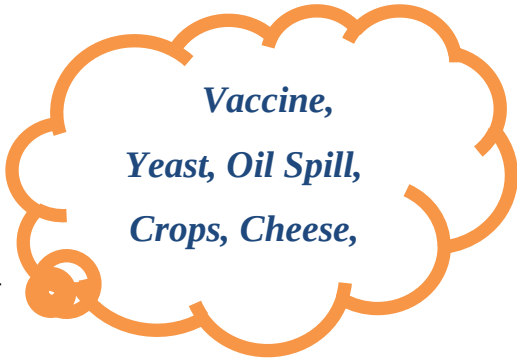
8. Categorization (10 Words)

Put the words into the correct category:

Words:

Categories:

1. **Medicine:** _____, _____
2. **Food:** _____, _____, _____
3. **Farming:** _____, _____
4. **Environment:** _____, _____



*Vaccine,
Yeast, Oil Spill,
Crops, Cheese,*

9. Sentence Ordering

Put the sentences in the correct order to explain biotechnology:

1. Farmers use biotechnology to grow stronger crops.
2. It can make food like yogurt and bread.
3. Biotechnology helps clean up the environment.
4. Biotechnology is a mix of biology and technology.
5. Doctors use biotechnology to make medicines like vaccines.



LISTENING TIME. What is Biotechnology?

Listening Tasks

1. Fill-in-the-Blanks

Listen to the text and complete the sentences:

1. Biotechnology is the science of using _____ things to solve problems.
 2. _____ is used to make bread rise.
 3. Farmers use biotechnology to grow stronger _____.
 4. Vaccines protect us from _____.
 5. Biotechnology helps clean _____ spills.
-

2. True or False

Listen to the text and write True or False:

1. Biotechnology only helps farmers.
 2. Yeast is used in bread-making.
 3. Vaccines are created by biotechnology to prevent diseases.
 4. Biotechnology makes the environment worse.
 5. Biofuels are cleaner than regular fuels.
-

3. Multiple Choices

Listen and choose the correct answer:

1. What is biotechnology?
 - a) A science about cars
 - b) A science that uses living things to solve problems
 - c) A science about planets
2. What tiny organism helps make yogurt?
 - a) Bacteria

b) Trees

c) Fish

3. How does biotechnology help the environment?

a) It makes more oil spills.

b) It cleans up oil spills.

c) It creates more waste.

4. What is an example of biotechnology in food?

a) Driving a car

b) Making bread

c) Watching TV

5. What does biotechnology mix?

a) Physics and history

b) Biology and technology

c) Chemistry and art

4. Short Answer

Answer the questions after listening:

1. What two things does biotechnology mix?

2. How does biotechnology help farmers?

3. Name one way biotechnology helps the environment.

4. What tiny living thing is used in bread-making?

5. Why is biotechnology important for medicine?



SPEAKING TIME:

Task 1: Role Play (Two Participants)

Scenario: One person is a scientist explaining biotechnology to a friend. The other person is curious and asks questions.

Roles:

- **Scientist:** Explain what biotechnology is, how it works, and give examples of its uses.
- **Friend:** Ask questions to understand more about biotechnology (e.g., "What is it?" "How does it help farmers?" "Can it help the planet?").

Example Dialogue:

Friend: What is biotechnology?

Scientist: It's a science that uses living things, like bacteria, to solve problems and make life better. For example, we use yeast to make bread rise.

Friend: Oh, I see. What else does it do?

Scientist: It helps farmers grow better crops and makes vaccines to protect us from diseases.

Task 2: Presentation Practice

Prepare a short presentation (2-3 minutes) about biotechnology.

Include:

1. A definition of biotechnology.

2. Examples of its use in food, farming, and medicine.
3. One way it helps the environment.
4. Your thoughts on why biotechnology is important.

Practice your presentation with a partner or teacher.

Task 5: Describe the Picture



Show a picture related to biotechnology (e.g., a farmer with genetically modified crops, bacteria in a lab, or oil being cleaned up). Ask the student to describe what they see and how it relates to biotechnology.

Questions to guide the description:

1. What is happening in the picture?
2. How does this show the use of biotechnology?
3. Why is this important for people or the environment?

UNIT 2. HISTORY OF BIOTECHNOLOGY

UNIT FOCUS:

- **New Vocabulary**
- **Reading: History of biotechnology**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: History of biotechnology**
- **Speaking time.**

NEW VOCABULARY:

biotechnology

organism

yeast

fermentation

selective breeding

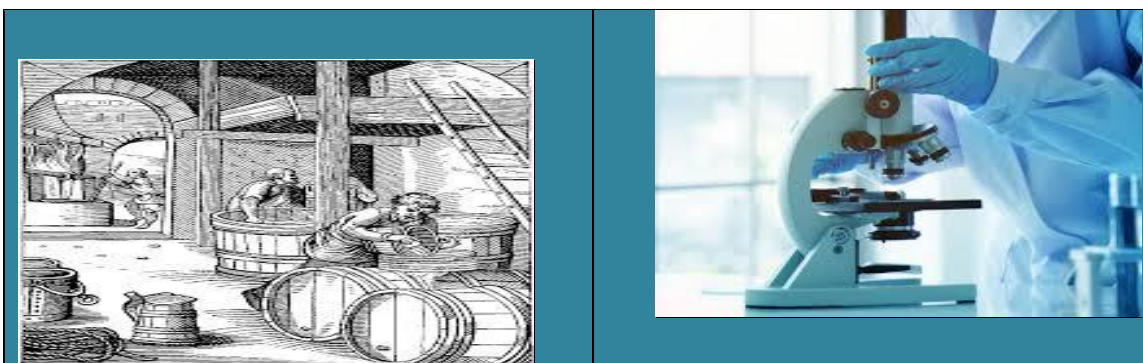
vaccine

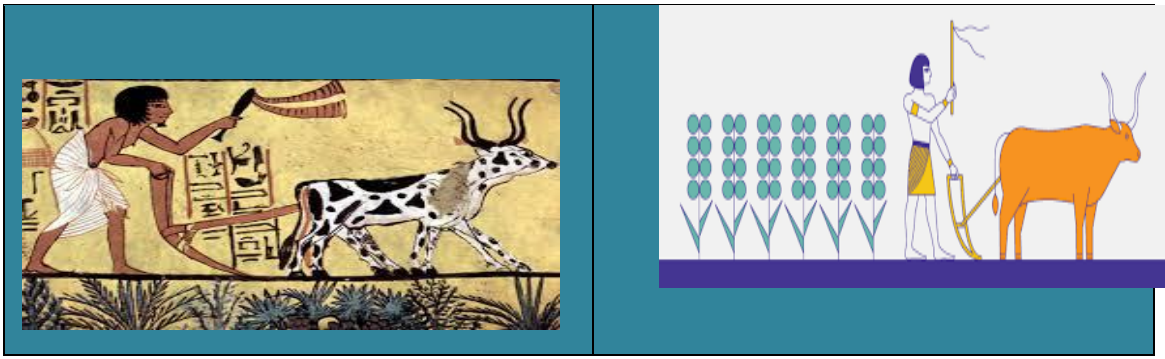
DNA



HISTORY OF BIOTECHNOLOGY

Biotechnology is the use of living things, like plants, animals, and tiny organisms, to make useful products. People have been using biotechnology for thousands of years, even if they didn't call it that!





1. Early Beginnings

Long ago, people used simple biotechnology. For example, they made bread using yeast. Yeast is a tiny organism that helps bread rise. They also made cheese and yogurt from milk and brewed drinks like beer using fermentation.

2. Farming

About 10,000 years ago, people started farming. They chose the best plants and animals to grow and breed. This is called "selective breeding." It helped make stronger crops and better animals for food.

3. Medicine

In the 1800s, scientists began to understand germs and how they cause diseases. This helped them make vaccines to keep people healthy. A famous example is the smallpox vaccine, which saved millions of lives.

4. Modern Biotechnology

In the 1900s, technology improved a lot. Scientists discovered DNA, the tiny code inside all living things. This helped them create new medicines, like insulin for people with diabetes, and stronger crops that can survive bad weather or pests.

5. Today

Now, biotechnology is used in many ways. It helps make better food,

clean energy, and new medicines. It even helps protect the environment by cleaning up pollution.

Biotechnology has come a long way from baking bread to creating amazing scientific discoveries! It shows how science and nature work together to make life better for everyone.

Comprehension Questions:

1. What is biotechnology?
2. How did people use biotechnology to make bread long ago?
3. What is fermentation? Can you name one product made with it?
4. Why did farmers practice selective breeding?
5. What does a vaccine do?
6. What discovery helped scientists create modern medicines like insulin?
7. How is biotechnology used today to help the environment?
8. Can you think of something you eat that might be made with biotechnology?



DOING EXERCISES:

1. Fill in the Blanks

Complete the sentences with the correct word:

**biotechnology (2t) , yeast, fermentation
(2t), selective breeding (2t), vaccine (2t), DNA**

1. _____ is the use of living things to make useful products.
2. Long ago, people used _____ to make bread rise.
3. Tiny organisms change food through a process called _____.

4. Farmers used _____ to grow better crops and animals.
 5. A _____ helps protect people from diseases.
 6. In the 1900s, scientists discovered _____, the code inside living things.
 7. Making yogurt from milk uses the process of _____.
 8. _____ helps create medicines and better food today.
 9. The smallpox _____ saved many lives.
 10. Farmers choose the strongest plants for _____.
-

2. True or False. Read the sentences and write “True” or “False.”

1. Biotechnology started only 100 years ago. “True” or “False.”
 2. Yeast is used to make bread rise. “True” or “False.”
 3. Farmers used selective breeding to make weaker animals. “True” or “False.”
 4. DNA is the code inside all living things. “True” or “False.”
 5. Fermentation is used to make cheese and yogurt. “True” or “False.”
 6. Vaccines make people sick. “True” or “False.”
 7. Biotechnology helps clean pollution today. “True” or “False.”
 8. Selective breeding started about 10,000 years ago. “True” or “False.”
-

3. Match the Columns

Match the words in Column A to their correct meaning in Column B.

Column A	Column B
1. Biotechnology	A. A process to make yogurt and cheese
2. Yeast	B. The tiny code in living things
3. DNA	C. A medicine to stop diseases
4. Vaccine	D. Choosing the best plants or animals
5. Fermentation	E. Helps bread rise
6. Selective Breeding	F. Using living things for useful products

4. Arrange the Sentences.

Put the sentences in the correct order to tell the history of biotechnology.

1. People started using fermentation to make drinks like beer.
2. Scientists discovered DNA in the 1900s.
3. Farmers chose strong crops and animals to grow.
4. Biotechnology began thousands of years ago.
5. Vaccines were created to stop diseases like smallpox.
6. People used yeast to bake bread.
7. Modern biotechnology helps clean the environment.
8. Today, biotechnology is used to make medicines and better food.
9. People learned about germs in the 1800s.
10. Biotechnology continues to make life better.

5. Multiple Choices. Choose the correct answer for each question.

1. What is biotechnology?
 - a) The study of animals
 - b) Using living things to make useful products
 - c) The study of ancient plants
2. What organism is used to make bread rise?
 - a) Yeast
 - b) Bacteria
 - c) Fungi
3. What process is used to make yogurt and cheese?
 - a) Freezing
 - b) Fermentation
 - c) Boiling
4. What helps protect people from diseases?
 - a) Vitamins
 - b) Vaccines
 - c) Fermentation
5. What do farmers use to grow stronger crops and animals?
 - a) Selective breeding
 - b) DNA
 - c) Vaccines
6. What is DNA?
 - a) A type of medicine
 - b) A tiny code inside living things
 - c) A tool to make food
7. When did people first start farming?
 - a) 5 years ago

- b) 10,000 years ago
- c) 1,000 years ago

8. What disease was stopped using a vaccine?

- a) Smallpox
- b) Flu
- c) Cold

9. What can biotechnology do today?

- a) Build houses
- b) Create better food and medicines
- c) Write books

10. Which product is NOT made using biotechnology?

- a) Bread
- b) Cars
- c) Yogurt

6. Rearrange the Words.

Rearrange the words to make correct sentences.

1. is / biotechnology / living things / using / to / useful products / make.
2. used / to / rise / bread / yeast / make / people.
3. process / Fermentation / helps / make / yogurt / cheese / and.
4. discovered / DNA / Scientists / in / the / 1900s.
5. Vaccines / protect / help / from / people / diseases.

7. Sorting Game

Sort the following words into the correct categories:

Words: *Bread, Smallpox, Fermentation, DNA, Vaccine, Selective Breeding, Cheese, Farming*

Food Products	Scientific Terms	Health	Farming



LISTENING TIME. The History of Biotechnology

Instructions for Students:

1. Listen carefully to the passage.
2. Answer the questions below.
3. You can listen again if needed.

Listening Task 1: True or False

Listen attentively and decide if the sentences are True or False:

1. Yeast is a large organism used to make bread rise. True or False
2. Fermentation is used to create yogurt and cheese. True or False
3. People started farming 5,000 years ago. True or False
4. Selective breeding involves choosing the best plants and animals to grow. True or False
5. Scientists discovered germs and diseases in the 1900s. True or False
6. The smallpox vaccine saved many lives. True or False
7. DNA is the tiny code inside living things. True or False
8. Biotechnology is only used to make food. True or False

Listening Task 2: Fill in the Gaps.

Use the words below to complete the sentences: (*yeast, DNA, fermentation, selective breeding, vaccine, environment, smallpox, farming, medicines, 10,000*)

1. _____ is used to make bread rise.
2. People started _____ about _____ years ago.
3. _____ is a process used to make yogurt and cheese.
4. Farmers used _____ _____ to grow better crops and animals.
5. The _____ for _____ saved many lives.
6. Scientists discovered _____ in the 1900s, which helped create new _____.
7. Biotechnology helps clean the _____ and improve our food.



SPEAKING TIME.

Activity 1. Describe and compare.

Instructions:

- Compare the use of biotechnology in ancient times and today.
- Use these sentence starters:
 - “In ancient times, people used biotechnology to...”
 - “Today, biotechnology is used to...”
 - “The biggest difference between ancient and modern biotechnology is...”

Activity 2. Present an Idea

Instructions:

- Imagine you are a scientist working on a new biotechnology project.

- Prepare a short speech (2-3 minutes) to explain your idea.
- Answer these questions in your speech:
 1. What problem does your project solve?
 2. How will it help people or the environment?
 3. What tools or methods will you use?

Activity 3. Picture Prompt

Instructions: Look at pictures of ancient bread-making, farming tools, and modern labs.

- Choose one picture and describe how it shows the use of biotechnology.
- Use these phrases:
 - “This picture shows...”
 - “In this process, people use...”
 - “This is an example of biotechnology because...”



1. Humans are born without bacteria, and they first acquire them while moving through the birth canal. Babies born through a C-section have a different micro biota from those born through vaginal birth. Such babies are at high risk of conditions such as obesity and allergies.

2. All human DNA is 99.9% similar. It is the 0.1% that accounts for the difference in people (individual uniqueness).



3. Biotechnology has been in use since 1919, and its first application was in a DNA recombination experiment with bacteria. Today, biotechnology has been applied in the manufacture of medicines, medical devices, diagnostic tools, biomaterials, and food production.



4. The human DNA is 98% similar to chimpanzees and 92% with mice. This would explain why mice and apes are used in drug studies.



5. Each cell in your body contains about 2 meters of DNA. If the whole DNA in one person was laid end to end in a straight line, it would measure up to 200 billion kilometers that is more than a thousand times the distance from the earth to the sun.



UNIT 3. BRANCHES OF BIOTECHNOLOGY

UNIT FOCUS:

- New Vocabulary
- Reading: Branches of biotechnology
- Reading strategy: Question-Answer Strategy

- **Listening task: Branches of biotechnology**
- **Speaking time.**

NEW VOCABULARY:

branches	pollution	
medical	bacteria	biodegradable
vaccine	biofuel	marine
agricultural		protect



Branches of Biotechnology

Biotechnology is the use of living things to make products that help people. There are many different branches, or types, of biotechnology. Each one focuses on something special.

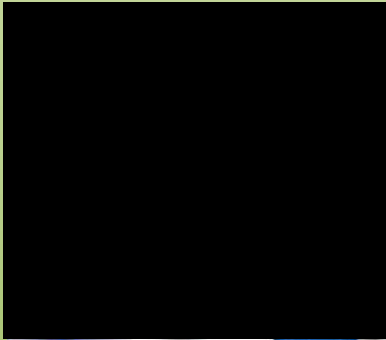
1. Medical Biotechnology

Medical biotechnology helps doctors make medicines and vaccines to keep people healthy. For example, it helps create insulin for people with diabetes and vaccines to protect us from diseases.

2. Agricultural Biotechnology

This branch helps farmers grow more food and stronger plants. Scientists can make crops that are bigger, grow faster, and can survive bad weather.

3. Environmental Biotechnology



Environmental biotechnology helps clean up pollution. Scientists use bacteria to clean dirty water or soil. This helps protect our planet.

4. Industrial Biotechnology

This branch uses living things to make products for factories. For example, it helps make biofuels, which are clean energy from plants, and materials like biodegradable plastics.

5. Marine Biotechnology

Marine biotechnology studies life in the ocean. Scientists use it to make medicines and new materials from plants and animals that live in the sea.

Each branch of biotechnology helps us in different ways. Together, they make our lives better by improving health, protecting the environment, and creating useful products.

Answer the following questions:

1. What are the main branches of biotechnology?
2. What does medical biotechnology focus on?
3. How does agricultural biotechnology help farmers?
4. What is the role of environmental biotechnology?

5. How is industrial biotechnology used in factories?
6. What does marine biotechnology study?
7. How does biotechnology help people and the environment?



DOING EXERCISES:

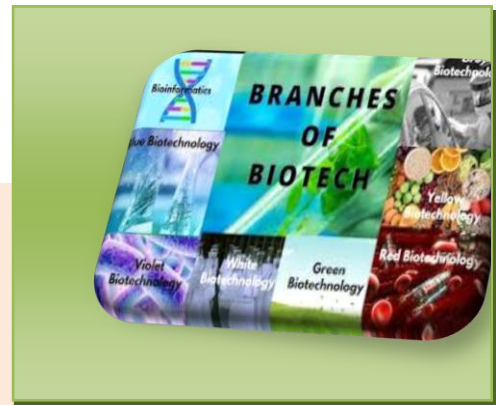
1. Match the Branch to Its Job

1. Medical biotechnology helps	a) biofuels and biodegradable materials.
2. Agricultural biotechnology makes	b) energy from plants.
3. Environmental biotechnology cleans	c) study the ocean.
4. Industrial biotechnology creates products like	d) people stay healthy by creating medicines and vaccines.
5. Marine biotechnology studies	e) water and soil
6. Medical biotechnology makes	f) grow crops and animals.
7. Farmers use agricultural biotechnology to	g) crops and animals grow stronger.
8. Environmental biotechnology helps	h) ocean life.
9. Scientists working with marine biotechnology	i) vaccines to protect people.
10. Industrial biotechnology produces	j) fight pollution in the soil.

2. Multiple Choices. Choose the correct answer.

1. Which branch makes vaccines?
 - a) Agricultural biotechnology
 - b) Medical biotechnology
 - c) Marine biotechnology
2. What does agricultural biotechnology improve?
 - a) Water and soil
 - b) Crops and animals
 - c) Ocean life

3. Which branch cleans pollution?
 - a) Industrial biotechnology
 - b) Environmental biotechnology
 - c) Medical biotechnology



4. What does marine biotechnology study?
 - a) Farming tools
 - b) Life in the ocean
 - c) Pollution on land
5. What is an example of a product from industrial biotechnology?
 - a) Biofuels
 - b) Vaccines
 - c) Soil cleaning
6. Which branch helps protect the environment?
 - a) Medical biotechnology
 - b) Agricultural biotechnology
 - c) Environmental biotechnology



7. Farmers use this biotechnology to grow crops:

- a) Marine biotechnology
- b) Agricultural biotechnology
- c) Industrial biotechnology

8. What does industrial biotechnology create?

- a) Energy and biodegradable materials
- b) Vaccines and medicines
- c) Stronger plants

3. Sentence Completion.

Complete the sentences using words and expressions from the table below.

1. Medical biotechnology creates _____.
2. Biofuels come from _____ biotechnology.
3. _____ biotechnology helps farmers grow stronger crops.
4. Environmental biotechnology cleans up _____.
5. Marine biotechnology studies _____ and _____ in the ocean.
6. Vaccines are made using _____ biotechnology.
7. Farmers improve their crops using _____.
8. Industrial biotechnology makes _____ products from plants.
9. _____ biotechnology helps fight pollution in the water.
10. Scientists studying the ocean work in _____ biotechnology.

agricultural	medical biotechnology	medicines and vaccines.	plants and animals in the ocean.	useful products from plants
agricultural biotechnology	industrial biotechnology	water and soil.	environmental	marine biotechnology

4. True or False

Write "True" or "False" for each sentence.

1. Medical biotechnology makes vaccines. "True" or "False"
2. Agricultural biotechnology studies ocean animals. "True" or "False"
3. Environmental biotechnology helps clean the air and water. "True" or "False"
4. Industrial biotechnology creates stronger crops for farmers. "True" or "False"
5. Marine biotechnology studies plants and animals in the ocean. "True" or "False"
6. Biofuels come from industrial biotechnology. "True" or "False"
7. Farmers grow healthier plants with agricultural biotechnology. "True" or "False"
8. Vaccines are made by marine biotechnology. "True" or "False"

5. Here are 10 scrambled words related to the topic

1. L N I T O M D E E N V I R _____

2. DARUALIRGICTO _____
3. ENIMRA _____
4. CLAMIDE _____
5. LUFOSIBOE _____
6. NIOLUTOLIP _____
7. VACINEC _____
8. CINECSIT _____
9. TLUDISNIAR _____
10. OSRIAGNIM _____



KEY WORDS: organisms, environmental, agricultural, marine, medical, biofuels, pollution, vaccine, scientists, industrial

6. Who Am I?

Read the description and guess the branch of biotechnology.

1. I create medicines and vaccines to protect people. Who am I?
2. I help farmers grow healthier crops and animals. Who am I?
3. I study life in the ocean, like fish and coral reefs. Who am I?
4. I clean water, soil, and air to fight pollution. Who am I?
5. I make biofuels and useful products from plants. Who am I?
6. I am used to grow rice that is stronger against pests. Who am I?
7. I study the tiny organisms in the ocean. Who am I?
8. I help stop diseases like smallpox with vaccines. Who am I?
9. I create energy from renewable sources like sugarcane. Who am I?
10. I improve the soil for better farming. Who am I?

7. Sort and Categorize.

Sort the following tasks into the correct branches.

Medi cal	Agricultu ral	Environme ntal	Industr ial	Marine Biotechnol ogy

Tasks to Sort:

1. Cleaning oil spills.
2. Making biofuels from plants.
3. Studying fish in the ocean.
4. Creating medicines for diseases.
5. Growing pest-resistant crops.
6. Protecting coral reefs.
7. Producing biodegradable plastics.
8. Developing vaccines.
9. Cleaning polluted rivers.
10. Improving soil for farming.

8. Find the Odd One Out.

In each row, identify the item that does not belong and explain why.

1. Vaccine, Medicine, Biofuel, Antibiotic
2. Corn, Rice, Soil, Coral
3. Ocean, Fish, Biofuel, Algae

4. Plastic, Energy, Medicine, Pollution
5. Pollution, Soil, Water, Crop
6. Coral, Fish, Vaccine, Seaweed
7. Rice, Medicine, Vaccine, Antibiotic
8. Oil Spill, Biodegradable Plastic, Coral, Soil Cleanup
9. Sugarcane, Biofuel, River, Antibiotic
10. Crops, Animals, Vaccines, Soil



LISTENING TIME.

Listening Task 1: Branches of Biotechnology

Instructions for Students:

Listening task 1. True or False

Decide if the following statements are true or false.

1. Medical biotechnology focuses on making medicines and vaccines.

True or False

2. Agricultural biotechnology harms animals and crops. **True or**

False

3. Environmental biotechnology works to reduce pollution. **True or**

False

4. Industrial biotechnology creates biofuels and plastics. **True or**

False

5. Marine biotechnology only studies coral reefs. **True or False**

6. Agricultural biotechnology helps plants resist pests. **True or False**

7. Marine biotechnology helps protect sea life. **True or False**

8. Industrial biotechnology replaces harmful chemicals with natural ones. **True or False**

9. Environmental biotechnology does not work on recycling. **True or False**
10. Medical biotechnology creates energy from plants. **True or False**
-

Listening Task 2: Fill in the Gaps

Complete the sentences using words from the audio script.

1. _____ biotechnology creates treatments for diseases like cancer.
 2. Farmers benefit from _____ biotechnology to grow crops in different climates.
 3. _____ biotechnology helps clean polluted water, soil, and air.
 4. Products like biodegradable plastics are made by _____ biotechnology.
 5. Scientists use _____ biotechnology to study coral reefs and fish.
 6. _____ biotechnology helps make plants resist pests.
 7. Energy from plants is created by _____ biotechnology.
 8. _____ biotechnology finds new medicines from the ocean.
 9. Cleaning pollution is the main job of _____ biotechnology.
 10. Making vaccines is part of _____ biotechnology.
-



SPEAKING TIME.

Speaking Task 1: Discuss and Explain

Choose one branch of biotechnology and explain:

1. What it does.

2. Why it is important.
3. One example of how it helps people or the planet.

Example Prompt:

- "I think medical biotechnology is very important because it helps make vaccines and medicines. For example, vaccines protect us from diseases like flu and smallpox. This branch saves many lives."
-

Speaking Task 2: Imagine and Create

Imagine you are a scientist working in one of the branches of biotechnology. Answer these questions:

1. Which branch are you working in?
2. What is your main goal or project?
3. How will your work help people or the environment?

Example Prompt:

- "I am working in agricultural biotechnology. My main goal is to create a new type of rice that can grow with less water. This will help farmers in dry areas grow food and feed more people."
-

Speaking Task 3: Agree or Disagree

Read the statements below and say if you agree or disagree. Explain why.

1. "Medical biotechnology is the most important branch of biotechnology."
2. "Environmental biotechnology is not as useful as other branches."
3. "Biotechnology is the key to solving global problems."

Example Response:

- "I agree that medical biotechnology is very important because it saves lives. However, I think other branches like environmental biotechnology are also important because they help protect the planet."

UNIT 4. BIOTECHNOLOGY IN EVERYDAY LIFE.

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Biotechnology in Everyday Life**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Biotechnology in Everyday Life**
- **Speaking time.**

NEW VOCABULARY:

biotechnology

pollution

medicine

yogurt

recycle

environment

vaccine

biofuel

pests

yeast



BIOTECHNOLOGY IN EVERYDAY LIFE.





Biotechnology is all around us, even if we don't always notice it! It helps make our lives easier, healthier, and better.

1. **Food:** Did you know biotechnology helps make yogurt, cheese, and bread? It uses tiny living things, like bacteria and yeast, to create tasty foods.
2. **Health:** Biotechnology helps make medicines and vaccines. These protect us from getting sick and help us get better when we are ill.
3. **Farming:** Farmers use biotechnology to grow plants that can survive bad weather or fight off pests. This helps grow more food for everyone.
4. **Environment:** Biotechnology cleans up pollution in water, soil, and air. It also helps us recycle and create less waste.
5. **Energy:** Scientists use biotechnology to make biofuels. These are special kinds of fuel made from plants, which are better for the Earth than regular fuels.

Biotechnology is important because it helps people stay healthy, grow more food, and protect our planet!

Questions by the text:

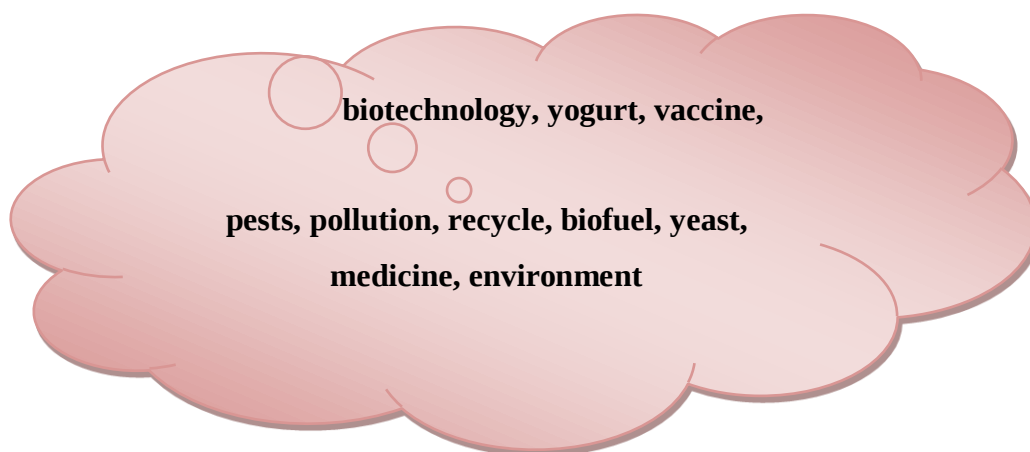
1. What does biotechnology help make in food?

2. How does biotechnology help keep people healthy?
3. What do farmers use biotechnology for?
4. How does biotechnology clean the environment?
5. What is biofuel made from?
6. Does biotechnology make yogurt and cheese?
7. Can biotechnology help protect the planet?
8. Do farmers use biotechnology to grow plants?
9. Is biofuel made from animals?
10. Does biotechnology help with recycling?



DOING EXERCISES:

1. Fill in the blanks. Complete the sentences using the words:



1. _____ helps make our lives better by using living things.
2. We eat _____ made with milk and bacteria.
3. A _____ protects people from diseases.
4. Farmers use biotechnology to keep _____ away from plants.
5. Cleaning _____ from water and air helps the planet.
6. It is important to _____ paper, plastic, and glass.

7. _____ is fuel made from plants.
8. Bread rises because of _____, a tiny living thing.
9. When we feel sick, we take _____ to feel better.
10. Protecting the _____ means taking care of nature, air, and water.

2. Match the pairs. Match the word with its description.

WORDS	ITS DESCRIPTION
Biotechnology	A. Protects people from diseases
Yogurt	B. Uses living things to help people
Vaccine	C. Made from plants to replace gasoline
Pests	D. Bugs that harm crops
Pollution	E. Dirty water, air, or land
Recycle	F. Turning old things into new items
Biofuel	G. Fuel made from plants
Yeast	H. Helps bread rise
Medicine	I. Helps us feel better when sick
Environment	J. The world around us, like nature and air

3. TRUE OR FALSE.

Read the sentences and decide if they are True or False.

1. Biotechnology helps make tasty food like yogurt and cheese. True
or False
2. A vaccine makes bread rise. True
or False

3. Farmers use biotechnology to grow stronger plants. **True**
or False
4. Biofuel is made from plastic. **True**
or False
5. Cleaning pollution helps the environment. **True**
or False
6. Recycle means throwing away all your trash. **True**
or False
7. Yeast is a tiny living thing used in making bread. **True**
or False
8. Medicine is made to help people stay healthy. **True**
or False
9. Biotechnology is not important for farming. **True**
or False
10. Protecting the environment helps everyone.
True or False
-

4. SORTING GAME

Sort the following into the correct categories:

Words: yogurt, vaccine, pests, pollution, biofuel, recycle, yeast, medicine, plants

- **Food:** _____
 - **Health:** _____
 - **Farming:** _____
 - **Environment:** _____
-

5. Choose the Correct Word

Choose the correct word to complete the sentence.

1. Biotechnology helps make (plants / video games) stronger.
 2. People eat (medicine / yoqurt) for a tasty snack.
 3. Farmers use biotechnology to keep (pests / pollution) away from crops.
 4. A (vaccine / biofuel) protects people from diseases.
 5. Bread rises because of (yeast / recycle).
 6. (Biofuel / Environment) is a special fuel made from plants.
 7. Cleaning pollution helps protect the (environment / yoqurt).
 8. Biotechnology helps people (recycle / sleep) materials.
 9. (Medicine / Plants) makes people feel better when they are sick.
 10. Farmers use biotechnology to grow (plastic / food).
-

6. Multiple Choice Questions

Choose the correct answer.

1. What helps bread rise?
 - a) Vaccine
 - b) Yeast
 - c) Biofuel
2. What protects us from diseases?
 - a) Pollution
 - b) Medicine
 - c) Vaccine
3. What does biotechnology use to make food?
 - a) Living things

- b) Rocks
- c) Metal

4. What do farmers grow with biotechnology?

- a) Stronger crops
- b) Buildings
- c) Cars

5. What does biofuel come from?

- a) Plants
- b) Plastic
- c) Animals

6. What can biotechnology clean?

- a) Computers
- b) Pollution
- c) Chairs

7. What do we recycle?

- a) Paper and plastic
- b) Water and air
- c) Trees and rocks

8. Where does marine biotechnology work?

- a) Forests
- b) Oceans
- c) Deserts

7. Unscramble the Sentences

Put the words in the correct order to make a sentence.

1. makes / bread / rise / yeast.

2. farmers / biotechnology / use / crops / stronger / grow / to.
3. creates / vaccines / biotechnology / help / to / people.
4. pollution / helps / clean / biotechnology / the.
5. yogurt / made / biotechnology / using / is.
6. medicine / people / take / to / feel / better.
7. biofuel / is / from / made / plants.
8. helps / recycle / waste / biotechnology.
9. biotechnology / oceans / marine / works / in.
10. living / uses / biotechnology / things.

8. Find the Missing Word

Fill in the blanks with words from the list:

biofuel	medicine	vaccine	crops	yogurt
yeast	biotechnology	environment	pollution	recycle

1. _____ helps make useful products with living things.
2. Farmers grow stronger _____ using biotechnology.
3. Bread rises because of _____.
4. A _____ protects people from diseases.
5. _____ cleans the air, water, and land.
6. _____ is a creamy food made from milk.
7. People use _____ to feel better when they are sick.
8. We must _____ paper, plastic, and other materials.
9. _____ is made from plants and used as fuel.
10. Cleaning up _____ helps protect the Earth.



LISTENING TIME.

Listening task: Biotechnology in everyday life.

Listening Exercise 1: True or False.

After listening to the audio, decide whether the following statements are True or False.

1. Biotechnology only helps with food production. **T/F**
 2. Yeast helps bread rise. **T/F**
 3. Biotechnology is not used to create vaccines. **T/F**
 4. Biotechnology can help protect the environment by cleaning pollution. **T/F**
 5. Biofuels are made from plants and are better for the Earth. **T/F**
-

Listening Exercise 2: Fill in the Blanks

Listen to the script and fill in the missing words.

1. Yeast helps bread _____.
 2. _____ are used to make yogurt.
 3. Vaccines help protect us from _____.
 4. Biotechnology helps farmers grow _____ crops.
 5. Biofuels are made from _____.
-

Listening Exercise 3: Match the Term to Its Use

Match each term with the correct description from the audio.

1. Yeast
2. Vaccines
3. Biofuels

- 4. Bacteria
 - 5. Crops
 - A. Help protect from diseases
 - B. Helps bread rise
 - C. Made from plants to clean the environment
 - D. Used to make yogurt
 - E. Help farmers grow stronger crops
-

Listening Exercise 5: Sequence the Sentences

Listen carefully and order the sentences from the script in the correct sequence:

1. Biotechnology helps protect the environment.
2. Yeast and bacteria are used in food production.
3. Biotechnology helps create vaccines.
4. Farmers use biotechnology to grow stronger crops.
5. Biofuels are made from plants.



Speaking Time. Presentation Task: "The Impact of Biotechnology in Our Lives"

Objective: Students will prepare and deliver a short presentation on how biotechnology impacts different areas of our daily lives, such as food, medicine, farming, and the environment. This task aims to improve speaking, research, and presentation skills.

Task Instructions:

1. **Introduction** (Teacher explains the task):

"In this task, you will create a presentation to explain how biotechnology is used in different areas of our lives. You will focus on how biotechnology affects food, medicine, farming, and the environment. Your goal is to make the class understand why biotechnology is important and how it helps make our world better."

2. **Presentation Structure:**

Your presentation should include the following points:

- **Introduction:** Briefly explain what biotechnology is.
- **Biotechnology in Food:** Describe how biotechnology is used in food production (e.g., genetically modified crops, fermentation for yogurt and cheese, etc.).
- **Biotechnology in Medicine:** Talk about how biotechnology helps make vaccines and medicines (e.g., insulin production, gene therapy).
- **Biotechnology in Farming:** Explain how biotechnology helps farmers grow stronger crops and improve livestock (e.g., disease-resistant plants, genetically improved animals).
- **Biotechnology and the Environment:** Describe how biotechnology helps clean the environment (e.g., pollution cleanup, biofuels, waste management).
- **Conclusion:** Sum up the importance of biotechnology and how it makes life better.

3. **Presentation Tips:**

- Use **visual aids**: PowerPoint slides, images, or posters to help explain your points.
- Speak clearly and confidently.
- Keep it **simple**: Focus on the main ideas to make your message easy to understand.
- **Engage the audience**: Ask questions or encourage discussion during your presentation.

4. **Time Limit:**

Your presentation should last about **5-7 minutes**. Make sure to organize your points clearly, and practice speaking within the time limit.

UNIT 5. VACCINES AND THEIR DEVELOPMENT

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Vaccines and their development**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Vaccines and their development**
- **Speaking time.**

NEW VOCABULARY:

vaccine	virus	safe
germ	bacteria	spread
immune system	test	shot



VACCINES AND THEIR DEVELOPMENT.

Vaccines are very important for our health. They protect us from diseases like measles, polio, and the flu. A vaccine teaches our body how to fight harmful germs, like viruses and bacteria. When we get a vaccine, it helps our immune system learn how to stop the germs before they make us sick.



How Are Vaccines Made?

Making a vaccine takes time and care. Here are the steps:

1. **Study the Germ:** Scientists first study the germ that causes the disease. They learn how it works and how it spreads.
2. **Create the Vaccine:** Scientists make the germ weak or take just a small, harmless part of it. This way, the vaccine can teach the body to fight the germ without making us sick.

3. **Testing:** Before giving a vaccine to people, scientists test it many times. They make sure it is safe and that it works well. This can take several years.
4. **Giving the Vaccine:** Once the vaccine is ready, doctors give it to people. Most vaccines are given as a shot, but some can be taken as drops or a spray.

Why Are Vaccines Important?

Vaccines protect not just one person but many people. When lots of people get vaccinated, it is harder for the disease to spread. This helps keep everyone safe, especially babies and older people who might get sick more easily.

Thanks to vaccines, some very dangerous diseases, like smallpox, are no longer a problem. Vaccines make the world a healthier and safer place for everyone!

Answer the questions by the text:

1. What is a vaccine, and why do we need it?
2. How does a vaccine help the body fight germs?
3. What are the steps to make a vaccine?
4. Why is testing a vaccine important?
5. How do vaccines help protect not just one person but many people?
6. Can you name a disease that vaccines have stopped from spreading?
7. What are some ways a vaccine can be given?
8. Why are vaccines important for babies and older people?



DOING THE EXERCISES:

1. True or False

Read the sentences and decide if they are TRUE OR FALSE.

1. Vaccines protect the body from diseases. **TRUE OR FALSE**
FALSE
 2. Germs are big and easy to see. **TRUE OR FALSE**
FALSE
 3. Scientists weaken germs to make vaccines. **TRUE OR FALSE**
FALSE
 4. Vaccines do not need to be tested. **TRUE OR FALSE**
FALSE
 5. Vaccines are always given as a shot. **TRUE OR FALSE**
 6. The immune system helps fight germs. **TRUE OR FALSE**
TRUE
 7. Vaccines make the body stronger. **TRUE OR FALSE**
FALSE
 8. Testing a vaccine is a very quick process. **TRUE OR FALSE**
FALSE
 9. Vaccines are only for children. **TRUE OR FALSE**
FALSE
 10. Vaccines help stop the spread of diseases. **TRUE OR FALSE**
-

2. Fill in the Blanks

Fill in the blanks with the correct words from the table below.

1. A _____ helps protect us from getting sick.

2. Scientists study _____ to understand how they work.
3. The _____ system fights germs in our body.
4. Vaccines are tested to make sure they are _____.
5. _____ and viruses are two types of germs.
6. Most vaccines are given through a _____.
7. Some diseases, like _____, have been stopped by vaccines.
8. Vaccines help protect _____, especially babies and older people.
9. Testing a vaccine can take several _____.
10. A vaccine teaches the body to _____ harmful germs.

immune	years	germs	everyone	fight
bacteria	vaccine	safe	smallpox	shot

3. Match the Columns

Match the words on the left to their correct meanings on the right.

Column A	Column B
1. Vaccine	A. Fights germs in the body
2. Germ	B. A way to give medicine using a needle
3. Immune system	C. Tiny organisms like viruses and bacteria
4. Safe	D. To move from one person to another

5. Shot	E. A medicine that protects against disease
6. Virus	F. A very small germ that causes sickness
7. Spread	G. Something that does not harm you
8. Testing	H. Checking if something works or is safe
9. Protect	I. To keep something safe
10. Disease	J. A sickness caused by germs

4. Choose the Correct Word

Choose the correct word to complete the sentence.

1. Vaccines protect us from **(germs/safe)**.
2. Scientists study **(viruses/spread)** to make vaccines.
3. The **(immune/sick)** system fights diseases in our body.
4. Vaccines are tested to make sure they are **(healthy/safe)**.
5. Most vaccines are given as a **(shot/study)**.
6. Germs like **(viruses/babies)** can make us sick.
7. Testing a vaccine can take several **(years/seconds)**.
8. Vaccines help **(spread/stop)** diseases from growing.
9. A vaccine teaches the body to **(fight/play)** germs.
10. Vaccines are important for **(children/sickness)** and older people.

5. Unscramble the Words. Unscramble the letters to form the correct words related to vaccines.

1. VECCINA _____
2. REMG _____

- | | |
|-------------|-------|
| 3. SUMIMNE | _____ |
| 4. FSATE | _____ |
| 5. SURVLI | _____ |
| 6. TBECIRA | _____ |
| 7. OHST | _____ |
| 8. TENGSTI | _____ |
| 9. LEAHSHT | _____ |
| 10. SESEDAI | _____ |

6. Write a Sentence

Write a sentence using the following words:

- | | |
|------------|-----------|
| 1. Vaccine | 4. Immune |
| 2. Germ | 5. Virus |
| 3. Safe | |

For example: "A vaccine helps the immune system fight germs."

8. Here is the word search puzzle. You can look for the following words in the grid:

vaccine, germ, virus, bacteria, immune, safe, shot, testing, spread, disease.

Enjoy solving it!



X	A	E	K	V	I	V	C	S	U	C	N
C	H	E	Z	F	Y	I	K	H	F	T	N
V	A	C	C	I	N	E	B	O	Z	T	U
D	O	C	H	M	D	F	G	T	Y	Q	S
W	G	S	B	M	I	M	F	A	W	L	T
O	E	A	G	U	S	S	I	D	I	Y	E
V	R	O	H	N	E	A	X	L	P	V	S
S	M	N	M	E	A	F	C	E	O	I	T



V	R	O	H	N	E	A	X	L	P	V	S
S	M	N	M	E	A	F	C	E	O	I	T
X	A	N	Z	Z	S	E	M	L	J	R	I
W	P	N	V	X	E	X	X	G	V	U	N
Z	V	B	A	C	T	E	R	I	A	S	G
Q	I	K	X	K	H	S	P	R	E	A	D



LISTENING TIME.

Listen to the audio text and do exercises based on it.

1. Multiple Choice Questions

1. What do vaccines teach the immune system?

a) How to avoid germs

- b) How to fight germs
 - c) How to make germs stronger
2. What is introduced into the body during vaccination?
- a) A dangerous germ
 - b) A small, safe part of a germ
 - c) A new type of medicine
3. Why do some vaccines need to be taken every year?
- a) Because they are not safe
 - b) Because the germ changes over time
 - c) Because they are too expensive
4. What is “herd immunity”?
- a) Protecting animals from diseases
 - b) Stopping diseases from spreading by vaccinating many people
 - c) Giving vaccines to one person at a time
5. What is an example of a disease that vaccines have wiped out?
- a) Polio
 - b) Smallpox
 - c) Measles

Listening task 2. Filling in the gaps

Listen to the text and fill in the missing words.

1. Vaccines help prevent serious _____, such as measles and polio.
2. Scientists study and _____ vaccines for years before they are used.
3. _____ immunity happens when many people are vaccinated.
4. Smallpox has been completely _____ thanks to vaccines.

5. Some vaccines, like the flu vaccine, need to be taken every _____.

Listening task 3. Matching exercise.

Match the terms with their correct meanings:

Term	Meaning
1. Vaccine	a) Prevents diseases from spreading
2. Immune System	b) A safe part of a germ used to protect health
3. Herd Immunity	c) Protects the body by fighting germs
4. Smallpox	d) A disease that has been wiped out
5. Testing	e) Ensures vaccines are safe and effective



SPEAKING TIME: DISCUSSING VACCINES

Here are some speaking activities to practice communication skills.

Task 1: Picture Description



Describe a picture of a doctor giving a vaccine to a patient or children in a clinic. **Questions to Guide the Description:**

- What is happening in this picture?
- Who are the people in the picture?
- How do you think the people feel?

Task 2: Role-Play

Scenario:

One person is a doctor, and the other is a patient asking about vaccines.

- The *doctor* explains why vaccines are important and how they work.
- The *patient* asks questions, such as:
 - "Why do I need this vaccine?"
 - "Is it safe?"

- "How does it protect me?"

Task 3. Personal Connection

Ask students to talk about their own experiences with vaccines.

Use these prompts:

- Have you ever received a vaccine? How did you feel?
- Do you know someone who has been protected from a disease because of a vaccine?
- What do you think about getting yearly vaccines, like the flu shot?

Task 4. Presentation

Prepare a short presentation about vaccines. Topics can include:

- How vaccines are made
- The history of vaccines
- A disease that has been stopped by vaccines
- The role of vaccines during the COVID-19 pandemic

UNIT 6. BIOTECHNOLOGY IN DISEASE DIAGNOSIS

UNIT FOCUS:

- New Vocabulary
- Reading: Biotechnology in disease diagnosis
- Reading strategy: Question-Answer Strategy
- Listening task: Biotechnology in disease diagnosis
- Speaking time.

NEW VOCABULARY:

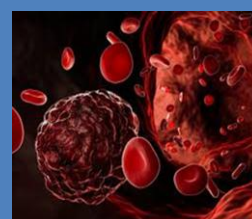
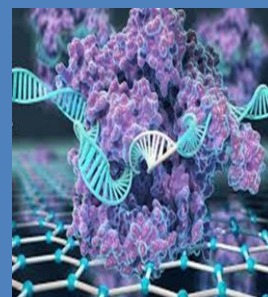
biotechnology	bacteria
disease	pcr test
diagnosis	cells
germs	health
virus	



BIOTECHNOLOGY IN DISEASE DIAGNOSIS

Biotechnology helps doctors find diseases early. It uses science and technology to study the body and germs. Doctors use special tools and tests to check if someone is sick. For example, they can test blood to see if there are harmful germs like viruses or bacteria.

One of the tools in biotechnology is called a "PCR test." This test looks for tiny parts of a virus in the body. Doctors used PCR tests a lot during



the COVID-19 pandemic to find out who had the virus.

Biotechnology also helps find diseases like cancer. Special machines can look at cells to see if they are healthy or not. This helps doctors treat the disease early and save lives.

Thanks to biotechnology, doctors can help people stay healthy. It is an important part of modern medicine.

QUESTIONS BY THE TEXT:

1. What does biotechnology help doctors do?
2. What is a PCR test used for?
3. How does biotechnology help with diseases like cancer?
4. Name two types of germs mentioned in the text.
5. Why is biotechnology important for modern medicine?



DOING EXERCISES:

1. True or False

Decide if the sentences are *True or False*.

1. Biotechnology is used to find diseases early. **True**
or False
2. Germs like bacteria and viruses are always good for the body.
True or False
3. A PCR test can find viruses in the body.
True or False
4. Biotechnology is not helpful for cancer diagnosis. **True**
or False
5. Special machines can look at cells to see if they are healthy.
True or False

6. Doctors use biotechnology to help people stay healthy. **True**
or False
7. A PCR test was used during the COVID-19 pandemic. **True**
or False
8. Bacteria and viruses are the same thing. **True**
or False
-

2. Fill in the blanks.

Fill in the blanks with the correct words from the text:

**biotechnology, germs , PCR ,
cells,COVID-19, cancer, bacteria , healthy,
diagnose , safe.**

1. _____ helps doctors find diseases early.
2. Doctors use special tools to check for _____ like viruses or bacteria.
3. A _____ test looks for tiny parts of a virus in the body.
4. Special machines can check if _____ are healthy or not.
5. Doctors used PCR tests a lot during the _____ pandemic.
6. Biotechnology helps find diseases like _____.
7. _____ are tiny living things that can be good or bad for the body.
8. When someone is not sick, they are _____.
9. Doctors use biotechnology to _____ people early.

10. Thanks to biotechnology, doctors can help people stay _____.

3. Match the terms with definitions

Match each word to its correct meaning:

WORD	DEFINITION
1. Biotechnology	a) A very small germ that causes diseases
2. Diagnosis	b) The use of science to study living things
3. Virus	c) A sickness that affects the body
4. Germs	d) Finding out if someone is sick
5. Disease	e) Tiny organisms like bacteria or viruses
6. PCR Test	f) A test to find viruses in the body
7. Bacteria	g) Tiny living things, some helpful, some harmful
8. Cells	h) Small building blocks of the body
9. Healthy	i) Feeling good and not being sick
10. Treat	j) To help someone get better

4. Scrambled words.

Unscramble the words to find key terms.

1. TTREBAIOHCYONL (_____)
2. ASIEDES (_____)
3. MSMEGR (_____)



4. SILVUR (_____)
 5. ICTSEALH (_____)
 6. TSERPCAETET (_____)
 7. LLECS (_____)
 8. LTHAYHE (_____)
 9. ITNADGOSII (_____)
 10. TARTE (_____)
-

5. Choose the correct option.

Select the best word to complete the sentence:

1. _____ is used to study the body and germs.
 - a) Biology
 - b) Biotechnology
 - c) Chemistry
2. Doctors use tools to check for harmful _____.
 - a) cells
 - b) bacteria
 - c) vaccines
3. A _____ test was helpful during the COVID-19 pandemic.
 - a) PCR
 - b) blood
 - c) health
4. Special machines can look at _____ in the body.
 - a) viruses
 - b) cells
 - c) bacteria

5. When many cells are _____, it helps the body stay strong.
- a) sick
 - b) healthy
 - c) broken
6. _____ are small organisms that can cause disease.
- a) Cells
 - b) Germs
 - c) Vaccines
7. Doctors study _____ to find diseases like cancer.
- a) healthy cells
 - b) body parts
 - c) sick cells
8. Thanks to biotechnology, diseases are found _____.
- a) early
 - b) late
 - c) slowly

6. Sentence reordering.

Rearrange the words to form correct sentences.

1. helps / diseases / Biotechnology / find / early / doctors.
2. are / Germs / like / bacteria / viruses / and.
3. can / body / in / check / Special machines / cells.
4. was / important / PCR testing / during / the COVID-19 / pandemic.
5. cells / build / the / body / Blocks / are / of.
6. healthy / body / fight / cells / help / the / germs.
7. used / doctors / tests / Biotechnology / diagnose / to / diseases.

8. early / Cancer / found / can / with / biotechnology / be.

7. ODD ONE OUT.

Find the word that does not belong to the group:

1. Germs, Virus, Cell, Healthy
 2. Cancer, PCR Test, Biotechnology, Forest
 3. Healthy, Sick, Diagnose, Food
 4. Cells, Heart, Bacteria, Virus
 5. Medicine, Pandemic, Ocean, COVID-19
 6. PCR Test, Machine, Technology, Bike
 7. Virus, Cancer, Healthy, Germ
 8. Diagnose, Study, Sleep, Test
-

8. TWO TRUTHS AND A LIE

Each set of sentences has one lie. Identify the false statement.

1. a) Biotechnology helps find diseases early.
b) Viruses are always good for the body.
c) A PCR test looks for tiny parts of a virus.
2. a) Cells are the building blocks of the body.
b) Healthy cells make the body strong.
c) Bacteria are the same as viruses.
3. a) Doctors used PCR tests during the COVID-19 pandemic.
b) Germs cannot cause diseases.
c) Biotechnology helps treat cancer early.

4. a) Viruses are tiny germs.
b) The body uses cells to fight germs.
c) The COVID-19 pandemic had no impact on healthcare.
 5. a) Bacteria are always harmful.
b) Biotechnology uses science and technology.
c) PCR tests are important for diagnosing diseases.
 6. a) Cancer can be found early with special tools.
b) Germs are only good for the body.
c) Biotechnology is part of modern medicine.
 7. a) Special machines can check if cells are healthy.
b) Bacteria are bigger than viruses.
c) Doctors use biotechnology to find diseases.
 8. a) Diagnosing diseases early saves lives.
b) Healthy cells help fight germs.
c) Germs never live inside the body.
-



LISTENING TIME.

Biotechnology in disease diagnosis.

Listening task 1. True or False

Listen to the script and decide if the sentences are TRUE OR FALSE:

1. Biotechnology uses only technology to study the body. TRUE OR FALSE
2. PCR tests were used during the COVID-19 pandemic. TRUE OR FALSE

3. Cells are not important for finding diseases. **TRUE OR FALSE**
4. Special machines can check if cells are healthy. **TRUE OR FALSE**
5. Germs like bacteria and viruses always help the body. **TRUE OR FALSE**
6. Biotechnology helps doctors find diseases early. **TRUE OR FALSE**
7. Doctors use biotechnology to study germs. **TRUE OR FALSE**
8. Cancer is a disease that can be found using biotechnology. **TRUE OR FALSE**
-

Listening task 2. Fill in the blanks.

Fill in the blanks while listening to the script:

1. Biotechnology uses _____ and technology to study the body.
 2. During the COVID-19 pandemic, doctors used _____ tests.
 3. A PCR test looks for tiny _____ of a virus inside the body.
 4. _____ are the building blocks of the body.
 5. Special machines can find diseases like _____.
 6. Germs, such as _____ and viruses, can make people sick.
 7. Doctors study cells to check if someone is _____ or sick.
 8. Biotechnology helps doctors _____ diseases early.
 9. By diagnosing diseases early, people can get better _____.
 10. Thanks to biotechnology, many _____ are saved every day.
-

Listening task 3. Order the sentences.

Listen and put the sentences in the correct order:

1. Biotechnology helps find diseases early.
2. Germs, like bacteria and viruses, can make people sick.
3. During the COVID-19 pandemic, PCR tests were used.
4. Doctors also study cells, the building blocks of the body.
5. Special machines check cells for diseases like cancer.
6. Biotechnology combines science and technology to study the body.



SPEAKING TIME:



1. Describing a Picture:

In this task, you could be given a picture that showcases a biotechnological process or tool used in disease diagnosis, such as a laboratory setup with PCR equipment, a gene sequencing machine, or a hospital setting where genetic testing is being performed. Here's a structure for describing such an image:

Description:

- **Introduce the Picture:** "The image shows a laboratory setup where biotechnology is used to diagnose diseases. In the center, there's a PCR machine, which is commonly used for amplifying DNA to detect specific pathogens or genetic mutations."
- **Details:** "You can see several laboratory technicians working with test tubes and microscopes. The technician on the left appears to be preparing samples for genetic testing, which could be used to detect early stages of cancer or viral infections."

- **Technology in Use:** "In the background, there is a computer displaying data, likely from a genetic sequencing test, which is essential for understanding the genetic makeup of diseases like cancer or inherited disorders."
 - **Significance:** "This image represents the application of biotechnology in diagnosing complex diseases by analyzing genetic information, offering more precise and timely results compared to traditional diagnostic methods."
-

2. Role Play:

In a role-playing scenario, you could take on the role of a medical professional explaining biotechnology to a patient, or you could play the role of a scientist discussing new diagnostic techniques with a colleague. Here's an example:

Scenario: Doctor Explaining Biotechnology to a Patient

- **Doctor:** "Good morning, Mr. Smith. I see you've come in for some diagnostic tests. We're going to be using some of the latest biotechnology to help understand your condition more accurately."
- **Patient:** "What kind of tests are these, Doctor?"
- **Doctor:** "We're going to use PCR to test for any bacterial or viral infections. This technology can detect the genetic material of pathogens in your body, even before you show symptoms."
- **Patient:** "How does it work?"
- **Doctor:** "PCR amplifies a tiny sample of DNA or RNA, making it easier to detect. For example, if we suspect you might have a virus, this test can give us results very quickly and accurately."

- **Patient:** "That sounds amazing! Are there any risks?"
- **Doctor:** "There are no significant risks with the test itself; it's non-invasive. However, it's important to understand that while biotechnology can give us a clear picture of your health, we also need to consider other factors, such as your symptoms and medical history."



Humans shares about 98% of their genes with chimpanzees, 92% with mice, 76% with zebrafish, 51% with fruit flies, 26% with thale cress (a type of weed), and 18% with E. coli bacteria.

All of the genetic information for every living organism is stored in combinations and sequences of just four molecules -- adenine, cytosine, guanine, and thymine. Differing sequences make up the 24,000 genes found in the human genome.

You aren't that special. About 99.9% of your DNA is exactly the same as everyone else's. The other 0.1% codes for all of the differences that make us unique.

Each cell in your body contains about two meters of DNA. If laid end-to-end it would measure 200 billion kilometers. That's long enough to stretch from Earth to the sun 1,333 times. To put that in perspective, it would take 7.4 days for sunlight to travel the same distance.

UNIT 7. GENE THERAPY

UNIT FOCUS:

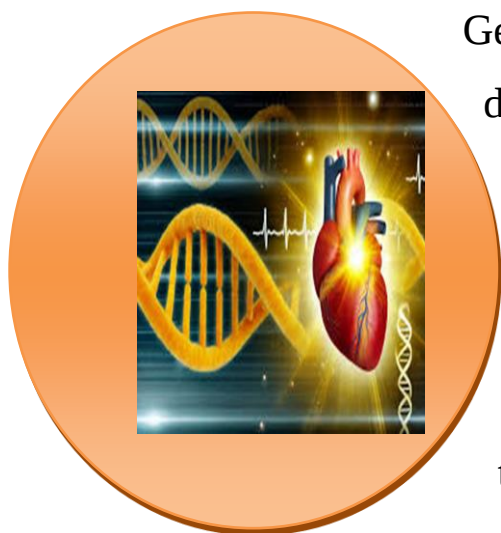
- New Vocabulary
- Reading: Gene therapy
- Reading strategy: Question-Answer Strategy
- Listening task: Gene therapy
- Speaking time.

NEW VOCABULARY:

gene	therapy	treatment
DNA	cure	person's cells
cell	genetic disease	cancer
protein	risk	



What is Gene Therapy?



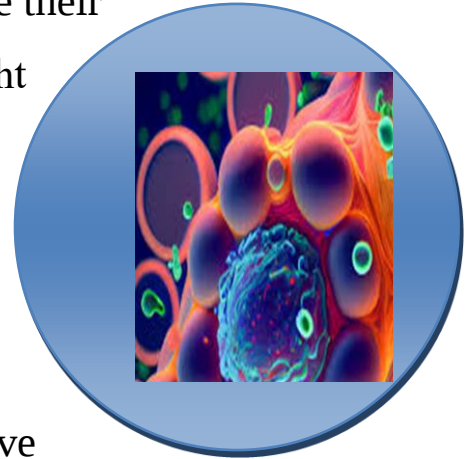
Gene therapy is a way to treat or even cure diseases by changing the genes inside a person's cells. Genes are like instructions that tell our bodies how to grow and work. Sometimes, people have problems because their genes don't work the way they should. Gene therapy tries to fix these problems.

How Does Gene Therapy Work?

Our body is made up of tiny building blocks called cells. Inside each cell, there is something called DNA, which carries our genes. If a person

has a disease caused by a bad gene, doctors might try to fix it by adding a healthy gene into their body. This new gene can help the body work better.

For example, if someone has a disease because their body can't make a special protein, doctors might put a good version of the gene that makes that protein into their cells. This way, the body can start making the protein it needs.

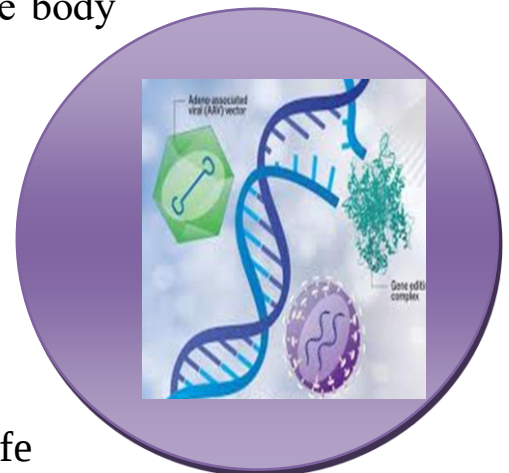


Why is Gene Therapy Important?

Gene therapy can help treat diseases that have been hard to fix in the past, like certain genetic diseases or even some kinds of cancer. It's like giving the body the right tools to fix itself!

Is Gene Therapy Safe?

Gene therapy is still being studied, and doctors are learning more about how it works. Sometimes it can be tricky, and there are risks. But scientists are working hard to make it safe and to help more people.

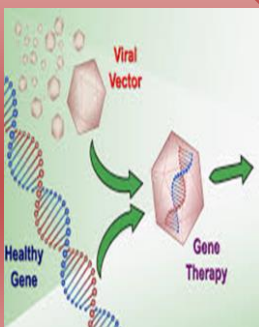


In the Future

Gene therapy might one day help many people with diseases that we can't treat right now. It gives hope for better treatments and even cures for some diseases!

Answer the following questions:

1. What is a gene, and why is it important for our bodies?
2. How does gene therapy help fix problems in the body?



3. What happens when a gene doesn't work the way it should?
4. Can gene therapy cure all diseases? Why or why not?
5. What is DNA, and how is it connected to genes?
6. Why is it important for scientists to study gene therapy?
7. What are some problems that gene therapy can help with?
8. What are the risks of gene therapy?
9. How might gene therapy change the way we treat diseases in the future?



DOING EXERCISES:

1. Fill in the Blank

Instructions: Fill in the blanks with the correct word from the list below.

Word List:

cure	cell	therapy	DNA	treatment
protein	disease	gene	genetic	risk

1. A _____ is like an instruction manual inside your body.
2. _____ helps our bodies build important things, like muscles and skin.
3. Doctors use _____ to help people feel better or fix problems.
4. A _____ is caused by a mistake in a person's genes.
5. If a gene doesn't work right, it can cause a _____.
6. A _____ is a tiny building block that makes up your body.

7. _____ is the code inside every _____ in your body.
8. Scientists are studying _____ to help treat diseases.
9. If a disease can be completely fixed, we call it a _____.
10. Sometimes gene therapy has some _____, so doctors have to be careful.

2. Match the words with their meanings.

Instructions: Match the words on the left with their correct meaning on the right.

Word	Meaning
1. Gene	A. A part of your body's instructions that tells how to grow and work.
2. DNA	B. A treatment to help people get better from a disease.
3. Protein	C. A tiny building block that makes up all living things.
4. Therapy	D. A substance made by the body that helps it work properly.
5. Disease	E. A risk or problem caused by a mistake in the genes.
6. Cure	F. A way to make a disease go away completely.
7. Cell	G. The special code inside your body that holds your genes.
8. Genetic	H. The study of how genes cause diseases.

9. Treatment	I. Something that can fix a problem or help make you better.
10. Risk	J. Something that might cause harm.

3. True or False

Instructions: Read each sentence and decide if it is true or false.

Write "True" or "False" next to each sentence.

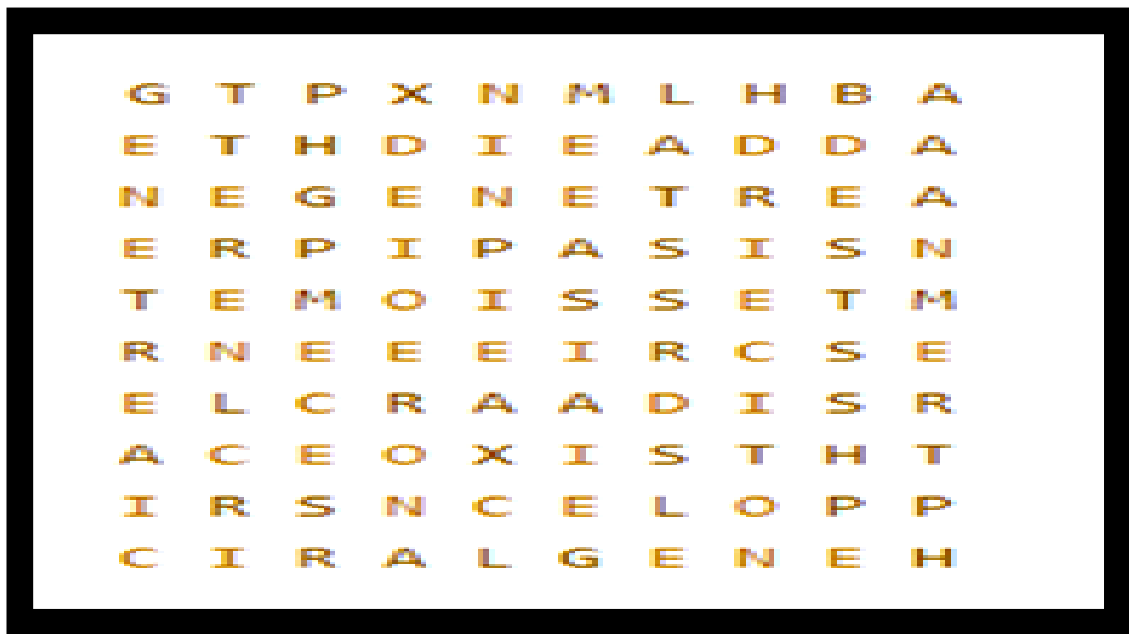
- Gene therapy helps fix problems in the genes by adding new genes into the body. (___)
 - DNA is a special code that helps your body make proteins and cells. (___)
 - Proteins are not important for our bodies. (___)
 - A cure can completely make a disease go away. (___)
 - Gene therapy can only treat problems in the eyes. (___)
 - Every living thing is made up of tiny building blocks called cells. (___)
 - A disease caused by a mistake in your genes is called a "genetic disease." (___)
 - Gene therapy is only used for very old people. (___)
-

4. Word Search

Instructions: Find and circle the words related to gene therapy in the word search. Words can go in any direction: horizontally, vertically, or diagonally.

Word List: *Gene, DNA, Cells, Protein, Therapy, Cure, Treatment, Risk, Disease, Genetic*

Word Search Grid:



5. Create a Poster

Instructions: Make a colorful poster to show how gene therapy works. Your poster should include:

- A picture of a cell with DNA inside.
- A drawing of a genetic disease being treated with gene therapy.
- A short description of how gene therapy helps people with genetic diseases.

6. "Gene Therapy in Action" – Creative Writing

Instructions: Write a short story (5-7 sentences) where gene therapy is used to solve a problem. Think about a character (could be yourself, a friend, or a made-up person) who is suffering from a disease and needs gene therapy to get better. Describe how gene therapy works and how it helps them.

Example Story: Lena was a 10-year-old girl who was born with a rare genetic disease that made her very tired and weak. One day, the doctors told her that gene therapy could help fix the mistake in her DNA. They used a special treatment to add healthy genes to her body. After the treatment, Lena felt stronger, and she could finally play with her friends without feeling tired all the time. Her life changed forever, and she was grateful for the scientists who created gene therapy.



LISTENING TIME.

Understanding gene therapy in modern medicine.

Instructions: Listen to the following script about gene therapy in modern medicine. Afterward, do the following exercises by the audio text.

Listening task 1: Fill in the Gaps

Instructions: Listen carefully to the script and fill in the missing words in the blanks. The missing words are key to understanding the concept of gene therapy.

"Gene therapy is a medical treatment that aims to _____ (1) the root cause of genetic diseases by _____ (2) or replacing the faulty genes in a person's cells. This method has been explored since the _____ (3) and gained more attention in the 1990s with the first _____ (4) trials. The main idea is to insert a healthy copy of the gene into the patient's cells to treat diseases like _____ (5) fibrosis, hemophilia, and sickle cell anemia.

There are several _____ (6) to deliver the new genes into the body. One method involves using _____ (7) viruses that are modified to carry the new gene without causing illness. Another method is direct _____ (8) of the gene into the bloodstream or tissues. Researchers are also studying the use of _____ (9) cells, which can transform into different types of cells, to deliver the therapeutic genes.

Gene therapy shows great promise, but challenges remain, such as the high _____ (10) and potential side effects. Despite these challenges, scientists are hopeful that, with continued research, gene therapy could be used to treat _____ (11) diseases, including diabetes and heart disease."

Listening task 2: True or False

Instructions: Listen to the following script about gene therapy. After listening, determine whether the following statements are True or False.

Statements:

1. Gene therapy is a treatment that targets the symptoms of genetic disorders. **True or False**
2. Gene therapy aims to introduce healthy genes to replace missing or defective ones. **True or False**
3. Clinical trials have shown that gene therapy has no challenges or risks. **True or False**
4. One challenge with gene therapy is the high cost of treatment. **True or False**
5. There is a debate about the ethics of using gene therapy, particularly for modifying embryos. **True or False**

6. Gene therapy may one day be used to treat common diseases like heart disease and diabetes. **True or False**
-



SPEAKING TIME.

Speaking task 1. Role play.

Instructions: Choose one of the roles below and engage in a role-play conversation about gene therapy. You can either perform this task alone or with a partner.

Sample scenario: Doctor and Patient.

- **Doctor:** You are a doctor explaining gene therapy to a patient who has been diagnosed with a genetic disorder. Provide information on how gene therapy works, the benefits, the possible risks, and how the treatment could help the patient.
 - **Patient:** You are a patient who has been diagnosed with a genetic disorder. You are curious about gene therapy and have many questions. Ask the doctor about how gene therapy can help, the risks involved, and how effective it is.
-

Speaking task 2. Describe the Picture.

Instructions: Imagine you are showing a picture related to **gene therapy** (such as an image of a doctor administering gene therapy, a diagram of how gene therapy works, or a depiction of a patient receiving treatment). You need to describe the image clearly, providing as many details as possible.

If you are using this task with a partner, you can either describe the picture to them, or you can ask them to describe the picture to you.

Steps:

1. Start with a general introduction of the image:

Begin by explaining what the picture is about. Mention the main subject(s) in the picture and the context (e.g., gene therapy).

Example:

"This picture shows a scientist or doctor in a laboratory, preparing to administer gene therapy to a patient. The doctor is standing next to a patient, and you can see equipment related to the treatment process."

2. Describe the people in the picture:

Focus on the key individuals in the picture. Mention their appearance, what they are doing, and how they are interacting.

Example:

"In the picture, the doctor is wearing a white coat and gloves, indicating that they are in a sterile medical environment. The patient looks calm but seems to be receiving an injection or a treatment. The patient is sitting on a medical chair with an intravenous (IV) line attached to their arm."

3. Describe the environment or setting:

Mention where the scene is taking place. Is it a hospital, laboratory, or another setting related to gene therapy?

Example:

"The scene takes place in a clean, bright medical laboratory, with scientific equipment and vials on the counter. There are several

shelves with medical tools and computers, typical of a research lab where gene therapy might be developed or tested."

4. Mention any visual cues or tools:

Focus on the specific tools or technology shown in the image. How are these relevant to gene therapy?

Example:

"In the background, you can see a computer screen showing a diagram of DNA, which suggests that the gene therapy involves manipulating genetic material. There are also syringes and small medical vials on the table, which may be used to deliver the new genes to the patient."

UNIT 8. PHARMACEUTICAL BIOTECHNOLOGY

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Pharmaceutical biotechnology**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Pharmaceutical biotechnology**
- **Speaking time.**

NEW VOCABULARY:

biotechnology

microscope

cells

bacteria

vaccine

cancer

DNA

insulin

protein

disease



What is Pharmaceutical Biotechnology?

Pharmaceutical biotechnology is a type of science that uses living things, like bacteria or cells, to make medicines. These special medicines help people feel better when they are sick or have a disease. Scientists use tiny parts of living things, like DNA or proteins, to create treatments.



How Does It Work?

1. Finding the Problem:

First, scientists figure out what is causing the sickness, like a virus or bacteria.

2. Using Helpful Tools:

They use special tools, like microscopes, to study tiny living things.

3. Making the Medicine:

Scientists use bacteria, plants, or even animal cells to make medicines. These cells are grown in labs and then turned into things like vaccines, insulin, or cancer treatments.

Why Is It Important?

Pharmaceutical biotechnology has helped make many life-saving medicines. For example:

- **Vaccines** help protect us from diseases like the flu or COVID-19.

- **Insulin** helps people with diabetes control their blood sugar.
- Special medicines can help fight cancer or rare diseases.

Fun Fact:

Did you know that scientists can make medicines using plants? Some plants are grown with special changes in their DNA so they can produce medicines naturally.

Answer the following questions:

1. What is pharmaceutical biotechnology?
2. What do scientists use to study tiny living things?
3. How do scientists make medicines in a lab?
4. Can you name three things made using pharmaceutical biotechnology?
5. Why is pharmaceutical biotechnology important?
6. How do vaccines help people stay healthy?



DOING EXERCISES:

1. Fill in the Blanks.

Instructions: Fill in the blanks with the correct word from the box.

1. Scientists study tiny living things like _____ to make medicines.
2. _____ is the use of living things to create products or solve problems.
3. _____ are the building blocks of all living things.
4. A _____ is a tool used to see things that are too small for our eyes.

5. A _____ helps protect people from getting sick by teaching the body to fight viruses.
6. _____ is a medicine that helps people with diabetes control their blood sugar.
7. _____ carries information about how living things grow and work.
8. A _____ is an illness or sickness that affects people or animals.
9. Some medicines are made by changing the _____ in living cells.
10. Scientists are working hard to find better treatments for _____, a serious disease.

Word Bank:

cells	vaccine	biotechnology	DNA	insulin
microscope	protein	disease	cancer	bacteria

2. True or False.

Instructions: Read each sentence and decide if it is True or False.

1. Pharmaceutical biotechnology uses living things to make medicines. **(True/False)**
2. Vaccines cure diseases completely. **(True/False)**
3. Insulin is used to help people with cancer. **(True/False)**
4. Scientists use microscopes to study very small living things. **(True/False)**

5. Bacteria are always harmful and cannot be used to make medicine.
(True/False)
 6. Proteins are important for the body to stay healthy. (True/False)
 7. DNA is found only in plants. (True/False)
 8. Pharmaceutical biotechnology has created life-saving medicines.
(True/False)
-

3. Match the sentence halves.

Instructions: Match the beginning of each sentence (Column A) with its correct ending (Column B).

COLUMN A	COLUMN B
1. Scientists use microscopes...	a. ...to help people with diabetes.
2. Vaccines are medicines...	b. ...to treat genetic diseases.
3. Insulin is a medicine...	c. ...used to see very small things.
4. Pharmaceutical biotechnology...	d. ...uses living things to make medicines.
5. DNA contains information...	e. ...that protect people from getting sick.
6. Proteins are important...	f. ...for the body to grow and stay healthy.

7. Cancer is a disease...	g. ...that causes cells to grow in a harmful way.
8. Some medicines are made...	h. ...using bacteria or plants.
9. Bacteria can be helpful...	i. ...when used to create medicines.
10. Cells are the building blocks...	j. ...of all living things.

4. Sentence Scramble

Instructions: Rearrange the words to form a correct sentence.

1. medicines / biotechnology / Pharmaceutical / uses / make / living things / to.
2. in / cells / Scientists / medicines / grow / labs / living.
3. protect / Vaccines / getting sick / from / people.
4. makes / Insulin / sugar / blood / control / easier.
5. are / living things / tiny / Bacteria.
6. medicine / DNA / change / Scientists / to / create.
7. important / Proteins / staying healthy / are / for.
8. blocks / all living things / building / are / Cells / of.

5. "What am I?" Riddles

Instructions: Solve the riddles by guessing the correct word.

1. I am the building block of all living things. **What am I?**
2. I am a tool that lets you see very small objects. **What am I?**

3. I carry instructions for how living things grow and work. **What am I?**
4. I am used to make medicines and solve problems using living things. **What am I?**
5. I protect people from diseases like the flu. **What am I?**
6. I help people with diabetes control their blood sugar. **What am I?**
7. I am a tiny living thing, sometimes helpful, sometimes harmful. **What am I?**
8. I cause cells to grow in a harmful way. **What am I?**
9. I am found in living cells and help the body stay healthy. **What am I?**
10. I am an illness or sickness that makes people or animals unwell. **What am I?**

6. Categorize the Words

Instructions: Sort the following words into the correct categories:

Tools: _____, _____, _____

Diseases: _____, _____, _____

Medicines _____, _____, _____

Word Bank:

microscope, cancer, vaccine, insulin, cells, diabetes, bacteria, protein, sickle cell anemia, DNA

7. Odd One Out.

Instructions: In each row, find the word that doesn't belong.

1. bacteria, microscope, vaccine, insulin
2. DNA, protein, disease, cells
3. cancer, diabetes, sickle cell anemia, plants

4. scientist, vaccine, gene, DNA
5. laboratory, building, equipment, cells

8. Guess the words:

1. A tool used to see very small things. (9 letters)
2. The building blocks of all living things. (5 letters)
3. A type of medicine that helps prevent diseases. (7 letters)
4. A medicine for people with diabetes. (7 letters)
5. Tiny living things used to make medicines. (8 letters)



LISTENING TIME.

Pharmaceutical Biotechnology

Instructions: Listen to the text and complete the exercises below.

You can use the provided script to check your answers.

Listening task 1: Fill in the Blanks.

Instructions: Listen to the text and fill in the blanks with the correct word from the script.

1. Pharmaceutical biotechnology uses living _____ to create medicines.
2. Scientists often work with _____, plants, or cells in laboratories.
3. _____ helps people with diabetes control their blood sugar.
4. Vaccines protect people from illnesses like the flu or _____.
5. Scientists study _____ to understand how diseases work.
6. Gene therapy introduces healthy _____ into a patient's cells.

7. Some medicines can target _____ cells without harming healthy ones.
 8. _____ is a branch of science that develops treatments for diseases.
 9. Special medicines reduce _____ in cancer treatment.
 10. Scientists hope to find _____ for more diseases in the future.
-

Listening task 2: *True or False*

Instructions: Listen to the text and decide whether each statement is **True or False**.

1. Pharmaceutical biotechnology only uses plants to make medicines.
T/F
 2. Insulin was created to help people with cancer. **T/F**
 3. Vaccines are one of the achievements of pharmaceutical biotechnology. **T/F**
 4. Scientists study DNA to understand diseases. **T/F**
 5. Gene therapy replaces healthy genes with faulty ones. **T/F**
 6. Cancer treatments in biotechnology focus only on side effects. **T/F**
 7. This field aims to cure more diseases in the future. **T/F**
 8. Pharmaceutical biotechnology is not useful for diabetes treatment.
T/F
-

Listening task 3: **Multiple choices.**

Instructions: Choose the correct answer for each question.

1. What does pharmaceutical biotechnology use to create medicines?
 - a) Machines
 - b) Living organisms
 - c) Rocks
2. What is one success of pharmaceutical biotechnology?
 - a) Producing insulin
 - b) Building hospitals
 - c) Creating microscopes
3. How do scientists study diseases?
 - a) By testing animals
 - b) By studying DNA
 - c) By looking at plants
4. What does gene therapy do?
 - a) Removes cells
 - b) Adds healthy genes
 - c) Creates vaccines
5. What is the goal of pharmaceutical biotechnology?
 - a) To build labs
 - b) To cure diseases
 - c) To grow bacteria



SPEAKING TIME.

Speaking task1. Pair Discussion - Role Play.

Instructions: Work with a partner. One person pretends to be a scientist explaining how a vaccine works. The other pretends to be a patient asking questions.

Example Conversation:

- Patient: "What is a vaccine?"
 - Scientist: "A vaccine is a medicine that helps your body fight diseases."
 - Patient: "How does it work?"
-

Speaking task 2. Sequence the Steps.

Instructions: Put the steps of making a medicine in the correct order.

1. Scientists study bacteria or cells.
2. Medicines are tested in labs.
3. Scientists grow cells in special environments.
4. The medicine is given to patients.
5. DNA is studied to understand the disease.

Correct Order: _____



Speaking task 3. Picture Description.



Instructions: Describe a picture of a scientist working in a lab with a microscope, vials, and DNA diagrams. Describe what is happening in the picture in at least 5 sentences.



UNIT 9. WHAT IS CRISPR AND GENE EDITING

UNIT FOCUS:

- New Vocabulary
- Reading: What is CRISPR and gene editing?
- Reading strategy: Question-Answer Strategy
- Listening task: What is CRISPR and gene editing?
- Speaking time.

NEW VOCABULARY:

DNA	recipe	mistake
CRISPR	scissors	scientists
gene	disease	
gene editing	crops	

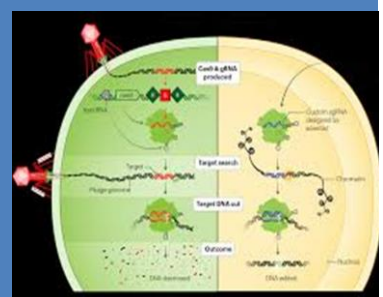
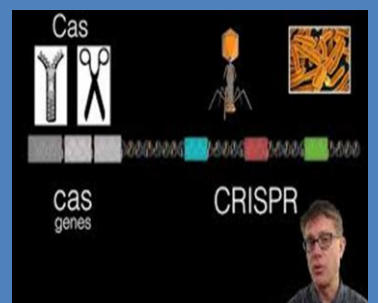
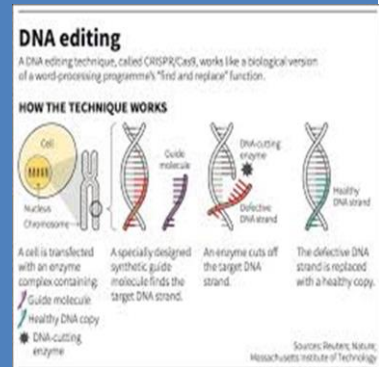


WHAT IS CRISPR AND GENE EDITING?

CRISPR (CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats. Repetitive DNA sequences, called CRISPR, were observed in bacteria) is a powerful tool that scientists use to make changes to DNA. But what is DNA? DNA is like a set of instructions in every living thing. It tells plants, animals, and even people how to grow, look, and work. It's like a recipe book for life!

Sometimes, there can be mistakes in this recipe. For example, a person might have a disease because their DNA has an error. CRISPR works like a pair of scissors that can cut out the mistake and help fix it. Scientists can also use CRISPR to add something new to DNA, like improving plants to grow more food or helping animals resist diseases.

Gene editing means using CRISPR to make these changes to genes. Genes are tiny pieces of DNA that decide things like the color of your hair, the shape of a flower, or even how



tall a tree can grow. With gene editing, scientists can fix broken genes, create stronger crops, or even make new medicines.

CRISPR is still very new, and scientists are learning how to use it carefully. It's a tool that could help solve big problems, like curing diseases, making better food, and protecting nature. Isn't it amazing how this tiny tool can make such a big difference?

Answer the following questions:

1. What is DNA, and what does it do?
2. What does CRISPR help scientists do?
3. Why do scientists compare CRISPR to scissors?
4. What is gene editing, and how does it help people?
5. Can you name two things scientists can use gene editing for?
6. Why is it important to use CRISPR carefully?
7. What can scientists fix if there is a mistake in DNA?



DOING EXERCISES:

1. True or False.

Decide if each sentence is True or False.

1. DNA is like a recipe book for living things. **True**
/False
2. CRISPR is a tool for coloring pictures. **True**
/False
3. Scientists use CRISPR to fix mistakes in DNA. **True**
/False
4. Genes are large parts of DNA that decide traits like eye color.
True /False

5. Gene editing is the same as cooking. **True**
/False
 6. CRISPR works like scissors to cut DNA. **True**
/False
 7. Gene editing can help cure diseases. **True**
/False
 8. Scientists can't use CRISPR on plants. **True**
/False
-

2. Fill in the Blanks

Complete the sentences with the correct words:

DNA (4times)	crops	CRISPR
Scientists (2times)	genes	Disease

1. _____ is like a recipe book inside living things.
 2. _____ use CRISPR to make changes to DNA.
 3. _____ are small parts of DNA that decide how we look.
 4. Sometimes, a mistake in DNA can cause a _____.
 5. CRISPR works like scissors to cut or change _____.
 6. Gene editing can help farmers grow stronger _____.
 7. CRISPR is a tool for fixing mistakes in _____.
 8. _____ is a new tool that can help cure diseases.
-

3. Match the columns.

Match the words on the left with their correct descriptions on the right.

A	B
1. DNA	A. A tool like scissors for DNA
2. CRISPR	B. Small parts of DNA that decide traits
3. Gene	C. A recipe book for living things
4. Scientists	D. People who study and discover things
5. Disease	E. An illness caused by DNA mistakes
6. Gene editing	F. Changing or fixing DNA using CRISPR

4. Choose the correct answer.

1. What is DNA?

- a) A tool for scientists
- b) Instructions for living things
- c) A type of food

2. What does CRISPR act like?

- a) A pencil
- b) Scissors
- c) A camera

3. What can gene editing help fix?

- a) Broken DNA
- b) Broken pencils
- c) Broken computers

4. What is a gene?

- a) A part of DNA
- b) A type of plant
- c) A cooking recipe

5. Who uses CRISPR?

- a) Farmers
- b) Scientists
- c) Chefs

6. What is one thing gene editing can help with?

- a) Making new clothes
- b) Growing better crops
- c) Coloring pictures

7. What can happen if there's a mistake in DNA?

- a) A disease
- b) A perfect plant
- c) A fun game

8. Why is CRISPR important?

- a) It helps people fix DNA
- b) It's a fun toy
- c) It cooks food

5. Write Your Own Sentences

Write your own sentences using the new words:

DNA, CRISPR, gene, disease, scientists.

1. _____.

2. _____.

3. _____.

4. _____.
 5. _____.
 6. _____.
 7. _____.
 8. _____.
 9. _____.
 10. _____.
-

6. Sorting Game.

Sort the following words into the correct category:

Words: DNA, CRISPR, genes, disease, scissors, crops, cure, scientists.

Category: What CRISPR Fixes	Category: Who Uses CRISPR	Category: Tools and Traits

7. Sentence Matching

Match the first half of each sentence (Column A) with the correct second half (Column B).

Column A	Column B
1. DNA is like	a) and tells us how we look.
2. CRISPR acts like	b) mistakes in DNA.
3. Gene editing can fix	c) a recipe book for life.
4. Genes are small parts of DNA	d) to make better crops.

5. Scientists use CRISPR

e) a pair of scissors for DNA.

8. Rearrange the Sentence

Put the words in the correct order:

1. DNA / living things / a / is / in / recipe book.
2. Scientists / CRISPR / use / DNA / to / mistakes / fix / in.
3. Diseases / DNA / mistakes / cause / can / in.
4. CRISPR / crops / make / stronger / can.
5. Small / genes / DNA / are / of / parts



LISTENING TIME.

WHAT IS CRISPR AND GENE EDITING?

Instructions

1. Listen carefully to the text being read aloud.
2. After listening, do exercises based on what you heard.

Listening task 1. True or False

Listen to the script and decide if these statements are true or false:

1. DNA gives instructions to living things on how to grow, look, and work. **T/F**
2. CRISPR is a tool used to paint pictures. **T/F**
3. Mistakes in DNA can cause diseases or problems. **T/F**
4. CRISPR acts like tiny scissors that fix or change DNA. **T/F**
5. Gene editing does not help plants, only people. **T/F**
6. Genes are large parts of DNA. **T/F**
7. Scientists are still learning how to use CRISPR carefully. **T/F**

8. CRISPR can help grow more food for the world. **T/F**

Listening task 2.Fill in the Blanks

Complete the sentences based on what you heard:

1. DNA is like a _____ book found in all living things.
 2. Sometimes, mistakes in DNA can cause _____ or problems.
 3. CRISPR is a special _____ that scientists use to fix DNA.
 4. CRISPR acts like tiny _____ to cut out mistakes.
 5. _____ are small parts of DNA that decide traits like eye color.
 6. Gene editing can make crops _____ and _____.
 7. CRISPR is still _____, and scientists are learning how to use it.
 8. This tool could help solve big problems like _____ diseases.
-

3. Multiple Choice Questions

Choose the correct answer:

1. What is DNA compared to?
 - a) A map
 - b) A recipe book
 - c) A dictionary
2. What happens if there is a mistake in DNA?
 - a) It causes diseases or problems

- b) It makes people taller
 - c) It disappears
3. What does CRISPR act like?
- a) A pencil
 - b) A pair of scissors
 - c) A flashlight
4. What do genes decide?
- a) What you eat
 - b) Your height and eye color
 - c) How fast you walk
5. How can gene editing help farmers?
- a) By growing stronger and healthier crops
 - b) By planting more trees
 - c) By making animals bigger
6. Why is CRISPR an exciting tool?
- a) It can be used to grow toys
 - b) It can help cure diseases and grow more food
 - c) It replaces books
7. Is CRISPR fully understood yet?
- a) Yes, it is perfect
 - b) No, scientists are still learning how to use it
 - c) No, it is not being studied anymore



SPEAKING TIME.

Speaking Task 1: Group Discussion

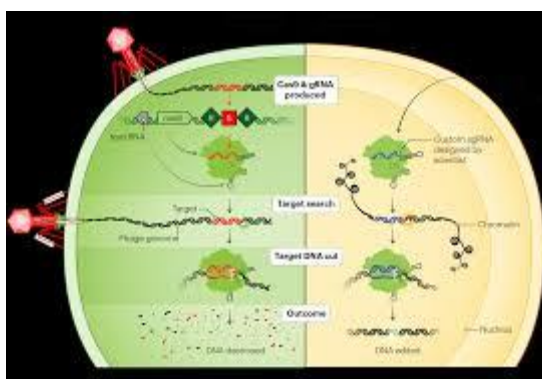
In small groups, discuss these questions:

1. How could CRISPR change the world in the future?
 2. What are the good and bad sides of using CRISPR?
 3. If you could use CRISPR to change one thing in the world, what would it be? Why?
-

Speaking Task 2: Picture Description

Show pictures or diagrams of DNA or CRISPR (you can draw it or find a simple image).

Sample:



Ask students to:

1. Describe what they see in the picture.
 2. Explain how CRISPR works using the diagram.
-

Speaking Task 3: One-Minute Speech

Prepare a short speech on one of these topics:

- “Why CRISPR is an exciting tool for the future.”
- “How gene editing can help people and plants.”
- “Why it’s important for scientists to use CRISPR carefully.”

Students can practice their speech, and then share it with the class.

UNIT 10. GENETICALLY MODIFIED ORGANISMS (GMOS)

UNIT FOCUS:

- New Vocabulary
- Reading: Genetically modified organisms (GMOS)
- Reading strategy: Question-Answer Strategy
- Listening task: Understanding GMOS.
- Speaking time.

NEW VOCABULARY:

genetically modified

resistant

organisms(GMOS)

harvest

DNA

lab (laboratory)

modify

safe

crops

environment

pest



What are genetically modified organisms (GMOS)?



Some plants and animals are changed by scientists to make them better. These are called **genetically modified organisms**, or

GMOs. Scientists change the DNA of plants and animals to help them grow faster, be stronger, or stay fresh longer.

For example, some fruits and vegetables are changed so they do not spoil quickly. Corn and tomatoes can be made to grow bigger and healthier. Farmers like GMOs

because they can grow more food and help stop insects from eating the plants.

Some animals can also be changed. Scientists can help cows produce more milk or make fish grow faster.

People use GMOs to make food better, but some people worry about how safe they are. Scientists continue to study GMOs to make sure they are good for people and the environment.

Answer the following questions.

1. What does GMO stand for?
2. Why do scientists change the DNA of plants and animals?
3. How do GMOs help farmers?
4. Give one example of a GMO food.
5. Why do some people worry about GMOs?

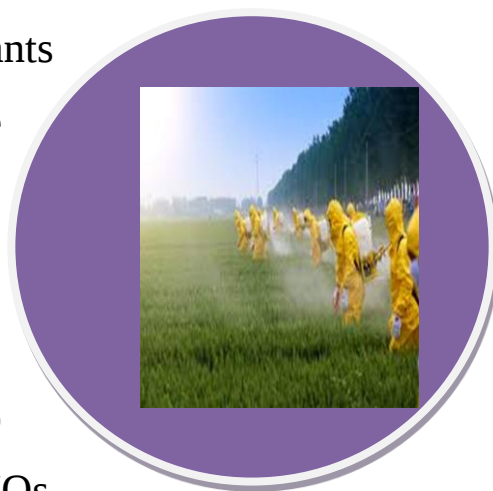


DOING EXERCISES:

1. Fill in the Blanks

Complete the sentences using these words:

harvest	crops	DNA	modify	pest
----------------	--------------	------------	---------------	-------------



safe	resistant	GMOs	environment	lab
------	-----------	------	-------------	-----

1. Scientists change the _____ of plants to help them grow better.
2. _____ are plants that farmers grow for food.
3. A _____ is an insect or animal that eats or harms plants.
4. Some GMOs are _____ to insects, so they do not get eaten.
5. Scientists work in a _____ to study plants and animals.
6. Farmers _____ their crops when they are ready to be sold.
7. Scientists _____ plants to make them stronger and healthier.
8. Some people worry if GMOs are _____ for people to eat.

2. Match the Words with Their Meanings

Match the words in Column A with the correct definition in

Column B.

Column A	Column B
1. GMOs	a) A place where scientists study things.
2. DNA	b) Small creatures that harm plants.
3. Modify	c) To change something to make it better.
4. Pest	d) Instructions inside all living things.
5. Resistant	e) Living things changed by scientists.
6. Lab	f) Plants that farmers grow for food.
7. Crops	g) To pick and collect crops.
8. Harvest	h) Not harmed by something.

9. Safe	i) Good for people and the environment.
10. Environment	j) Nature, plants, and animals around us.

3. True or False

Decide if the statements are true (T) or false (F).

1. GMOs are plants and animals that scientists change. (T / F)
2. DNA does not affect how plants grow. (T / F)
3. GMOs can help farmers by making crops grow stronger. (T / F)
4. A pest is a scientist who works in a lab. (T / F)
5. Scientists modify plants to make them weaker. (T / F)
6. GMOs can help crops resist insects. (T / F)
7. The lab is a place where farmers grow food. (T / F)
8. Some people worry about whether GMOs are safe. (T / F)

4. Multiple Choice Questions

Choose the best answer for each question.

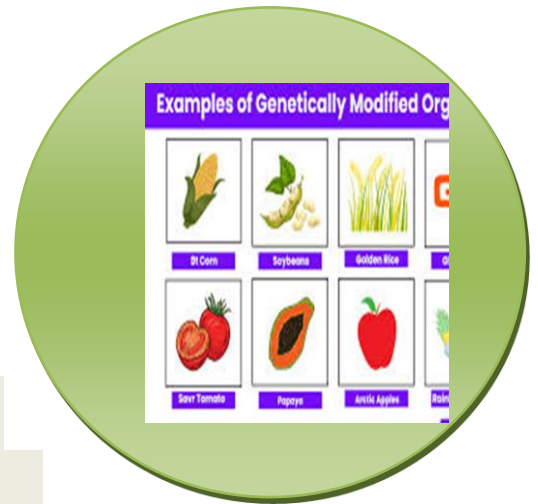
1. What does GMO stand for?
 - a) Good Modified Organisms
 - b) Genetically Modified Organisms
 - c) Green Modern Objects
2. Why do scientists modify plants?



- a) To make them weaker
- b) To help them grow better
- c) To make them disappear

3. What is DNA?

- a) A type of food
- b) Instructions inside all living things
- c) A type of farmer



4. What is a pest?

- a) An insect that harms plants
- b) A person who sells food
- c) A scientist

5. Why do farmers like GMOs?

- a) They grow faster and resist insects
- b) They cost more money
- c) They need more water

6. Where do scientists study GMOs?

- a) In a garden
- b) In a laboratory
- c) In a supermarket



7. What does "resistant" mean?

- a) Strong against something
- b) Very small
- c) A type of plant

a) Strong

8. What do farmers do when they harvest crops?
- a) Eat them
 - b) Pick and collect them
 - c) Throw them away
-

5. Sentence Scramble

Put the words in the correct order to make a sentence.

- 1. modify / Scientists / plants / GMOs / to / make.
 - 2. strong / crops / grow / help / GMOs.
 - 3. The / in / work / scientists / a / lab.
 - 4. DNA / inside / all / living / found / things / is.
 - 5. Harvest / farmers / their / crops / when / they / are / ready.
 - 6. Plants / pests / some / GMOs / from / protect.
 - 7. GMOs / fresh / help / stay / food / longer.
 - 8. The / important / environment / very / is.
-

6. Jumbled Words: Unscramble the letters.

- 1. **SMOG** → ____ (Living things changed by scientists)
- 2. **NAD** → ____ (Instructions inside all living things)
- 3. **FYDIMO** → ____ (To change something to make it better)
- 4. **PORSC** → ____ (Plants that farmers grow for food)
- 5. **PETS** → ____ (Small bugs that harm plants)
- 6. **STREISNAT** → ____ (Strong against something, like insects or disease)
- 7. **RBLA** → ____ (A place where scientists do experiments)

8. **FRTHAEVS** → ____ (To pick and collect crops when they are ready)
9. **ASEF** → ____ (Not dangerous for people or nature)
10. **TNENVIRMOEN** → ____ (The world around us, including nature, plants, and animals)
-

7. Word Association. Match each word with something related to it.

- | | |
|-------------------|--|
| 1. GMO → | a) Laboratory |
| 2. DNA → | b) Fruits and vegetables |
| 3. Modify → | c) Strong against insects |
| 4. Crops → | d) Instructions inside all living things |
| 5. Pest → | e) Bugs that harm plants |
| 6. Lab → | f) To change something |
| 7. Safe → | g) Scientists work here |
| 8. Harvest → | h) Picking food when ready |
| 9. Resistant → | i) Not harmful |
| 10. Environment → | j) Nature, plants, and animals |
-

8. Odd One Out

Which word does not belong in the group?

1. **Corn – Wheat – DNA – Rice** → ____
2. **Scientist – Farmer – Lab – Teacher** → ____
3. **Safe – Dangerous – Healthy – Good** → ____
4. **Modify – Change – Keep – Edit** → ____
5. **Pest – Insect – Disease – Water** → ____

9. Complete the sentences. Fill in the blanks with the correct words:

**GMOs, DNA, modify, crops, pest,
resistant, harvest, lab, safe, environment**

1. Farmers grow _____ like corn, wheat, and rice.
2. Scientists work in a _____ to study plants and animals.
3. A _____ is a bug that eats plants and harms crops.
4. Some plants are _____ to insects, so they do not get eaten.
5. People want to know if GMOs are _____ for humans.
6. Farmers _____ their crops when they are ready.
7. Scientists _____ plants to make them stronger.
8. _____ are living things that have been changed by scientists.



LISTENING TIME.

Listening Exercises

Listening task 1. Fill in the Blanks

Listen to the text and complete the missing words:

1. Scientists change the _____ of plants and animals to make them better.
2. _____ help plants grow faster and resist diseases.
3. Some crops are made to fight off _____ so farmers use fewer chemicals.

4. Scientists can help _____ produce more milk.
 5. Some people worry about how _____ GMOs are for the environment.
-

Listening task 2. True or False

Listen to the text and decide if the statements are true (T) or false (F).

1. GMOs are plants and animals that scientists change. (T / F)
 2. Scientists change DNA to make food spoil faster. (T / F)
 3. Farmers use GMOs to grow more food. (T / F)
 4. GMOs can help some animals produce more milk. (T / F)
 5. Scientists have finished studying GMOs and know everything about them. (T / F)
-

Listening task 3. Answer the Questions

After listening to the script, answer these questions:

1. What does GMO stand for?
2. Why do scientists modify plants?
3. How can GMOs help farmers?
4. Why do some people worry about GMOs?
5. What are scientists doing to learn more about GMOs?



SPEAKING TIME.

DISCUSSION ON GMOS.

Speaking task 1: Picture Description.

1. Show students a picture of a farm with GMO crops and a scientist in a lab.
2. Ask them to describe what they see using key vocabulary:
crops, scientist, lab, DNA, modify, harvest, pest, safe.



3. Encourage students to make sentences like:
 - "I see a scientist working in a lab."
 - "The farmer is harvesting crops."

Speaking task 2: Think-Pair-Share

1. **Think:** Ask students to think about one advantage and one disadvantage of GMOs.
2. **Pair:** Have them discuss their ideas with a partner.
3. **Share:** Each pair shares one idea with the class.

Example Sentences:

- "An advantage of GMOs is that they help farmers grow more food."
- "A disadvantage is that some people worry GMOs might not be safe."



UNIT 11. BIOTECHNOLOGY IN PEST CONTROL

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Biotechnology in Pest Control**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Biotechnology in Pest Control**
- **Speaking time.**

NEW VOCABULARY:

pests

chemicals

biotechnology

friendly insects

healthier

crops.

stronger

environment

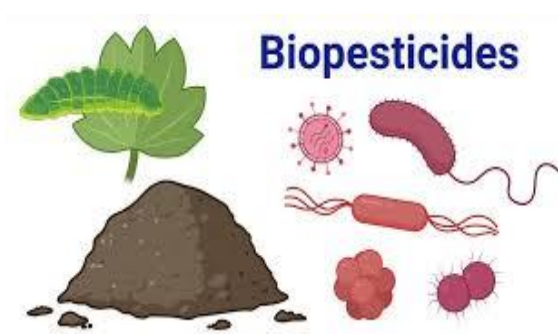


BIOTECHNOLOGY IN PEST CONTROL



Farmers grow plants like corn, wheat, and rice to make food. But sometimes, small insects called **pests** eat the plants and damage them. This can make it hard for farmers to grow enough food.

Scientists have found a way to help! They use **biotechnology** to protect plants from pests. Biotechnology is when scientists change plants to make them **stronger** and **healthier**. Some plants are changed so that pests do not eat them. This helps farmers grow more food without using too many chemicals.



Biotechnology can also help by using **friendly insects**. Some insects eat the pests and keep plants safe. This is a natural way to protect crops.

Many farmers like using biotechnology because it helps their plants grow better and keeps food safe. Scientists are still studying new ways to help plants without harming the environment.

Answer the following questions.

1. What are pests and how do they affect plants?
2. How does biotechnology help protect plants from pests?
3. What is one way biotechnology makes plants stronger?
4. Why do farmers like using biotechnology?
5. How do friendly insects help protect plants?
6. What are scientists still studying about biotechnology?
7. Can biotechnology help grow more food? How?
8. Why is it important to protect plants without harming the environment?



DOING EXERCISES:

1. Fill in the Blanks

Complete the sentences with the correct words from the list below:

1. Farmers use _____ to grow more food.
2. _____ can be used to protect plants from pests.
3. Some plants are made _____ so pests cannot harm them.
4. _____ is a natural way to protect crops without chemicals.
5. Farmers grow _____ like corn and rice for food.
6. _____ can sometimes use _____ to kill pests, but it can harm the environment.
7. The _____ helps plants grow without pests eating them.
8. Using _____ helps make the plants _____ and resistant to pests.

farmers	healthier	biotechnology	friendly insects	stronger
crops	plants	pests	chemicals	environment

2. True or False

Read the sentences and decide if they are True (T) or False (F).

1. Biotechnology helps protect plants from pests.

(T / F)

2. Farmers grow crops like cars and computers.

(T / F)

3. Pests help crops grow stronger.

(T / F)

4. Friendly insects can eat pests and help crops stay safe.

(T / F)

5. Biotechnology makes plants weaker and more easily harmed.

(T / F)

6. Farmers use biotechnology to grow more food.

(T / F)

7. Chemicals are the only way to protect crops from pests.

(T / F)

8. The environment is not important when using biotechnology.

(T / F)

3. Word Scramble

Unscramble the letters to find the correct words from the text:

1. **tspe** → _____
2. **hnolgyoiotebc** → _____
3. **hserhealt** → _____
4. **ckorps** → _____
5. **csairwtn** → _____
6. **nersotg** → _____
7. **alhemicc** → _____
8. **lyfndri sntcsi** → _____

4. Matching the words to their definitions.

Match the words in Column A with the correct definition in Column B.

COLUMN A	COLUMN B
1. Pests	a) A way to change plants to help them grow better.
2. Biotechnology	b) Things that can harm plants, like bugs.
3. Crops	c) Plants that are grown for food.
4. Friendly Insects	d) Things that help protect plants naturally.
5. Chemicals	e) Substances used to kill pests but can harm nature.
6. Stronger	f) Able to resist damage.
7. Environment	g) The natural world, including plants and animals.
8. Healthier	h) In better condition and not sick.

5. Sentence construction.

Use the words provided to make correct sentences.

Words: *biotechnology, crops, pests, healthier, farmers, plants, stronger, chemicals*

1. _____ help _____ grow _____ and _____.
 2. Some plants are made _____ so they can resist _____.
 3. _____ use _____ to protect their _____ from _____.
 4. Using _____ can make _____ _____ and protect the _____.
 5. _____ can help make _____ grow without using too many _____.
-

6. Fill in the table.

Complete the table below based on the information from the text.

Word	Definition
1. Pests	_____ (What do they do to plants?)
2. Biotechnology	_____ (What does it help to do?)
3. Friendly Insects	_____ (How do they help plants?)
4. Crops	_____ (What are they grown for?)
5. Environment	_____ (What does it include?)
6. Chemicals	_____ (What are they used for?)

7. Word Search

Look for the following words in the word search below. The words can be hidden vertically, horizontally, or diagonally.

Words to Find:

- Pests
- Biotechnology
- Crops
- Insects
- Chemicals
- Farmers
- Environment
- Stronger
- Plants
- Healthier



8. Synonym Matching

Match the vocabulary words in Column A with their synonyms in Column B.

COLUMN A	COLUMN B
1. Stronger	a) Bugs
2. Healthier	b) Plants grown for food
3. Environment	c) Tougher
4. Pests	d) Natural world
5. Farmers	e) People who grow food
6. Biotechnology	f) Better

7. Crops

g) Technology for improving living organisms

8. Friendly Insects

h) Beneficial bugs



LISTENING TIME.

Listening task1: True or False

Read the statements below. After listening to the script, decide if the statements are True or False.

1. Farmers use chemicals to kill pests, but these chemicals are always safe for the environment. T/F
2. Biotechnology can help plants fight pests naturally without harming animals. T/F
3. Friendly insects are used to help control pests without using chemicals. T/F
4. Biotechnology is not as safe as using chemicals to control pests. T/F
5. Using friendly insects helps farmers grow healthy food. T/F

Listening task 2: Fill in the Blanks

Complete the sentences below with the missing words from the list:

chemicals, biotechnology, friendly insects, pests,
naturally, environment, healthy food.

1. _____ can harm the _____ and other living things.
 2. _____ offers a safer way to control _____.
 3. Some plants can fight pests _____ without harming humans or animals.
 4. Scientists use _____ to make plants that fight pests without chemicals.
 5. Using _____ helps protect crops without using harmful chemicals.
 6. This method helps farmers grow _____.
-

Listening task 3. Multiple Choice

Choose the correct answer based on the script.

1. What do farmers often use to kill pests? a) Friendly insects
b) Chemicals
c) Biotechnology
d) Water
2. What does biotechnology do to help control pests? a) Changes animals
b) Changes plants so they fight pests naturally
c) Uses chemicals to kill pests
d) Uses machines to catch pests

3. What is one method of controlling pests without chemicals? a)
Growing crops in different places
b) Using friendly insects
c) Burning the plants
d) Using more chemicals
4. What does biotechnology help to protect? a) The environment and crops
b) The economy
c) Only the plants
d) Only the pests
5. What is the benefit of using friendly insects? a) They kill plants
b) They help protect crops without chemicals
c) They are harmful to the environment
d) They make the crops grow bigger



SPEAKING TIME.

Speaking task 1. "Biotechnology in Pest Control" Video.

Instructions:

1. Show a **short, kid-friendly video** about how biotechnology helps control pests.
2. After watching, ask students to write down **3 things they learned** from the video.
3. Then, hold a **class discussion** where each student shares one of their observations.

Variation: You can make it interactive by stopping the video at different points and asking **questions** related to the content, or have students guess what will happen next.

Speaking task: "Pest Control Machine" Design.

Instructions:

1. Students are tasked with **designing a pest control machine** that uses biotechnology.
2. Ask them to draw the machine and **describe** how it works.
3. Each student or group should present their machine to the class, explaining:
 - **What it does**
 - **How biotechnology is used**
 - **How it helps protect the environment**

Example:

"My machine uses a special spray made from friendly insects to stop pests. It doesn't harm plants, and it's safe for the environment!"

Speaking task 3. Interactive Exercise 14: "The Mystery Box" Game.

Instructions:

1. Prepare a **box** with objects or pictures related to biotechnology (e.g., small plastic bugs, pictures of plants, a piece of cotton to represent crops, a toy scientist, etc.).
2. Blindfold students or have them reach into the box without looking.
3. They will **pull out one item** and must **explain** how that item is related to biotechnology or pest control.

Example:

If a student pulls out a picture of a plant, they might say:

"This is a genetically modified plant that resists pests!"

UNIT 12. BIOTECHNOLOGY AND FOOD PRODUCTION

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Biotechnology and Food Production**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Biotechnology and Food Production**
- **Speaking time.**

NEW VOCABULARY:

biotechnology

conditions

tastier

production

nutrients

population

crops

disease

abundant

golden rice



BIOTECHNOLOGY AND FOOD PRODUCTION.





Biotechnology is a way scientists use technology to improve plants and animals. In food production, biotechnology helps make food better, healthier, and more abundant.

One example of biotechnology is making crops that can grow in difficult conditions, like in dry or cold weather. This helps farmers grow more food even when the weather is not perfect. Scientists can also use biotechnology to make plants stronger, so they are less likely to get diseases or be eaten by insects.

Another way biotechnology helps food production is by making crops that have more nutrients. For example, scientists have made rice that has more vitamin A, which helps people see well. This rice is called "Golden Rice."

Biotechnology also helps animals. Scientists can use biotechnology to make animals healthier and grow faster. This helps farmers provide more food for people.

In the future, biotechnology will continue to help us produce more food for everyone, especially as the world's population grows. It can help create food that is healthier, tastier, and easier to grow.

Answer the questions based on the text:

1. What is biotechnology?
2. How does biotechnology help crops grow in difficult conditions?

3. What is "Golden Rice" and how does it help people?
4. How does biotechnology help animals in food production?
5. Why is biotechnology important for the future of food production?
6. What does the word "abundant" mean in the context of food production?
7. How can biotechnology make food healthier?
8. What is one example of how biotechnology helps plants fight diseases?



DOING EXERCISES:

1. Fill in the Blanks

Complete the sentences with the correct words from the list:

1. _____ helps improve plants and animals.
2. Farmers use _____ to grow more food in difficult weather.
3. _____ is a special type of rice that has more vitamin A.
4. The _____ of the world is growing, and we need more food.
5. Biotechnology can make food _____, so people enjoy it more.
6. Some plants are stronger and better at fighting _____ with biotechnology.
7. Biotechnology helps make _____ grow even when the weather is cold or dry.
8. _____ is the process of making or growing food.
9. Plants need _____ to stay healthy, and biotechnology can help provide more.
10. With biotechnology, we can produce an _____ amount of food.

tastier	conditions	production	Golden rice	nutrients
biotechnology	abundant	crops	disease	population

2. True or False

Read the sentences below and decide if they are True or False.

1. Biotechnology helps make plants stronger and less likely to get sick.

T/F

2. "Golden Rice" has extra vitamin C to help people's eyesight

T/F

3. Biotechnology makes food grow slower and harder to produce.

T/F

4. With biotechnology, we can grow more food even in bad weather.

T/F

5. Scientists use biotechnology to make animals grow slower.

T/F

6. The population of the world is decreasing, so less food is needed

T/F

7. Crops made with biotechnology are always healthier than regular crops. **T/F**

8. Biotechnology helps create food that tastes better and is more nutritious. **T/F**

3. Multiple Choices. Choose the correct answer based on the text.

1. What does biotechnology help to improve?
 - a) Only animals
 - b) Only food production
 - c) Both plants and animals
 - d) Weather
2. What is "Golden Rice"?
 - a) Rice that grows in cold weather
 - b) Rice with extra vitamin A
 - c) Rice that tastes better
 - d) Rice that can fight diseases
3. Why is biotechnology important for the future?
 - a) It can help us make food that grows faster
 - b) It helps produce more food for a growing population
 - c) It helps crops grow in any weather
 - d) All of the above
4. What does the word "abundant" mean?
 - a) Too little
 - b) Just enough
 - c) More than enough
 - d) Not enough
5. How does biotechnology help crops?
 - a) By making them grow slower
 - b) By making them taste bad
 - c) By making them stronger and healthier
 - d) By using more chemicals

4. Matching

Match the term with its correct definition:

TERM	DEFINITION
1. Biotechnology	a) The process of growing food, like fruits and vegetables.
2. Crops	b) A type of rice with extra vitamin A to help people.
3. Golden Rice	c) A way scientists use technology to improve plants and animals.
4. Nutrients	d) Substances in food that help living things grow and stay healthy.
5. Population	e) The number of people living in an area or country.
6. Production	f) The process of making or growing something.
7. Tastier	g) When food has a better and more delicious flavor.
8. Disease	h) An illness or sickness that affects people, plants, or animals.
9. Conditions	i) The environment, like weather, that affects how plants grow.
10. Abundant	j) When something is available in large amounts, more than enough.

5. Sentence Scramble (Jumbled Words)

Rearrange the words to form correct sentences:

1. helps / food / grow / Biotechnology / more.

Example: Biotechnology helps grow more food.

2. Scientists / make / stronger / crops. / can
 3. is / A / way / to / food / improve / biotechnology.
 4. People / Golden Rice / eat / helps / healthier.
 5. Plants / can / survive / bad / with / weather / biotechnology.
 6. grow / The / population / more / means / food / we / need / to.
 7. Nutrients / make / strong / and / healthy. / us
 8. Production / means / something. / making / growing / or
-

6. Find the mistake.

Each sentence has one mistake. Find and correct it.

1. Biotechnology helps make food grow **small and weak**.

Example: Biotechnology helps make food grow **strong and healthy**.

2. Golden Rice is made to give people extra vitamin B.
 3. Farmers use biotechnology to make plants taste worst.
 4. The world's population is shrinking, so we need less food.
 5. Crops need video games to grow well.
 6. Nutrients are bad for our health.
 7. Production means destroying food.
 8. Biotechnology makes food more difficult to grow.
-

7. Choose the Best Answer (Multiple Choice)

Select the correct answer for each question.

1. What is biotechnology?
 - a) A type of food

- b) A way to improve plants and animals using science
 - c) A new kind of plant
2. What is Golden Rice?
- a) Rice with extra vitamin A
 - b) A rice that is made of gold
 - c) A type of chocolate
3. What do nutrients do?
- a) Make food unhealthy
 - b) Help people and plants stay healthy
 - c) Make food taste bad
4. How does biotechnology help plants?
- a) It makes them weaker
 - b) It helps them grow better and fight diseases
 - c) It makes them disappear
5. What does production mean?
- a) The process of growing or making food
 - b) The process of destroying food
 - c) The process of eating food

8. Yes or No Game (Speaking Activity)

Ask your partner the following questions. Answer "Yes" or "No", then explain your answer.

1. Do you think biotechnology is important for the future?
2. Would you eat food made with biotechnology?
3. Can biotechnology help people get more nutrients?
4. Does biotechnology make food less tasty?

5. Should farmers use biotechnology to grow more food?
 6. Do you think biotechnology can help poor countries get more food?
 7. Can biotechnology help plants fight diseases?
 8. Do animals benefit from biotechnology?
 9. Is biotechnology dangerous for humans?
-

9. Odd One Out

Find the word that does NOT belong in each group.

1. Rice – Corn – **Apple** – Golden Rice
2. Biotechnology – Production – Pizza – Nutrients
3. Healthy – Strong – Disease – Vitamins
4. Farmers – Scientists – Engineers – Crops
5. Population – People – Trees – Villages
6. Abundant – Enough – More – Less
7. Food – Water – Sunlight – Chocolate
8. Grow – Make – Destroy – Produce



LISTENING TIME. **BIOTECHNOLOGY AND FOOD PRODUCTION**

Listening task 1. Fill in the Blanks

Listen to the passage and complete the missing words:

1. Biotechnology helps farmers grow more _____.
2. Scientists make crops _____ and tastier.
3. Some plants can survive bad _____.
4. _____ Rice has extra vitamin A.

5. Many countries use Golden Rice to prevent _____.
 6. Biotechnology helps the _____ by reducing chemicals.
 7. Scientists are still learning new _____ to use biotechnology.
-

Listening task 2. True or False

Listen to the passage and decide if the sentences are *True* or *False*:

1. Biotechnology makes crops weaker. **T/F**
 2. Scientists use biotechnology to make plants grow faster. **T/F**
 3. Golden Rice has extra vitamin C. **T/F**
 4. Some plants can fight diseases because of biotechnology. **T/F**
 5. Biotechnology increases the use of harmful chemicals. **T/F**
 6. Scientists are still finding new uses for biotechnology. **T/F**
-

Listening task 3. Answer the Questions

Listen carefully and answer:

1. How does biotechnology help farmers?
2. What is special about Golden Rice?
3. Why is biotechnology good for the environment?
4. How does Golden Rice help people stay healthy?
5. What are scientists still learning about?



SPEAKING TIME.

Speaking task 1. Role-Play Activity

Situation: Imagine you are a **scientist** and your friend is a **farmer**. The farmer asks you about biotechnology. Act out a conversation using these prompts:

- **Scientist:** Explains how biotechnology helps grow stronger crops.
- **Farmer:** Asks if biotechnology is safe and useful for farmers.
- **Scientist:** Talks about Golden Rice and how it helps people.
- **Farmer:** Decides if they want to use biotechnology or not and explains why.

Speaking task 3. Debate: "Is Biotechnology Good for Food Production?"

Split into two groups: **For** and **Against**. Each side gives reasons for their opinion.

✓ **For Biotechnology:**

- Helps grow more food
- Makes crops stronger
- Reduces the use of chemicals

✗ **Against Biotechnology:**

- Some people think it is unnatural
- Can be expensive for farmers
- We don't know all the long-term effects

Each group presents their arguments and then discusses together

	<table border="1"> <thead> <tr> <th>Across</th> <th>Down</th> </tr> </thead> <tbody> <tr> <td>5. A process that uses microorganisms to convert sugars into alcohol or acids; used in making bread, beer, and yogurt.</td> <td>1. Meat produced from animal cells in a lab without the need to raise and slaughter animals.</td> </tr> <tr> <td>7. A gene-editing technology that allows scientists to alter DNA sequences and modify gene function.</td> <td>2. An organism that contains a gene or genes which have been artificially inserted instead of the organism acquiring them through reproduction.</td> </tr> <tr> <td></td> <td>3. Live beneficial bacteria added to foods, which are good for the digestive system.</td> </tr> <tr> <td></td> <td>4. A vessel or container in which biological reactions are carried out, often used for producing cultured products.</td> </tr> <tr> <td></td> <td>6. Proteins used in various food processes to break down complex molecules; commonly used in cheese making.</td> </tr> </tbody> </table>	Across	Down	5. A process that uses microorganisms to convert sugars into alcohol or acids; used in making bread, beer, and yogurt.	1. Meat produced from animal cells in a lab without the need to raise and slaughter animals.	7. A gene-editing technology that allows scientists to alter DNA sequences and modify gene function.	2. An organism that contains a gene or genes which have been artificially inserted instead of the organism acquiring them through reproduction.		3. Live beneficial bacteria added to foods, which are good for the digestive system.		4. A vessel or container in which biological reactions are carried out, often used for producing cultured products.		6. Proteins used in various food processes to break down complex molecules; commonly used in cheese making.
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UNIT 13. PLANT TISSUE CULTURE

UNIT FOCUS:

- New Vocabulary
- Reading: Plant Tissue Culture
- Reading strategy: Question-Answer Strategy
- Listening task: Plant Tissue Culture
- Speaking time.

NEW VOCABULARY:

tissue	root	endangered
culture	leaf	technique
nutrient	lab (laboratory)	
gel.	resistant	



PLANT TISSUE CULTURE

Plant tissue culture is a special way to grow plants **without seeds**. Instead of planting seeds in the soil, scientists take a **tiny part of a plant**, such as a **leaf, stem, or root**, and grow it in a **lab**.

First, the plant part is put into a **nutrient gel** that has food, water, and vitamins. This gel helps the plant grow. After some time, the small piece starts to form **roots and leaves**. Soon, it becomes a **new plant**!



This method is **very useful** for farmers and scientists. It helps farmers grow **many plants quickly**. It also helps save **rare and endangered plants**. Scientists can use this technique to make plants **stronger, healthier, and resistant to diseases**.

Plant tissue culture is used to grow crops like **bananas, potatoes, and flowers**. It is an **important** way to produce more food and protect plants for the future!

Answer the questions about the text:

1. What is plant tissue culture?
2. What parts of a plant can scientists use?
3. Where do scientists grow plant tissues?
4. What helps the plant grow in the lab?
5. Name one crop that can be grown using tissue culture.
6. Why is plant tissue culture useful for farmers?
7. What is the job of a root?
8. What does "resistant" mean?



DOING EXERCISES:

1. Fill in the Blanks

Complete the sentences with the correct words from the table below:

1. Plant _____ culture helps grow new plants without seeds.
2. Scientists take a small piece of plant _____ to grow a new one.
3. The plant part is placed in a special _____ to help it grow.
4. _____ are important because they take water from the soil.
5. The nutrient _____ gives food and vitamins to the growing plant.
6. This method is a useful _____ for farmers.
7. Some plants grown in the lab are more _____ to diseases.
8. Scientists work in a _____ to grow plants in a safe place.
9. We can save _____ plants using tissue culture.
10. The green _____ of a plant helps it make food.

roots	resistant	tissue	culture	lab
technique	nutrients	leaf	gel	endangered

2. Matching Exercise

Match the word to its meaning:

WORD	DEFINITION
------	------------

1. Nutrient	a) A place where scientists work
2. Resistant	b) A green part of a plant
3. Lab	c) A jelly-like material for plant growth
4. Culture	d) Something that helps plants grow
5. Leaf	e) A special method to grow plants without seeds
6. Endangered	f) A plant that is in danger of disappearing
7. Roots	g) A part of a plant that takes water from soil
8. Technique	h) A method of doing something
9. Gel	i) Strong against diseases or problems
10. Tissue	j) A small part of a plant or animal

3. True or False

Write True or False for each sentence.

1. Plant tissue culture uses seeds to grow new plants. **True/False**
2. Scientists take small plant parts and grow them in a lab.
True/False
3. Nutrients help plants grow strong. **True/False**
4. Gel is hard like a rock. **True/False**
5. This method helps to grow fewer plants. **True/False**
6. Roots help plants take in water. **True/False**
7. Scientists use plant tissue culture to help endangered plants.
True/False
8. Leaves help plants breathe and make food. **True/False**

4. Sentence Scramble

Put the words in the correct order to form a sentence.

1. culture / grow / plants / scientists / in / use / a lab / tissue.
 2. nutrients / plants / for / gel / the / in / has / growth.
 3. plants / method / helps / strong / grow / this.
 4. farmers / helps / crops / culture / tissue / grow / healthy.
 5. endangered / some / plants / save / we / culture / can / tissue / with.
 6. nutrients / gel / in / are / vitamins / food / and.
 7. small / a / from / can / piece / plant / grow / new / a.
 8. without / seeds / new / plants / can / grow / culture / tissue..
-



5. "Who Am I?" (Riddles)

Read the clues and guess the correct word!

1. I am a tiny part of a plant. Scientists use me to grow new plants.
What am I?
2. I am soft like jelly and full of nutrients. Plants grow in me in a lab.
What am I?
3. I am the place where scientists do experiments. What am I?
4. I help plants take water from the soil. What am I?
5. I am green, and I help plants make food. What am I?
6. I am a method of growing plants without seeds. What am I?
7. I give plants food and vitamins to grow strong. What am I?
8. I describe plants that are in danger of disappearing forever. What
am I?
9. I help protect plants from diseases. What am I?
10. I am a special way of doing something. What am I?

Answer key: *Nutrient, Tissue, Gel, Lab, Resistant, Technique, Endangered, Roots, Leaf, Plant tissue culture*

6. "Act It Out!" (Charades) □

One student picks a word from the list below and acts it out without speaking. The others must guess!

Words to Act Out:

- **Roots** (Pretend to dig into the ground)
 - **Leaf** (Wave your arms like leaves in the wind)
 - **Gel** (Pretend to hold something squishy)
 - **Lab** (Act like a scientist using a microscope)
 - **Endangered** (Pretend to be a rare plant disappearing)
-

7. "Odd One Out"

Choose the word that doesn't belong in the group!

1. Tissue – Root – Leaf – **Chair**
 2. Lab – Nutrient – Soil – Endangered
 3. Gel – Culture – Sunlight – Roots
 4. Leaf – Water – Gel – Book
 5. Technique – Resistant – Happy – Lab
-

5. "Finish My Sentence".

Complete the sentences in your own words! Be creative!

1. Scientists use plant tissue culture because _____.
2. A plant grows best when it has enough _____.
3. The **gel** in the lab is important because _____.

4. If a plant is **endangered**, it means _____.
 5. Roots are useful because they _____.
 6. A **lab** is a place where _____.
 7. A **resistant** plant does not get sick easily because _____.
 8. Leaves help plants make _____.
-

6. “Create a Mini-Story”

Use at least 5 words from the list below to write a funny or interesting short story about plants!

Words to Use: *Tissue, Lab, Nutrient, Roots, Leaf, Gel, Endangered, Resistant, Culture, Technique*

Example Start:

“One day, a scientist in a lab found a very special **tissue** from a rare plant. He placed it in a **gel** full of **nutrients** and waited to see what would happen...



LISTENING TIME.

Plant Tissue Culture. Tasks Based on the Script

Listening task 1. Comprehension Task.

Answer the following questions based on the audio:

1. What is plant tissue culture?
2. What is the purpose of using a sterile environment in this process?
3. What is an explant?

4. What is a callus, and how does it develop into a complete plant?
5. Why is plant tissue culture important for agriculture and conservation?

Listening task 2. Vocabulary Task

- Match the terms with their definitions:

- | | |
|------------------------------|--------------------------|
| ◦ Explant | ◦ Nutrient medium |
| ◦ Callus | ◦ Plant growth |
| ◦ Sterile environment | regulators |

- A. A mass of undifferentiated plant cells that form during tissue culture.
- B. A small piece of plant tissue used to start the tissue culture process.
- C. A controlled condition free of microorganisms to prevent contamination.
- D. A gel-like substance containing essential minerals, vitamins, and nutrients.
- E. Substances like auxins and cytokinins that influence plant growth and development.

Listening task 3. Ordering Task.

- Arrange the steps of plant tissue culture in the correct order:
 - A. Shoots and roots develop from the callus.
 - B. The explant is sterilized and placed in a nutrient medium.
 - C. A complete plant is formed.
 - D. A callus forms from the explant.
 - E. A small piece of plant tissue (explant) is selected.

Listening task 4. Gap-Fill Task.

- Fill in the blanks with the correct words from the script:
 1. Plant tissue culture is a technique used to grow plant _____, _____, or _____ in a controlled environment.
 2. The process starts with selecting a small piece of plant tissue, called an _____.
 3. The explant is placed in a _____-rich medium that contains essential minerals and vitamins.
 4. Over time, the cells divide and form a mass of undifferentiated cells known as a _____.
 5. This method helps propagate _____ or endangered plant species.

Listening task 5. Discussion Task

- Discuss with a partner or write a short paragraph about:
 - How can plant tissue culture benefit farmers?
 - What challenges might scientists face in plant tissue culture?

-



SPEAKING TIME.

Speaking task 1. Debate task

Task: Discuss the advantages and disadvantages of plant tissue culture.

- One student argues that it is **beneficial** (e.g., helps conserve plants, creates disease-resistant crops).
- The other argues that it has **challenges** (e.g., expensive, requires expertise).

Speaking task 2. Presentation Task

Task: Prepare a **1-minute presentation** on one of the following topics:

- "The Importance of Plant Tissue Culture in Agriculture"
- "How Scientists Use Plant Tissue Culture to Save Endangered Species"
- "The Future of Plant Tissue Culture in Food Production"

UNIT 14. BIOFERTILIZERS

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Biofertilizers**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Biofertilizers – Nature's Helpers**
- **Speaking time.**

NEW VOCABULARY:

biofertilizers.	fungi	farmers
nutrients	algae	natural
soil	chemical	safe
bacteria	fertilizers	



BIOFERTILIZERS: NATURAL PLANT FOOD

Plants need food to grow big and strong. They get their food from the soil. But sometimes, the soil does not have enough nutrients. This is where **biofertilizers** help!



What Are Biofertilizers?

Biofertilizers are **natural fertilizers** made from tiny living things like **bacteria, fungi, and algae**. These tiny helpers add important nutrients to the soil, making plants grow better.

Why Are Biofertilizers Good?

- They help plants grow faster.
- They make the soil healthy.
- They do not harm nature like chemical fertilizers.

Examples of Biofertilizers

- ✓ **Rhizobium** – Helps bean and pea plants grow.
- ✓ **Azotobacter** – Adds nitrogen to the soil.
- ✓ **Blue-green algae** – Makes the soil rich in nutrients.

Farmers use biofertilizers to grow healthy fruits, vegetables, and grains. They are **safe, natural, and good for the Earth!**

Questions by the text:

1. What are biofertilizers?

2. Why do plants need nutrients?
3. How do biofertilizers help plants?
4. What is an example of a biofertilizer?
5. Why are biofertilizers better than chemical fertilizers?



1. Matching exercise (Match the words with their meanings)

Draw lines to match the words with the correct definitions:

TERMS	DEFINITIONS
1. Biofertilizers	A. Small living things that help plants grow
2. Nutrients	B. The material where plants grow
3. Soil	C. Substances that help plants grow
4. Bacteria	D. A type of biofertilizer that helps beans and peas
5. Fungi	E. Substances made by humans to help plants grow
6. Algae	F. Tiny plants that grow in water
7. Chemical fertilizers	G. People who grow food
8. Farmers	H. A natural fertilizer that helps plants
9. Rhizobium	I. Small organisms that live in the soil

10.Natural

J. Something that comes from
nature

3. Fill in the blanks (Choose the correct word).

Words to use:

soil	nutrients	algae	fungi	natural
Rhizobium	farmers	bacteria	biofertilizers	chemical

- _____ help plants grow in a natural way.
- Plants get their food from the _____.
- _____ and _____ are small living things that help plants.
- Blue-green _____ add nutrients to the soil.
- _____ fertilizers can harm nature.
- Plants need _____ to grow big and strong.
- _____ is a biofertilizer that helps beans and peas.
- Many _____ use biofertilizers to grow crops.
- Biofertilizers are a _____ way to feed plants.
- Healthy soil contains many helpful _____.

3. True or False? (Circle the correct answer)

- Biofertilizers are made from living things. (True / False)
- Chemical fertilizers are better for the environment than biofertilizers. (True / False)
- Soil gives plants the nutrients they need to grow. (True / False)

4. Biofertilizers harm the environment.

(True / False)

5. Bacteria, fungi, and algae help plants grow.

(True / False)

6. Farmers do not use biofertilizers.

(True / False)

7. Rhizobium helps fruit trees grow.

(True / False)

8. Biofertilizers make the soil healthier.

(True / False)

4. Sentence ordering (Rearrange the words to make correct sentences)

1. help / Biofertilizers / plants / grow.

2. soil / Plants / get / from / their / food.

3. tiny / Biofertilizers / made / living things / are / of.

4. nutrients / need / grow / Plants / to.

5. fertilizers / Chemical / harm / nature.

6. farmers / Biofertilizers / Many / use.

7. soil / Bacteria / the / help.

8. a / Rhizobium / is / biofertilizer.

5. Jumbled words (Unscramble the words)

Rearrange the letters to form the correct words related to biofertilizers.

1. tinosrutne → _____
2. losi → _____
3. oiatclgmuurfebri → _____
4. rtahulan → _____
5. raermfs → _____
6. ilziumrohbb → _____
7. ualgae → _____
8. aicartb → _____
9. hnreiemcal fetirzilres → _____
10. ogiwngr → _____

6. Word search (Find the hidden words)



Find the words hidden in the grid below:

Words to Find: *biofertilizers, nutrients, soil, bacteria, fungi, algae, farmers, Rhizobium, natural, growth*

B	I	O	F	E	R	T	I	L	I	Z	E	R	S
N	X	R	H	I	Z	O	B	I	U	M	G	W	A
U	M	Y	A	L	G	A	E	O	L	I	S	I	T
T	Q	N	A	T	U	R	A	L	C	U	B	R	H
R	Z	B	A	C	T	E	R	I	A	P	O	W	T
I	F	U	N	G	I	Y	R	O	W	T	H	H	I
E	F	A	R	M	E	R	S	M	H	J	K	U	O
N	U	T	R	I	E	N	T	S	A	L	P	O	L



Find the words **horizontally, vertically, or diagonally!**

7. Multiple choice (Choose the correct answer)

1. What do biofertilizers add to the soil?

- a) Plastic
- b) Nutrients
- c) Rocks

2. What is a biofertilizer made of?

- a) Tiny living things
- b) Metals
- c) Oil

3. Which of these is a type of biofertilizer?

- a) Rhizobium
- b) Cement
- c) Sugar

4. Why are biofertilizers better than chemical fertilizers?

- a) They are cheaper
- b) They are natural and safe
- c) They make plants grow instantly

5. What does algae do in biofertilizers?

- a) Adds color to the soil
- b) Provides important nutrients
- c) Stops plants from growing

6. What helps fix nitrogen in the soil?

- a) Rhizobium
- b) Plastic
- c) Sand

7. Which is NOT a type of biofertilizer?

- a) Blue-green algae
- b) Azotobacter
- c) Pesticides

8. Who uses biofertilizers the most?

- a) Farmers
- b) Painters
- c) Fishermen

8. Categorization (Sort the words into the right groups)

Sort the words into the correct category:

Types of Biofertilizers	Nutrients for Plants	Parts of Nature	Words to Categorize

Rhizobium, Nitrogen, Soil, Algae, Farmers, Phosphorus, Fungi, Azotobacter, Sunlight, Water

Fill in the table with the correct words!

Challenge: Try to find all **10 words** in **2 minutes**!



LISTENING TIME.

Biofertilizers – Nature’s Helpers

Instructions:

1. Listen to the audio (or read the script if needed).
2. Answer the questions based on what you hear.
3. Discuss the answers with a partner or write them down.

1. Listening questions.

1. Multiple choice:

1. What do biofertilizers do?
 - a) Make plants grow slower
 - b) Help plants grow naturally
 - c) Remove nutrients from the soil
2. What are biofertilizers made of?
 - a) Tiny living things
 - b) Rocks and sand
 - c) Plastic and chemicals

3. Which is an example of a biofertilizer?
 - a) Rhizobium
 - b) Cement
 - c) Sugar
 4. Why do farmers like biofertilizers?
 - a) They are expensive
 - b) They are natural and safe
 - c) They make plants turn blue
 5. What do biofertilizers NOT do?
 - a) Pollute the environment
 - b) Help the soil
 - c) Add nutrients
-

2. Fill in the blanks

1. Plants need _____ to grow.
 2. Farmers use _____ to make plants grow better.
 3. Biofertilizers are made from tiny living things like _____, _____, and _____.
 4. _____ is a biofertilizer that helps beans and peas grow.
 5. Biofertilizers are good for the _____ because they do not pollute.
-

3. True or False?

1. Biofertilizers are bad for the soil. **(True / False)**
2. Chemical fertilizers are better for the environment than biofertilizers. **(True / False)**

3. Rhizobium helps add nitrogen to the soil. (**True / False**)
 4. Biofertilizers are made from living things. (**True / False**)
 5. Farmers do not use biofertilizers. (**True / False**)
-



IT IS SPEAKING TIME.

Speaking task 1: Role play – Farmer & Scientist

Imagine you are a farmer, and your partner is a scientist.

- **Farmer:** You want to grow healthy crops but don't know about biofertilizers. Ask the scientist about them.
- **Scientist:** Explain what biofertilizers are and why they are useful. Give advice on how to use them.

Example Dialogue:

Farmer: I want to grow healthy crops, but I don't want to use chemical fertilizers. What should I do?

Scientist: You should try biofertilizers! They are natural and help the soil.

Farmer: Oh! What are biofertilizers made of?

Scientist: They are made of tiny living things like bacteria, fungi, and algae. They help plants grow strong!

Speaking task 2: Picture description.

Look at pictures of a farm and describe what can you see there.



For example: Biofertilizers can help the plants in the picture.

Speaking task 3: Mini-Presentation

Prepare a 1-minute talk about biofertilizers. Use these key points:

- What are biofertilizers?
- Why are they important?
- How do they help the environment?

After your talk, answer questions from your classmates.



1. Biofertilizers Can "Talk" to Plants

Some biofertilizers, like **Rhizobium bacteria**, communicate with plants through **chemical signals**. These signals help the bacteria attach to plant roots and start fixing nitrogen in the soil!



2. Biofertilizers Can Be Made from Waste

Did you know that some biofertilizers are made from **organic waste, animal manure, or even food scraps**? Instead of throwing away waste, it can be turned into **nutrient-rich fertilizers** for plants!



3. Some Algae-Based Biofertilizers Glow in the Dark!

Certain algae, like **blue-green algae**, can produce light (bioluminescence). While this isn't common in all biofertilizers, some microbial fertilizers can have glowing bacteria!



4. Fungi-Based Biofertilizers Create an "Underground Internet"

Biofertilizers like **mycorrhizal fungi** connect plant roots underground, forming a vast network called the "**Wood Wide Web**." This network helps plants **share nutrients and even send warning signals** about pests or drought!



5. Some Biofertilizers Can Absorb Heavy Metals from Soil

Certain bacteria and fungi used in biofertilizers can **remove toxic heavy metals** like lead and mercury from polluted soil. This process, called **bioremediation**, helps clean the environment!



6. Biofertilizers Can Help Plants Grow in Space

Scientists are testing biofertilizers in **space farming**! Since biofertilizers improve soil health naturally, they might help astronauts grow food on Mars or the Moon in the future!

improves:



8. Biofertilizers Can Be Sprayed on Leaves

While most fertilizers go into the soil, some biofertilizers can be **sprayed directly onto plant leaves**. The tiny bacteria and fungi enter through the leaf pores and start working inside the plant!

UNIT 15. ENVIRONMENTAL BIOTECHNOLOGY: BIOREMEDIATION

UNIT FOCUS:

- New Vocabulary
- Reading: Environmental Biotechnology: Bioremediation
- Reading strategy: Question-Answer Strategy
- Listening task: Bioremediation
- Speaking time.

NEW VOCABULARY:

biotechnology	pollution	harmful
bioremediation	chemicals	planet
bacteria	oil spill	
fungi	soil	



Environmental Biotechnology: Bioremediation

Environmental biotechnology is a special type of science that helps nature. One important part of it is called **bioremediation**. This means using tiny living things, like bacteria and fungi, to clean up the Earth.

Sometimes, the land, water, or air gets dirty because of pollution. Factories, cars, and garbage can make harmful chemicals that hurt plants, animals, and people. But nature has helpers! Some bacteria and fungi can eat these harmful chemicals and turn them into safe things.

For example:

- Special bacteria can clean oil spills in the ocean.
- Fungi can help remove harmful chemicals from the soil.
- Some plants can take bad metals out of the ground.

Bioremediation is a natural way to help our planet stay clean and healthy.

Questions by the text:

1. What is bioremediation?
2. How do bacteria help clean the environment?
3. What can fungi do to help nature?
4. Why is pollution bad for the planet?
5. Can plants help clean the soil? How?
6. Why is bioremediation important?
7. What are some examples of pollution?
8. How can people help keep the environment clean?
9. Have you ever seen pollution in your city or town? What kind?
10. What would happen if we didn't clean pollution?



DOING EXERCISES:

1. Fill in the Blanks

Fill in the blanks with the correct words from the word bank.

Word Bank: *pollution, bacteria, bioremediation, fungi, chemicals, planet, oil spill, soil, harmful, environment*

1. _____ helps clean the Earth using tiny living things.
2. _____ can make water, air, and land dirty.
3. Some _____ eat harmful chemicals and make them safe.
4. _____ can grow on trees, rocks, and even in the soil.

5. Too many _____ in the water can harm fish and plants.
 6. We must take care of our _____ because we live here.
 7. An _____ happens when oil spills into the ocean.
 8. Plants grow in the _____ and can help clean it.
 9. Too much trash is _____ to animals and people.
 10. We should all help keep our _____ clean.
-

2. True or False?

Read the sentences and write **True** or **False**.

1. Bioremediation is a way to clean pollution using living things.

T/F

2. Bacteria and fungi cannot help clean the environment. T/F

3. Oil spills are good for the ocean and fish. T/F

4. Some plants can take harmful chemicals out of the soil. T/F

5. Bioremediation is a natural way to help the Earth. T/F

6. Pollution is good for nature. T/F

7. Fungi can break down harmful chemicals in the soil. T/F

8. We do not need clean air and water to live. T/F

9. Chemicals in the water can be dangerous for animals. T/F

10. Scientists use biotechnology to help nature. T/F

3. Matching Game

Match the words in **Column A** with their meanings in **Column B**.

COLUMN A	COLUMN B
1. Bioremediation	a) Tiny organisms that help clean pollution

2. Pollution	b) Helps clean the environment naturally
3. Bacteria	c) Harmful things in the air, water, and land
4. Fungi	d) A place where plants grow
5. Chemicals	e) Organisms like mushrooms that help break down waste
6. Oil spill	f) Too many bad substances in water
7. Soil	g) A dangerous event when oil leaks into the ocean
8. Harmful	h) Something that can hurt people or animals
9. Environment	i) The world around us, including nature
10. Planet	j) Earth, where we all live



4. Choose the correct answer (Multiple choice).

Select the correct answer for each question.

1. What does bioremediation do?
 - a) Makes pollution worse
 - b) Cleans the environment using living things
 - c) Adds more chemicals to nature
2. What tiny organisms help in bioremediation?
 - a) Bacteria and fungi
 - b) Dogs and cats
 - c) Rocks and sand
3. What do oil spills harm?
 - a) The ocean and marine animals
 - b) The sky
 - c) Forests

4. Where do plants help clean pollution?
 - a) In the water
 - b) In the soil
 - c) In the sky
5. Why is pollution bad?
 - a) It helps animals grow
 - b) It makes air, water, and soil dirty
 - c) It makes the planet cleaner
6. What helps fungi break down pollution?
 - a) Their special chemicals
 - b) Their big leaves
 - c) Their roots
7. What does an oil spill look like?
 - a) Clean water
 - b) A thick black liquid in the ocean
 - c) A big rock in the sea
8. What can we do to reduce pollution?
 - a) Throw trash into rivers
 - b) Use less plastic and recycle
 - c) Burn more garbage

5. Find the mistakes (Error correction).

Each sentence has **one mistake with the words in bold**. Rewrite the correct sentence.

1. Bioremediation is a way to **make pollution worse**.
2. Bacteria and fungi **cause more pollution**.

3. Oil spills are **good** for the ocean.
 4. Some plants **make soil dirty**.
 5. Pollution **helps nature grow**.
 6. We **do not** need clean air and water.
 7. Fungi **cannot** break down harmful chemicals.
 8. People should **throw more trash** into rivers.
-

6. Word scramble.

Unscramble the letters to find the correct word.

1. oiol slipl → _____
 2. ortipulonl → _____
 3. reobiodmitaien → _____
 4. cmaihsllec → _____
 5. rievnamtneon → _____
 6. iatcreab → _____
 7. afngi → _____
 8. nltape → _____
-

7. Guess the puzzle (Clues & Words)

Solve the crossword using the clues:

1. Tiny living things that help clean pollution - - - - -
2. Harmful substances in the air, water, or land - - - - -
3. What we should do to keep the planet clean - - - - -
4. A thick black liquid that spills into the ocean - - - - - - -
5. The planet, where we all live - - - - -

6. A special way to clean pollution using living things - - - - -
- - -
7. Organisms like mushrooms that help break down waste - - - -
8. The ground where plants grow - - - -
9. A science that helps people and nature - - - - -

Earth	Pollution	Biotechnology	Recycle	Soil
Fungi	Oil spill	Bacteria	Bioremediation	

8. Odd One Out

Find the word that does NOT belong in the group.

- (Bacteria, Fungus, Virus, Bioremediation) → _____
- (Water, Soil, Sky, Pollution) → _____
- (Tree, Plant, Metal, Grass) → _____
- (Oil Spill, Trash, Recycling, Smoke) → _____
- (Ocean, River, Car, Lake) → _____
- (Clean, Polluted, Fresh, Healthy) → _____
- (Air, Fire, Water, Land) → _____
- (Plastic, Oil, Fungi, Bacteria) → _____

9. Story completion.

Fill in the blanks with the correct words.

One day, Anna and her friend Ben saw a big _____ (1) in the river. They knew pollution is _____ (2) for the environment. Anna read about _____ (3), a special way to clean the Earth. She learned

that tiny _____ (4) and _____ (5) can eat harmful _____ (6) and make them safe.

Ben said, "Let's tell people to stop polluting the _____ (7)!"

Anna and Ben also planted _____ (8) to help clean the _____ (9). They were happy because they helped the _____ (10)!

10. "What Am I?" Riddles

Guess the word based on the riddle.

1. I help clean pollution using tiny living things. What am I?

2. I am a black liquid that spills into the ocean. What am I?

3. I am a group of tiny organisms that help break down waste. What am I? _____

4. I am the top layer of the ground where plants grow. What am I?

5. I am a harmful substance that makes the air, water, or land dirty. What am I? _____

6. I am a type of science that helps the environment. What am I?

7. I am an organism like a mushroom that helps clean the soil. What am I? _____

8. I am the place where we all live. What am I? _____

9. I am the process where plants take bad metals out of the soil. What am I? _____

10. I am what you should NOT throw into rivers and oceans.
What am I? _____



LISTENING TIME. BIOREMEDIATION – NATURE'S CLEANER

Instructions:

1. Listen to the script (or read it aloud to students).
2. Do exercises based on what you hear.

Listening comprehension questions:

Listening task 1. Listen attentively to the audio and say True or False?

1. Bioremediation uses machines to clean pollution. (**False**)
2. Bacteria and fungi help clean the environment. (**True**)
3. Bioremediation can remove pollution from the air, water, and soil.
(**True**)
4. Oil spills make the ocean cleaner. (**False**)
5. People can help stop pollution by recycling. (**True**)

Listening task 2. Listen again and fill in the blanks.

1. _____ is a process that helps clean pollution using tiny living things.
2. Special _____ can break down oil spills in the ocean.
3. _____ and fungi eat harmful chemicals and turn them into safe substances.
4. People can help the Earth by _____ trash in the right place.
5. _____ helps remove harmful substances from the soil.

Listening task 3. Discussion Questions

1. What is bioremediation, and how does it work?

2. How do bacteria and fungi help clean pollution?
 3. Can plants help remove harmful chemicals? How?
 4. Why is bioremediation important for the Earth?
 5. What are three things people can do to stop pollution?
-



IT IS A SPEAKING TIME.

Speaking task 1: Role-Play – Be a scientist!

Instructions:

1. One student plays the role of a scientist explaining bioremediation.
2. The other student plays the role of a curious child asking questions.
3. Switch roles after a few minutes.

Example Dialogue:

- Child:** What is bioremediation?
 - Scientist:** Bioremediation is a way to clean pollution using bacteria, fungi, and plants.
 - **Child:** Wow! How do bacteria clean pollution?
 - **Scientist:** Some bacteria eat harmful chemicals and turn them into safe substances.
 - **Child:** That's amazing! Can people help too?
 - **Scientist:** Yes! We can recycle, use less plastic, and keep our environment clean.
-

Speaking task 2: Picture talk.

Instructions:

1. Look at a picture of pollution (e.g., an oil spill, trash in the ocean, or dirty air).
2. Describe what you see in 3-5 sentences.
3. Explain how bioremediation could help solve the problem.

Example Answer:

"I see a beach covered in oil. The water is dark, and the fish are in danger. This is called an oil spill. Scientists can use bacteria to break down the oil and make the water clean again. This is an example of bioremediation."

Speaking task 3: "If I Were a Scientist..."**Instructions:**

1. Imagine you are a scientist working to clean pollution using bioremediation.
2. Complete the sentence: **"If I were a scientist, I would..."**
3. Share your ideas with the class.

Example Answer:

"If I were a scientist, I would use bacteria to clean oil spills and make the ocean safe for fish. I would also teach people how to stop pollution before it happens."

UNIT 16. BIOPLASTICS

UNIT FOCUS:

- New Vocabulary
- Reading: Bioplastics
- Reading strategy: Question-Answer Strategy
- Listening task: The Story of bioplastics
- Speaking time.

NEW VOCABULARY:

break down

pollution

harm

materials

reduce

waste

sugarcane

bottles

bags

food containers



BIOPLASTICS – A BETTER CHOICE FOR OUR PLANET



Every day, we use plastic for bottles, bags, and food containers. But did you know that regular plastic is made from oil? It does not break down quickly and can stay in nature for hundreds of years. This creates a lot of waste and pollution. Many animals eat plastic by mistake, which can harm them.

What are bioplastics?

Bioplastics are a special kind of plastic made from plants like corn, sugarcane, and potatoes. Because they come from natural materials, they break down much



faster than normal plastic. Some bioplastics disappear in just a few months! This helps keep the Earth clean and safe.

Why should we use bioplastics?

More and more businesses are choosing bioplastics to make cups, plates, and shopping bags. Some countries are also making new rules to reduce plastic waste. If more people use bioplastics, we can protect our planet and reduce pollution.

What can we do?

We can help by choosing products made from bioplastics. Small actions, like using a bioplastic bag instead of a regular plastic one, can make a big difference. Together, we can keep the Earth clean and beautiful!

Answer the questions:

1. What is regular plastic made from?
2. Why is regular plastic bad for the environment?
3. What are bioplastics made from?
4. How are bioplastics different from normal plastic?
5. How can we help the planet by using bioplastics?



DOING EXERCISES:

1. Fill in the blanks.

Complete the sentences with the correct words:

clean	plastic	bioplastics	nature	harmful
break down	pollution	protect	reduce	materials

1. Regular _____ takes a long time to disappear.

2. _____ are made from plants like corn and sugarcane.
 3. It is important to _____ waste to help the planet.
 4. Some bioplastics can _____ in just a few months.
 5. Animals can eat plastic by mistake, which is _____ for them.
 6. Factories make plastic using different _____.
 7. Too much plastic causes _____ in oceans and on land.
 8. We should keep _____ safe by using less plastic.
 9. Bioplastics help to keep the Earth _____.
 10. If we use bioplastics, we can _____ our planet.
-

2. True or False?

Decide if the sentences are **true** or **false**. If false, correct them.

1. Regular plastic is made from plants.
 2. Bioplastics break down faster than normal plastic.
 3. Plastic waste is not dangerous for animals.
 4. We can make bioplastics from potatoes and corn.
 5. Some bioplastics disappear in a few days.
 6. Plastic pollution is good for the environment.
 7. Many businesses now use bioplastics for cups and plates.
 8. Bioplastics help keep nature clean.
-

3. Match the words to their meanings

Draw a line to connect each word to the correct meaning.

WORDS	MEANINGS
1. Bioplastics	a) Making something less
2. Break down	b) Things used to make something
3. Reduce	c) A special kind of plastic from plants
4. Pollution	d) To disappear or change over time
5. Harmful	e) To keep something safe
6. Materials	f) Something that is bad for health or nature
7. Nature	g) Dirty or dangerous things in the environment
8. Protect	h) The world of plants, animals, and land
9. Plastic	i) A material made from oil, used for bottles, bags, and more
10. Safe	j) Not dangerous

4. Make a sentence.

Use each word in a sentence.

1. Bioplastics

2. Reduce

3. Pollution

4. Break down

5. Protect

6. Plastic

7. Nature

8. Harmful

5. What would you do? (Discussion questions)

Answer the questions with your own ideas.

1. What can you do to use less plastic?
 2. Why is plastic pollution bad for animals?
 3. Do you think bioplastics are a good idea? Why?
 4. How can schools help reduce plastic waste?
 5. What happens if people keep using too much plastic?
 6. Have you ever seen plastic waste in nature? Where?
 7. What are some things made from bioplastics?
 8. Why is it important to protect the environment?
-

6. Word Scramble.

Unscramble the letters to find words related to bioplastics!

1. **TBSOLET** → _____ (Hint: We drink water from this.)
2. **UTPNOLOIL** → _____ (Hint: Dirty things in nature.)
3. **LPSTCIA** → _____ (Hint: Made from oil, used for bags and bottles.)
4. **TPOTSEOA** → _____ (Hint: A vegetable used to make bioplastics.)

5. **RALTEAIMS** → _____ (Hint: Things used to make something.)
 6. **TORPCTE** → _____ (Hint: To keep safe.)
 7. **DEUCER** → _____ (Hint: To use less of something.)
 8. **IBASLTOCIP** → _____ (Hint: A special type of plastic.)
 9. **NURTEA** → _____ (Hint: Trees, animals, land, and water.)
 10. **FARHMLU** → _____ (Hint: Something that can cause damage.)
-

7. Who Am I? (Riddles).

Read the riddles and guess the word!

1. I am used for bottles and bags, but I do not disappear quickly.
What am I?
2. I come from plants, and I break down fast. People use me instead of plastic. What am I?
3. I am the reason why the Earth is dirty. I come from trash and waste. What am I?
4. I am green, and I give air to people. I am hurt by plastic waste.
What am I?
5. People want to use less of me because I cause problems. What am I?
6. I help clean the Earth by making less waste. What am I?
7. I am made from sugarcane and potatoes, and I can break down quickly. What am I?
8. People do this when they use fewer plastic bags. What is it?
9. I keep things safe, including animals and nature. What am I?

10. I am what happens when animals eat plastic. What am I?

KEY WORDS: *bioplastic ,nature ,recycling ,plastic ,harm, protect, reduce, bioplastics, plastic, pollution*

8. Find the Secret Message!

Find the hidden message by using the first letter of each answer!

1. What is made from oil and used in many products? → **P**- - - - -**c**
2. What is made from plants and is a better choice? → **B** - - - - -**c**
3. What should we do to waste? → **R** - - - - **e**
4. What do bioplastics do faster than regular plastic? → **B**- - -**k** - - -
n
5. What should we keep clean? → **N** - - - - **e**
6. What helps keep the Earth safe? → **P** - - - - -**t**
7. What is dangerous to animals? → **P** - - - - -**n**
8. What do businesses use instead of regular plastic? → **B** - - - - -
- - - **s**
9. What happens when animals eat plastic? → **H** - - **m**
10. What do we need to take care of? → **E** - - -**h**

Secret Message: "P B R B N P P B H E" → Protect Bioplastics, Reduce Bad Pollution, Be Happy, Earth!"

9. Bioplastic Detective.

Look around your home, school, or local store. Find at least 5 things made from plastic. Then, think about whether they could be replaced with bioplastics!

- **Example:** A plastic bottle → A bottle made from bioplastics
- **Example:** A plastic spoon → A wooden or bioplastic spoon

Write down your findings and discuss:

- Which items could be replaced with bioplastics?
 - What would happen if everything was made from bioplastics?
 - Do you think bioplastics should be used everywhere?
-



LISTENING TIME.

The Story of bioplastics.

Instructions:

1. Listen carefully to the script (read by the teacher or played as an audio).
2. Answer the questions based on what you heard.

Listening task 1. Comprehension Questions.

Multiple choices (Choose the correct answer)

1. What is regular plastic made from?
 - a) Water
 - b) Oil
 - c) Trees
2. How long does it take for normal plastic to break down?
 - a) A few weeks
 - b) Hundreds of years
 - c) One year
3. Why is plastic dangerous for animals?
 - a) They use it to build homes
 - b) They eat it by mistake
 - c) It makes them run faster
4. What are bioplastics made from?
 - a) Rocks
 - b) Metal
 - c) Plants

5. What is one way people can help reduce plastic waste?
 - a) Use more plastic bags
 - b) Choose bioplastics
 - c) Throw plastic in the ocean
-

Listening task 2. Fill in the Blanks

1. Regular plastic is made from _____ and takes a long time to break down.
 2. Many _____ eat plastic by mistake, which is dangerous.
 3. Bioplastics are made from natural things like _____, sugarcane, and potatoes.
 4. Some types of bioplastics disappear in just a few _____.
 5. We can help the planet by choosing bioplastics and using _____ plastic.
-



SPEAKING TIME.

Speaking task 1. Bioplastics Pictionary

- Each student takes a turn drawing a bioplastics-related word (like **bottle, pollution, nature, recycle, plastic bag, protect, reduce**).
 - Other students guess the word!
 - The person who guesses correctly gets to draw next!
-

Speaking task 2. Story Challenge.

Finish the story:

"Lily and Jack went to the beach. They were excited to play in the sand and swim in the ocean. But when they arrived, they saw plastic bottles, bags, and trash everywhere! Jack picked up a plastic bottle and said..."

- What did Jack say?

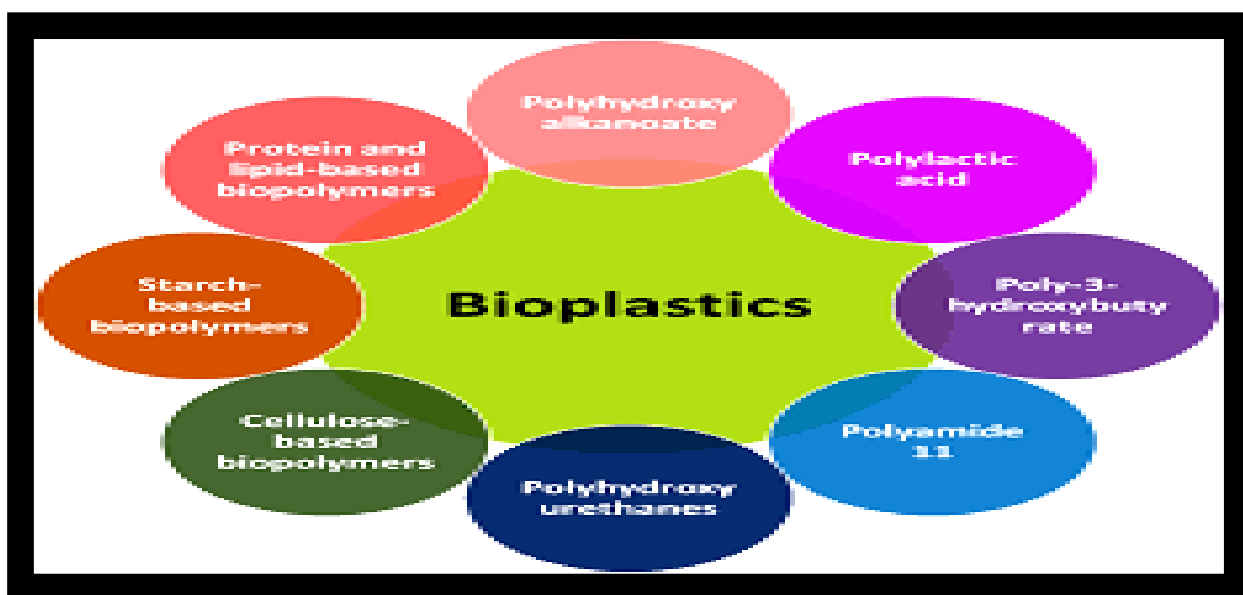
- How can Lily and Jack help?
- How does the story end?

Write your own ending and share it!

Speaking task 3 . Would You Rather?

Choose one option and explain why!

1. Would you rather use bioplastic plates or glass plates?
2. Would you rather recycle plastic or never use plastic at all?
3. Would you rather clean up a park or clean up a beach?
4. Would you rather live in a world with no plastic or no electricity?
5. Would you rather invent a new kind of bioplastic or a way to make plastic disappear instantly?



UNIT 17. WASTEWATER TREATMENT

UNIT FOCUS:

- New Vocabulary
- Reading: Wastewater Treatment
- Reading strategy: Question-Answer Strategy
- Listening task: The Journey of Wastewater
- Speaking time.

NEW VOCABULARY:

wastewater	bacteria	ultraviolet (uv)
treatment	filtering	light
screening	disinfecting	rivers and lakes.
settling		environment

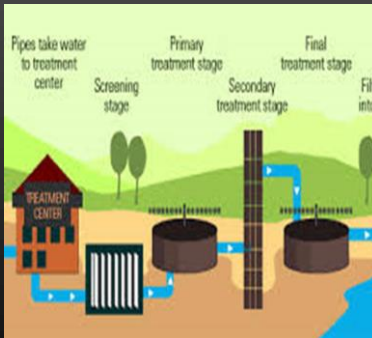


WASTEWATER TREATMENT: HOW DIRTY WATER BECOMES CLEAN AGAIN.

Have you ever wondered what happens to the water after you flush the toilet or wash your hands? This water is called **wastewater**, and it needs to be cleaned before it goes back into rivers and lakes.

Steps of Wastewater Treatment

1. **Screening** – First, big trash like leaves, plastic, and sticks are removed from the water.
2. **Settling** – The water is left to sit so that heavy dirt and sand sink to the bottom.
3. **Cleaning with Bacteria** – Tiny helpful bacteria eat the bad stuff in the water, making it cleaner.



4. **Filtering** – The water passes through special filters to remove tiny particles.

5. **Disinfecting** – Chemicals like chlorine or ultraviolet (UV) light kill any remaining germs.

After all these steps, the water is clean and safe to return to nature! This process helps keep our rivers and oceans clean and protect animals and people.

How Can You Help?

- Do not throw trash or oil down the sink.
- Use less water when washing or brushing your teeth.
- Tell others about the importance of clean water!

Clean water is important for everyone.

Let's help keep it safe!

Answer the following questions:

1. What is wastewater?
2. Why do we need to clean dirty water?
3. What is the first step of wastewater treatment?
4. How do bacteria help in cleaning water?
5. What happens during the filtering step?
6. Why is disinfecting important?

7. Where does clean water go after treatment?
8. How can you help keep water clean?



DOING EXERCISES:

1: Fill in the blanks.

Complete the sentences using the words from the word bank.

Word Bank:

wastewater, treatment, screening, bacteria, filtering,
disinfecting, rivers, environment, ultraviolet, settling

1. _____ is dirty water that needs to be cleaned.
2. The process of cleaning water is called water _____.
3. In the first step, big trash is removed. This step is called _____.
4. _____ are tiny living things that help clean the water.
5. In the _____ step, dirt and sand sink to the bottom.
6. Water passes through special materials to remove tiny particles in the _____ step.
7. In the last step, _____ light or chemicals kill germs.
8. After cleaning, the water is returned to _____ and lakes.
9. We must keep our _____ clean to protect animals and people.
10. _____ light is used to kill bacteria in the disinfecting step.

2: True or False

Read the sentences and write **True** or **False**.

1. Wastewater is already clean and safe to drink.

T/F

2. Bacteria help clean the water by eating bad things in it.

T/F

3. Screening removes small dirt particles from the water.

T/F

4. Water treatment has only one step.

T/F

5. Filtering helps remove tiny particles from the water.

T/F

6. Disinfecting kills germs and makes water safer.

T/F

7. Wastewater treatment helps keep rivers and lakes clean.

T/F

8. Settling removes large plastic trash from the water.

T/F

3: Match the steps.

Match the wastewater treatment steps with their correct descriptions.

STEPS	DESCRIPTIONS
1. Screening	A. Tiny living things eat the bad stuff in the water.
2. Settling	B. Chemicals or UV light kill germs.
3. Bacteria Cleaning	C. Big trash like plastic and sticks are removed

4. Filtering	D. The water passes through special materials to remove dirt.
5. Disinfecting	E. Heavy dirt and sand sink to the bottom.
6. Wastewater Collection	F. Dirty water from homes, schools, and factories is gathered.
7. Aeration	G. Air is added to the water to help bacteria grow and clean it
8. Sludge Treatment	H. Solid waste that settles at the bottom is removed and treated separately
9. Water Testing	I. Scientists check the water to make sure it is clean and safe.
10. Release into Nature	J. The clean water flows back into rivers, lakes, or the ocean.

4. Rearrange the sentences.

Put the sentences in the correct order (1-10) to show the wastewater treatment process.

1. Bacteria help clean the water.
2. The water goes through a filter to remove small dirt.
3. The water is returned to nature.
4. Trash is removed from the water.
5. The water is ready for use again.
6. Chemicals or UV light kill germs.
7. Heavy dirt and sand sink to the bottom.
8. Dirty water enters the treatment plant.
9. The water is tested to make sure it is clean.
10. The clean water flows into rivers and lakes.

5: Discussion questions (Think & Answer)

Talk about these questions with a partner or write your answers.

1. Why is it important to clean wastewater?
 2. What would happen if wastewater was not treated?
 3. How can we save water in daily life?
 4. What can we do to keep rivers and lakes clean?
 5. How do bacteria help in water treatment?
 6. Why should we not throw trash in the sink?
 7. What do you think happens if dirty water goes back into nature?
 8. How can schools teach students about clean water?
-

6: Mystery words (Guess the word!)

Read the clues and write the correct word.

1. I am dirty water that comes from homes and factories. What am I?

2. I am the first step in cleaning water. I remove big trash like plastic and leaves. What am I? _____
3. I am tiny but powerful! I eat bad things in the water to help clean it. What am I? _____
4. I make dirt and sand sink to the bottom. What am I? _____
5. I use special materials to remove tiny dirt from water. What am I?

6. I kill germs with chemicals or ultraviolet light. What am I?

7. I am where the clean water goes after treatment. What am I?

8. I help keep water safe for people and animals. What am I?

7: Spot the mistakes!

Each sentence has a mistake. Find it and rewrite the sentence correctly.



1. Wastewater treatment makes water dirtier.

cleaner

2. The first step of wastewater treatment is adding soap.

3. Bacteria are bad for water and should not be used in cleaning. _____

4. Filtering is the first step in wastewater treatment.

5. We should throw trash and oil into the sink to help water treatment.

6. Water does not need to be disinfected before going back to nature. _____

7. Wastewater treatment plants make water salty. _____

8. Clean water is not important for people and animals. _____

9. The last step of wastewater treatment is adding sugar. _____

10. After treatment, water is thrown away and never used again. _____
-



LISTENING TIME. "The Journey of Wastewater"

Instructions:

1. Listen carefully to the script (read by the teacher or played as an audio).
2. Do exercises based on what you heard.

Listening task 1: Fill in the Blanks

Listen to the script and fill in the missing words.

1. Wastewater needs to be _____ before it can return to nature.
 2. The first step of treatment is _____, where big objects like plastic and sticks are removed.
 3. In the _____ tank, heavy dirt and sand sink to the bottom.
 4. Tiny _____ help clean the water by eating harmful waste.
 5. The water then goes through _____ to remove tiny particles.
 6. The last step is _____, where chemicals or UV light kill germs.
 7. After treatment, the water is _____ and safe.
 8. Clean water flows back into _____ and lakes.
 9. Thanks to wastewater treatment, we can protect _____.
 10. We should help keep our _____ clean.
-

Listening task 2: Multiple choice questions (MCQ)

Choose the correct answer based on the script.

1. What is wastewater?
 - a) Clean drinking water
 - b) Dirty water that needs to be cleaned
 - c) Water from the ocean
2. What is the first step in wastewater treatment?
 - a) Disinfecting
 - b) Filtering
 - c) Screening
3. What happens in the settling tank?
 - a) Water is sent to homes
 - b) Heavy dirt and sand sink to the bottom
 - c) Water becomes salty
4. What do bacteria do in wastewater treatment?
 - a) Make the water dirty
 - b) Eat harmful waste and clean the water
 - c) Remove plastic from water
5. How are germs killed in the final step?
 - a) By boiling the water
 - b) Using chemicals or ultraviolet (UV) light
 - c) Adding more bacteria
6. Where does clean water go after treatment?
 - a) To factories
 - b) Back into rivers and lakes
 - c) To the ocean without treatment
7. Why is wastewater treatment important?
 - a) To make the water dirtier

- b) To clean water and protect the environment
 - c) To create more wastewater
8. What should we NOT throw in the sink or toilet?
- a) Water and soap
 - b) Trash and oil
 - c) Drinking water
-

Listening task 3: Order the steps.

Put the wastewater treatment steps in the correct order (1-6).

- Steps:

- Filtering
- Screening
- Settling
- Disinfecting
- Water returns to nature
- Bacteria cleaning



SPEAKING TIME.

Speaking task 1: Act it out! (Role-Play)

Work in pairs or groups. Act out a conversation using these roles:

Scientist – Explains how wastewater treatment works.

Environmental Activist – Talks about why clean water is important.

Student – Asks questions about how they can help save water.

Fish – Says what happens if water is not cleaned before going into the river.

Example conversation:

- **Scientist:** "Wastewater goes through many steps to become clean again."

- **Activist:** "That's great! We need clean water to protect animals and people."

Student: "How can I help keep water clean?"

- **Fish:** "Please don't throw trash in the water! It makes it hard for me to live."



Speaking task 2: Draw the process.

Draw a step-by-step diagram of how wastewater is treated. Include labels like:

- Screening
- Settling
- Bacteria cleaning
- Filtering
- Disinfecting
- Clean water release

After drawing, explain your diagram to a friend or family member!

Speaking task 3: Water Superhero Story!

Imagine you are a **Water Superhero!** Write a short story about how you save a river from pollution. Use these words in your story:

- Wastewater

- Treatment
- Bacteria
- Filtering
- Disinfecting
- Clean water
- River
- Pollution
- Environment
- Save

Example start:

"One day, Super Water Saver saw that the river was full of dirty wastewater. 'Oh no!' he said. 'We need to clean it!' He used a special bacteria power to..."

Encourage students to be creative! They can also draw their superhero and present their story.

UNIT 18. RENEWABLE ENERGY FROM BIOTECHNOLOGY

UNIT FOCUS:

- New Vocabulary
- Reading: Renewable Energy from Biotechnology
- Reading strategy: Question-Answer Strategy
- Listening task: How Biotechnology Creates Renewable Energy
- Speaking time.

NEW VOCABULARY:

biotechnology



renewable
energy
biofuels
biogas
algae
waste

pollution
electricity
fuels
protect



RENEWABLE ENERGY FROM BIOTECHNOLOGY.

Did you know that we can make energy from plants, tiny living things, and waste? This is called **renewable energy from biotechnology**! It helps us get power without harming the Earth.

How Does It Work?

1. **Biofuels** – Some plants, like corn and sugarcane, can be turned into fuel for cars, buses, and even airplanes. This fuel is called **biofuel**.
2. **Biogas** – When food waste, animal poop, or dead plants break down, they make a gas called **biogas**. This gas can be used for cooking and making electricity.
3. **Algae Power** – Tiny green plants called **algae** grow in water. Scientists can turn algae into fuel for cars and machines!
4. **Waste to Energy** – Some garbage can be changed into energy instead of being thrown away. This helps reduce waste and makes power at the same time!

Why Is It Important?

- It helps save the planet by reducing pollution.



- It does not run out like coal and oil.
- It uses waste and plants instead of harmful fuels.
- **Renewable energy from biotechnology is a smart way to protect nature and keep our world clean!**



DOING EXERCISES:

1: True or False?



Instructions: Read each sentence. Write **T** if it is true and **F** if it is false.

1. Renewable energy can run out quickly. **(T/F)**
2. Biofuels are made from plants like corn and sugarcane. **(T/F)**
3. Biogas comes from old batteries and plastic. **(T/F)**
4. Algae can be used to make fuel. **(T/F)**
5. Biotechnology helps us make energy from living things. **(T/F)**
6. Burning coal is a type of renewable energy. **(T/F)**
7. Waste can be turned into energy instead of being thrown away.
(T/F)
8. Biogas smells like fresh flowers. **(T/F)**
9. Electricity can be made from food waste. **(T/F)**
10. Renewable energy helps keep the Earth clean. **(T/F)**

2: Match the words.

Instructions: Match the word to its correct definition.

WORDS	DEFINITIONS
1. Biotechnology	A. Tiny green plants used to make fuel
2. Biofuels	B. Power made from things that do not run out
3. Biogas	C. Fuel made from plants like corn and sugarcane
4. Algae	D. Gas made from food waste and poop
5. Electricity	E. Energy used to turn on lights and machines
6. Pollution	F. Using living things to make energy
7. Waste	G. Things we throw away, like food scraps
8. Renewable Energy	H. Dirty air, land, or water
9. Protect	I. To keep something safe
10. Fuel	J. Something burned to make energy

3: Fill in the blanks.

Instructions: Complete each sentence using the correct word from the box below.

- _____ is made from plants like corn and sugarcane.
- Scientists use _____ to create energy from living things.
- _____ energy comes from sources that never run out.
- Food scraps and animal waste can be turned into _____.
- Cars and airplanes need _____ to move.
- Tiny green plants called _____ can make fuel.
- We need to _____ the Earth by using clean energy.

8. Some _____ can be turned into energy instead of being thrown away.
9. Dirty air and water are examples of _____.
10. We use _____ to turn on lights and power machines.

electricity	protect	biotechnology	algae	waste
biogas	pollution	renewable	fuel	biofuels

4: Unscramble the words.

Instructions: Unscramble the words and write the correct word.

1. nogspiolu → (p_____)
2. ofbuile → (b_____)
3. niceabrwlel → (r_____)
4. gsaibo → (b_____)
5. tyiecleclri → (e_____)
6. otoeygnihtbloc → (b_____)
7. lapgae → (a_____)
8. eluf → (f_____)
9. ettrpco → (p_____)
10. saetw → (w_____)

5: Choose the correct word.

Instructions: Choose the correct word to complete each sentence.

1. _____ (Pollution / Renewable energy) does not run out.
 2. _____ (Biogas / Plastic) is made from food waste and poop.
 3. We need _____ (fuel / pollution) to make cars and airplanes move.
 4. _____ (Electricity / Coal) turns on lights and machines.
 5. Tiny green plants called _____ (algae / pollution) can be used to make fuel.
 6. We should _____ (protect / throw away) the Earth by using clean energy.
 7. _____ (Plastic / Biotechnology) helps turn living things into energy.
 8. Some waste can be turned into _____ (fuel / trees) instead of being thrown away.
 9. _____ (Coal / Renewable energy) is bad for the environment.
 10. Biofuels are made from _____ (plants / rocks).
-

6: Sentence Matching

Instructions: Match the first part of the sentence with the correct ending.

First Part	Second Part
1. Biogas is made from	A. using renewable energy.
2. Renewable energy never	B. turns on lights and machines.
3. Biofuels come from	C. food waste and animal poop.
4. Pollution makes	D. can be used to make fuel.

5. Algae	E. plants like corn and sugarcane.
6. We should protect the Earth by	F. helps make fuel and energy.
7. Waste can	G. turn into energy.
8. Electricity	H. run out.
9. Fuel helps	I. the air dirty.
10. Biotechnology	J. cars and airplanes move.

7: What comes next?

Instructions: Fill in the blanks to complete the sentence based on logic.

1. Biofuels are made from plants, so _____ can be used to make fuel.
2. We need electricity to turn on _____.
3. If we don't stop pollution, the air will become _____.
4. Instead of throwing food waste away, we can turn it into _____.
5. Using too much coal and oil is bad for the _____.
6. If we use more renewable energy, we can _____ the Earth.
7. A good way to reduce waste is to turn it into _____.
8. When food waste breaks down, it creates _____.
9. Tiny green algae can be turned into _____.
10. The best way to keep nature clean is to stop _____.

8: Discussion Questions

Instructions: Answer the following questions in your own words.

1. Why is renewable energy important?
2. How does biotechnology help make energy?
3. What are biofuels made from?
4. What are two things that can make biogas?
5. Why should we reduce pollution?
6. How can we turn waste into energy?
7. What is a good way to protect the Earth?
8. How does electricity help us every day?



LISTENING TIME.

"How Biotechnology Creates Renewable Energy"

Instructions:

1. **Listen carefully** (or read the script aloud to students).
2. **Answer the questions** after listening.

Listening task 1. Fill in the blanks:

1. _____ is energy that never runs out.
2. Biofuels are made from _____ like corn and sugarcane.
3. Biogas is created from _____ waste, animal poop, and dead plants.
4. Tiny green plants called _____ can be turned into fuel.
5. _____ can be changed into electricity instead of being thrown away.

Listening task 2. True or False?

6. Biotechnology helps us make energy from plants and waste.
(T / F)
7. Biogas is made from plastic bottles and metal cans.
(T / F)
8. Biofuels can power cars and airplanes.
(T / F)
9. Renewable energy pollutes the Earth.
(T / F)
10. Algae can be used to make fuel.
(T / F)

Listening task 3. Short Answer Questions:

11. What is biotechnology?
12. How does biogas help us?
13. Why is renewable energy better than coal and oil?
14. What are biofuels made from?
15. What can we do to help the Earth?



SPEAKING TIME.

Speaking Task 1. «Picture Description (For groups or individual)

Look at a picture of a wind farm, solar panels, or a biogas plant.



- Describe what you see.
- Explain how the energy in the picture is used.
- Say why this type of energy is good for the environment.

Speaking Task 2: Role-Play (For Pairs or Groups)

Scenario 1:

You are a **scientist** explaining biotechnology to a group of kids. Explain how we make biofuels, biogas, or algae fuel.

Scenario 2:

You are a **school principal**. A student asks why the school should use renewable energy. Convince them with three reasons.

Scenario 3:

You are a **news reporter**. Interview a "scientist" (your friend) about how biotechnology helps the planet. Ask at least **three** questions!

Speaking Task 3: Debate (For Teams)

Topic: *"Should all cars use biofuels instead of gasoline?"*

- Team 1: **Yes! Biofuels are better for the planet.**
- Team 2: **No! Gasoline is still important.**

- Each team gives **3 reasons** to support their side.
- After both teams speak, discuss a **compromise**.

Speaking Task 4: Storytelling Challenge.

Imagine a future where the world only uses renewable energy!

- How does life look different?
- What does your city use for energy?
- What new inventions exist?

UNIT 19. BIOSENSORS

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Biosensors**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: How biosensors help us.**
- **Speaking time.**

NEW VOCABULARY:

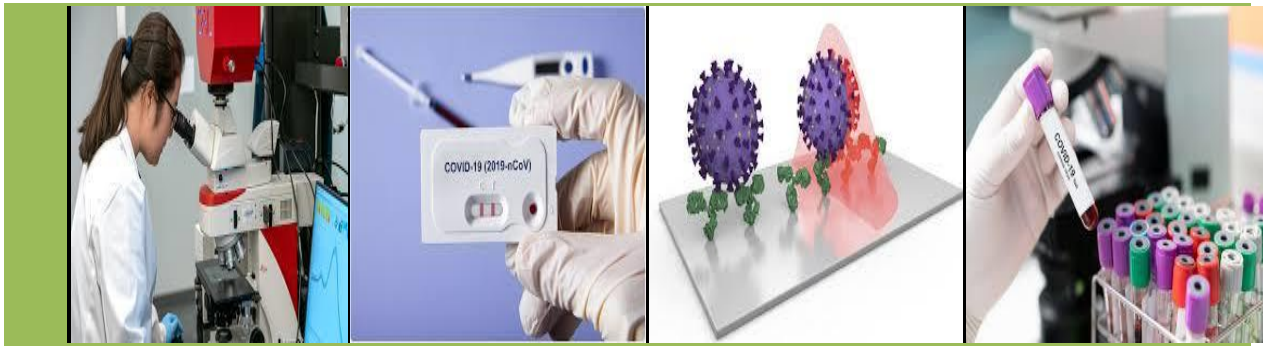
biosensor	test	safe
detect	blood sugar	environment
measure	germs	
screen	fresh	



BIOSENSORS: TINY HELPERS FOR BIG DISCOVERIES!

Have you ever seen a doctor check someone's blood or scientist test water? They often use a special tool called a **biosensor**!

What is a Biosensor?



A **biosensor** is a tiny device that helps **find and measure things** in our bodies, food, or the environment. It works like a **mini detective** looking for clues!

How Do Biosensors Work?

1. **They find something special** – like sugar in blood, germs in water, or vitamins in food.
2. **They measure it** – how much is there?
3. **They show the result** – on a screen or paper, so doctors or scientists can understand it.

Where Do We Use Biosensors?

- ✓ **Hospitals** – Doctors check blood sugar for diabetic patients.
- ✓ **Food safety** – Scientists test if food is fresh and safe to eat.
- ✓ **Nature protection** – People check if water or air is clean.

Biosensors help us **stay healthy, keep food safe, and protect nature**. They are small but very important!

Answer the following questions:

1. What is a biosensor?
2. Where do we use biosensors?
3. Why are biosensors important for health?
4. How do biosensors help the environment?

5. Can you think of another way biosensors can help people?



DOING EXERCISES:

1. Match the words with their meanings.

Instructions: Match each word to its correct meaning.

WORD	MEANING
1. Biosensor	A. To check something carefully
2. Detect	B. A small device that finds and measures things
3. Measure	C. The amount of sugar in a person's blood
4. Germs	D. The air, water, and land around us
5. Screen	E. A part of a device that shows numbers or pictures
6. Blood Sugar	F. Tiny living things that can make us sick
7. Safe	G. Something that is not dangerous
8. Fresh	H. Food that is new and good to eat
9. Test	I. To find something
10.Environment	J. To check how much of something is there

2. Find the mistakes and fix the sentences.

Instructions: Each sentence has **one mistake**. Find and correct it!

1. A biosensor makes water **dirty**.
2. Biosensors only work in hospitals.
3. We use biosensors to add sugar to blood.
4. Germs make food fresher.

5. Biosensors cannot detect anything in food.
6. The screen of a biosensor never shows results.
7. Biosensors help make the environment more dangerous.
8. People do not use biosensors to check if water is safe.
9. Fresh food is old and unsafe to eat.
10. Biosensor cannot measure things in nature.

3. Sentence matching.

Instructions: Match the **first part** of the sentence with the **correct ending**.

FIRST PART	SECOND PART
1. A biosensor helps	A. find and measure things in our body.
2. Doctors use biosensors	B. and keep the environment clean.
3. A biosensor has	C. people check their blood sugar.
4. Scientists use biosensors	D. a screen that shows results.
5. Germs are	E. to check if food is safe to eat.
6. Fresh food	F. tiny things that can make us sick.
7. The environment is	G. means food is good to eat.
8. A test helps	H. check if water is clean.
9. We need to be safe	I. by using clean food and water.

**10. Biosensors
protect us**

J. the world around us.

4. Fill in the Blanks.

Instructions: Complete the sentences using the words from the table below:

1. A _____ is a device that finds and measures things.
2. Doctors use biosensors to check _____ levels.
3. _____ can make people sick if they are in food.
4. Scientists use a _____ to see if water is clean.
5. The _____ of a biosensor shows the results.
6. We must protect the _____ by keeping it clean.
7. Biosensors help _____ if food is fresh.
8. A biosensor can _____ how much sugar is in blood.
9. If something is _____, it means it is not dangerous.
10. We should eat _____ food to stay healthy.

screen	measure	blood sugar	germs	biosensor
safe	fresh	detect	test	environment

5. What's the question?

Instructions: Read the answer and **write the correct question.**

1. **Answer:** A biosensor is a device that helps measure things.

Question: _____?

2. **Answer:** Doctors use biosensors to check blood sugar.

Question: _____?

3. **Answer:** Scientists use biosensors to test food and water.

Question: _____?

4. **Answer:** A biosensor has a screen to show results.

Question: _____?

5. **Answer:** Germs are tiny things that can make us sick.

Question: _____?

6. **Answer:** Fresh food is safe to eat.

Question: _____?

7. **Answer:** Biosensors help keep the environment clean.

Question: _____?

8. **Answer:** People use biosensors to make sure food is safe.

Question: _____?

9. **Answer:** The environment is the air, water, and land around us.

Question: _____?

10. **Answer:** Measuring blood sugar is important for people with diabetes.

Question: _____?

6. Writing challenge: "A day with a biosensor"

Instructions: Imagine you are a biosensor. Write **5-10 sentences** about your day.

Example:

"Hi! I am a biosensor. Today, I helped a doctor check a patient's blood sugar. Then, I went to a food lab to test if milk was fresh. Later, scientists used me to check the water in a river. I love helping people stay safe and healthy!"

7. Rearrange the Sentences (Put in Correct Order)

Instructions: The sentences below are in the wrong order. Put them in the correct sequence based on the text.

1. A biosensor shows the result on a screen or paper.
2. People use biosensors to check if water or air is clean.
3. A biosensor is a small tool that helps measure things.
4. Scientists use biosensors to test if food is safe to eat.
5. Doctors check blood sugar using biosensors.
6. Biosensors work like tiny detectives.
7. They measure how much of something is in food, water, or blood.
8. Biosensors help keep food safe, protect nature, and keep us healthy.
9. They first find something special, like sugar in blood or germs in water.
10. Biosensors are very important and used in hospitals, food safety, and nature protection.



Now, write the sentences in the correct order!

8. Scrambled words: Unscramble the letters.

Instructions: Unscramble the letters to form the correct word from the text.

1. sonerbios → _____
2. dectoet → _____
3. asreemu → _____
4. sercne → _____

5. obldo rusga → _____
6. tset → _____
7. mger → _____
8. shfrea → _____
9. vesntienmor → _____
10. saef → _____



Now, write the correct words!



LISTENING TIME.

"How Biosensors Help Us"

Instructions:

1. Listen carefully (or read the script aloud to students).
2. After listening, do exercises below.

Exercises Based on the Listening Script

Listening task 1. True or False?

Instructions: Read the sentences. If the sentence is true, write T. If it is false, write F and correct the mistake.

1. ____ A biosensor is a large machine that measures things. **T/F**
2. ____ Biosensors work like tiny detectives. **T/F**
3. ____ Biosensors can only be used by doctors. **T/F**
4. ____ Scientists use biosensors to check if food is fresh and safe.
T/F
5. ____ Biosensors help us keep our environment clean. **T/F**
6. ____ A biosensor measures things but cannot show results. **T/F**

7. ____ Biosensors are used to check blood sugar levels. **T/F**
8. ____ People use biosensors to check the cleanliness of water and air. **T/F**
9. ____ Biosensors are not useful in hospitals. **T/F**
10. ____ Even though biosensors are small, they do an important job. **T/F**

Listening task 2. Fill in the blanks.

Instructions: Use the correct word from the script to complete each sentence.

1. A _____ is a small device that helps find and measure things.
2. Biosensors work like a tiny _____ looking for clues.
3. First, a biosensor _____ something special, like sugar in blood.
4. Then, it _____ how much is there.
5. Finally, it _____ the result on a screen or paper.
6. Doctors use biosensors to check _____ for diabetic patients.
7. Scientists use biosensors to check if _____ is fresh and safe.
8. Biosensors help check if _____ and _____ are clean.
9. Biosensors help us stay _____ and protect _____.
10. Even though biosensors are small, they do a very _____ job!

Listening task 3. Multiple choice quizzes.

Instructions: Choose the correct answer for each question.

1. What do biosensors help doctors check?
 - a) Air quality
 - b) Blood sugar levels
 - c) Weather temperature
 2. What do biosensors work like?
 - a) A giant robot
 - b) A tiny detective
 - c) A television
 3. Where do scientists use biosensors?
 - a) To test if food is fresh and safe
 - b) To play games
 - c) To build houses
 4. What do biosensors do FIRST?
 - a) Show results on a screen
 - b) Find something special
 - c) Measure the amount of sugar
 5. How do biosensors help protect the environment?
 - a) By making food taste better
 - b) By checking if water and air are clean
 - c) By helping people sleep
-

Listening task 4. Sentence scramble.

Instructions: Unscramble the words to form correct sentences.

1. a / small / Biosensor / is / device.
2. things / Biosensors / measure / help.
3. sugar / check / blood / Doctors / biosensors / use / to.

4. food / safe / Scientists / biosensors / fresh / test / use / to / if / is.
 5. clean / check / Biosensors / air / and / water.
 6. first / Biosensors / special / find / something.
 7. results / Biosensors / show / screen / paper / a / on / or.
 8. healthy / us / help / Biosensors / stay.
 9. nature / protect / Biosensors / help.
 10. do / important / a / job / very / Biosensors.
-



Fun Speaking Activity 1: Act It Out!

Instructions: Work with a partner and act out one of these roles.

Role 1: Doctor & Patient

- The doctor explains how a biosensor checks blood sugar.
- The patient asks questions.

Role 2: Scientist & Reporter

- The scientist explains how biosensors keep food safe.
- The reporter asks questions.

Role 3: Environmentalist & Student

- The environmentalist explains how biosensors check water safety.
 - The student asks questions.
-

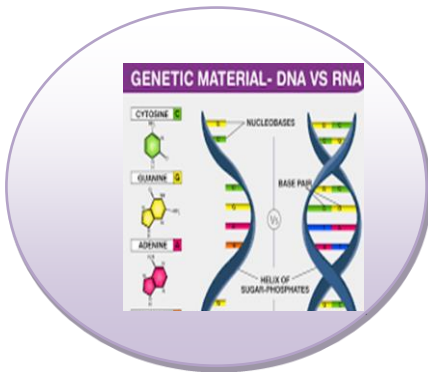
UNIT 20. DNA AND ITS STRUCTURE.

UNIT FOCUS:

- New Vocabulary
- Reading: DNA and its structure
- Reading strategy: Question-Answer Strategy
- Listening task: The amazing world of DNA
- Speaking time.

NEW VOCABULARY:

DNA	thymine (T)	genetic code
cells	cytosine (C)	inheritance
double helix	guanine (G)	
adenine (A)	traits	



DNA AND ITS STRUCTURE – THE CODE OF LIFE!

Have you ever wondered why you look like your parents? It's because of **DNA**!

What is DNA?

DNA is like a special **code** inside every living thing. It tells our body how to grow, look, and work. DNA is found inside **cells**, which are tiny parts of our body.

What Does DNA Look Like?

DNA looks like a twisted ladder. Scientists call this shape a **double helix**. The steps of the ladder are made of four special letters:

- **A** (Adenine)
- **T** (Thymine)
- **C** (Cytosine)
- **G** (Guanine)

A always pairs with T, and C always pairs with G. These letters form the code that makes **everything in your body work!**

Why is DNA Important?

- ✓ It decides your **eye color, hair type, and height**.
- ✓ It helps your **body grow and stay healthy**.
- ✓ It passes **traits** from parents to children.

Fun Fact!

If you stretched out the entire DNA in one human body, it could reach the sun and back **600 times!**

DNA is amazing because it helps make **YOU unique!**

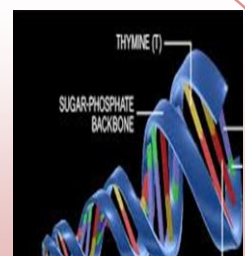
Answer the following questions:

1. What is DNA?
2. Where is DNA found in the body?
3. What shape does DNA have?
4. What are the four special letters in DNA?
5. Which letters always pair together?

What does DNA decide about a person?

7. Why is DNA important?
8. What do scientists call the shape of DNA?

6.





DOING EXERCISES:

1. True or False?

Instructions: Read each statement. Write **T** if it is true and **F** if it is false. If false, correct the mistake.

1. ____ DNA is found inside rocks and water.

True / False

2. ____ DNA tells the body how to grow and work.

True / False

3. ____ DNA is shaped like a straight line.

True / False

4. ____ The four special letters in DNA are A, B, C, and D.

True / False

5. ____ Adenine (A) always pairs with Thymine (T).

True / False

6. ____ Cells are the tiny building blocks of all living things.

True / False

7. ____ DNA helps decide a person's eye color and hair type.

True / False

8. ____ DNA is only found in animals, not plants.

True / False

9. ____ The shape of DNA is called a **double helix**.

True / False

10. ____ DNA helps pass traits from parents to children.

True / False

2. Fill in the blanks.

Instructions: Use the correct word from the word bank to complete each sentence.

traits	Thymine	cells	code	Guanine
inheritance	DNA	Adenine	double helix	Cytosine

1. The full name for DNA is _____.
2. DNA is found inside tiny parts of the body called _____.
3. The shape of DNA looks like a twisted ladder, called a _____.
4. The four special letters in DNA are **A, T, C, and G**, which stand for _____, _____, _____, and _____.
5. DNA carries a special _____ that tells the body how to work.
6. The process of passing features from parents to children is called _____.
7. DNA helps decide physical _____ like hair color and height.
8. The letter **A** always pairs with _____.
9. The letter **C** always pairs with _____.
10. Without _____, life could not exist!

3. Multiple choice quizzes.

Instructions: Choose the correct answer for each question.

1. What is DNA?
a) A type of food

- b) A special code inside living things
- c) A kind of rock

2. Where is DNA found?

- a) In the air
- b) Inside cells
- c) On clothes

3. What shape does DNA have?

- a) A straight line
- b) A double helix (twisted ladder)
- c) A circle

4. What are the four letters in DNA?

- a) A, T, C, G
- b) X, Y, Z, W
- c) D, N, A, B

5. Which letter pairs with Adenine (A)?

- a) Cytosine (C)
- b) Thymine (T)
- c) Guanine (G)

6. What does DNA help decide?

- a) The color of your clothes
- b) Your traits like eye color and height
- c) What you eat for lunch

7. Why is DNA important?

- a) It helps people write books
- b) It tells the body how to grow and work
- c) It makes people run faster

8. What do scientists call the twisted ladder shape of DNA?
- a) Helix twist
 - b) Double helix
 - c) Spinning rope
-

4. Match the pairs.

Instructions: Match the word in **Column A** with the correct definition in **Column B**.

Column A	Column B
1. DNA	A. Decides eye color, hair type, etc.
2. Cells	B. The twisted ladder shape of DNA
3. Double helix	C. Tiny building blocks of all living things
4. Adenine (A)	D. The special code that makes life possible
5. Thymine (T)	E. The letter that always pairs with Adenine (A)
6. Cytosine (C)	F. The letter that always pairs with Cytosine (C)
7. Guanine (G)	G. The process of passing traits to children
8. Genetic code	H. The information inside DNA
9. Traits	I. The letter that always pairs with Guanine (G)
10. Inheritance	J. The letter that always pairs with Thymine (T)

5. Sentence scramble.

Instructions: Unscramble the words to make correct sentences.

1. DNA / in / found / is / cells.
 2. like / DNA / a / ladder / twisted / looks.
 3. special / DNA / a / code / is.
 4. A / with / T / always / pairs.
 5. C / with / G / always / pairs.
 6. passes / traits / DNA / parents / from / children / to.
 7. called / shape / DNA's / is / helix / a / double.
 8. decides / color / DNA / eye.
 9. scientists / DNA / use / to / study / life.
 10. helps / body / DNA / the / grow.
-

6. Scrambled Words.

Instructions: Unscramble the letters to find the correct word.

1. D N A → _____
2. C E L S L → _____
3. D E C O → _____
4. T I A R T S → _____
5. E L U B O D X H E I L → _____
6. I T O N H R A C I E N → _____
7. T H Y I N M E → _____
8. G N A U I N E → _____
9. E C T I S N T I S → _____
10. H I T O E G H → _____

7. Complete the Sentences.

Instructions: Fill in the missing words using clues from the lesson.

1. DNA is found inside tiny parts of our body called _____.
 2. The shape of DNA is called a _____ helix.
 3. The four special letters in DNA are _____, _____, _____, and _____.
 4. _____ always pairs with Thymine (T).
 5. _____ always pairs with Guanine (G).
 6. DNA carries the special _____ that tells the body what to do.
 7. DNA passes traits from _____ to children.
 8. Scientists study DNA to learn more about _____.
 9. Without DNA, our _____ would not work properly.
 10. DNA helps decide how tall we are and the _____ of our eyes.
-



LISTENING TIME.

"The amazing world of DNA"

Instructions:

1. Listen carefully (or read the script aloud to students).
 2. Answer the questions based on the story.
-

Listening task 1: Fill in the Blanks

Instructions: Listen to the script and fill in the missing words.

1. DNA is a special _____ inside our bodies.

2. DNA is found inside tiny parts of the body called _____.
 3. The shape of DNA looks like a _____.
 4. Scientists call the shape of DNA a _____.
 5. The four letters in DNA are _____, _____, _____, and _____.
 6. DNA helps decide a person's _____ and _____.
 7. DNA is passed from _____ to _____.
 8. Scientists use DNA to study _____ and solve _____.
 9. Even though DNA is very _____, it is very important.
 10. DNA helps the body _____ and _____ properly.
-

Listening task 2: True or False?

Instructions: Write **T** if the sentence is true and **F** if it is false. If false, correct the mistake.

1. ____ DNA is found in water and rocks.
 2. ____ The shape of DNA is a straight line.
 3. ____ The four letters in DNA are A, T, C, and G.
 4. ____ DNA decides your eye color and hair type.
 5. ____ DNA is passed from parents to children.
 6. ____ Scientists do not use DNA for anything.
 7. ____ DNA helps the body grow and work.
 8. ____ Adenine (A) always pairs with Cytosine (C).
 9. ____ DNA is super small but very important.
 10. ____ Cells are the tiny building blocks of all living things.
-

Listening task 3: Answer the Questions

Instructions: Listen carefully and answer in **one or two sentences**.

1. What is DNA?
2. Where is DNA found?
3. What does DNA look like?
4. What are the four letters in DNA?
5. How does DNA decide what we look like?
6. What is it called when DNA passes from parents to children?
7. How do scientists use DNA?
8. Why is DNA important for the body?



Speaking task 1. Role-Play - Be a Scientist!

Instructions: Imagine you are a scientist explaining DNA to a young child. Use simple words and gestures.

Example:

- "DNA is like a recipe for your body! It tells your hair to be curly or straight and your eyes to be blue or brown!"

Now, take turns explaining DNA to a partner or family member!

Speaking task 2: Finish the Sentence

Instructions: Complete each sentence aloud.

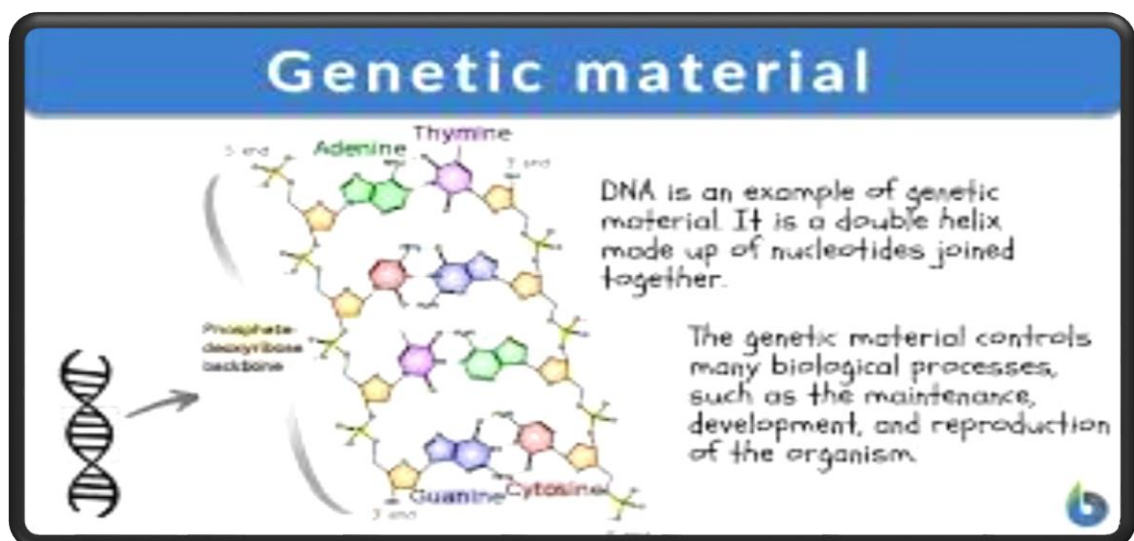
1. DNA is very _____.
2. The shape of DNA looks like a _____.
3. DNA helps decide our _____ and _____.
4. The four letters in DNA are _____, _____, _____, and _____.

5. Scientists use DNA to _____ and _____.
 6. We get our DNA from our _____.
 7. If DNA didn't work, our bodies wouldn't _____.
 8. Cells are the tiny _____ that hold DNA.
 9. DNA is inside all _____ things.
 10. I think DNA is _____ because _____.
-

Speaking task 3: Describe & Draw

Instructions:

1. First, **describe** the shape of DNA using words.
2. Then, **draw** what you think DNA looks like and explain your drawing to a friend.



UNIT 21. CLONING

UNIT FOCUS:

- New Vocabulary
- Reading: Cloning
- Reading strategy: Question-Answer Strategy
- Listening task: The Science of Cloning
- Speaking time.

NEW VOCABULARY:

clone	scientists	copy
DNA	medicine	nature
technology	plants	
traits	animals	



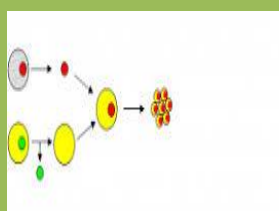
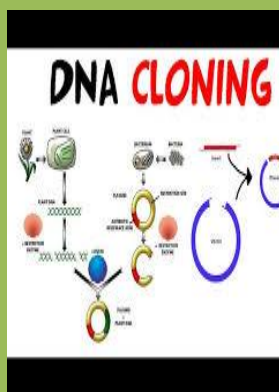
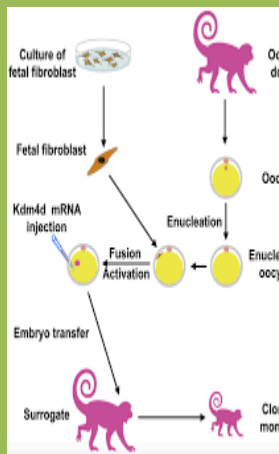
WHAT IS CLONING?

Cloning means making an **exact copy** of a plant, animal, or even a tiny cell. The new copy looks and works just like the original!

How Does Cloning Happen?

Scientists use **special technology** to take the DNA from one living thing and use it to make a copy. This means the new copy has the **same traits** as the original.

Where is Cloning Used?



✓ **Plants** – Farmers clone strong and healthy plants to grow more food.

✓ **Animals** – Scientists clone animals to learn more about them.

✓ **Medicine** – Cloning helps doctors make better treatments for sick people.

Is Cloning Good or Bad?

Cloning can help people, animals, and nature, but some scientists think we must be **careful** when using it. It is still a new science, and scientists are learning more every day!

Cloning is an exciting way to make copies, but nature still makes every living thing special!

Answer the following questions:

1. What is cloning?
2. What do scientists use to make a clone?
3. What does DNA do in cloning?
4. How do farmers use cloning?
5. Why do scientists clone animals?
6. How can cloning help sick people?
7. What are some good things about cloning?
8. What are some things we must be careful about with cloning?
9. Do you think cloning should be used a lot? Why or why not?

10. If you could clone something, what would it be and why?



DOING EXERCISES:

1. True or False?

Instructions: Read the sentences and decide if they are **True (T)** or **False (F)**. If false, correct the sentence!

1. Cloning means making a copy of something.
2. DNA is not important for cloning.
3. Farmers clone plants to grow more food.
4. Scientists use magic to create clones.
5. Cloning can be used to help sick people.
6. Cloned animals always look different from the original.
7. Cloning is a natural process that happens on its own.
8. Scientists clone animals to learn more about them.
9. Cloning is only used for making pets.
10. Every clone is an exact copy of the original.

2. Match the Words!

Instructions: Match the words with their meanings.

Words:

Words:	Meanings:
1. Clone	A. A doctor uses this to help sick people.
2. DNA	B. The special code inside every living thing.

3.Scientist	C. An exact copy of something
4. Traits	D. Living things like trees and flowers
5.Medicine	E. Tools and machines used for science.
6. Technology	F. Everything around us, like trees, water, and air.
7. Nature	G. A living thing like a cat or dog
8. Copy	H. A person who studies and learns new things in science.
9. Animal	I. Special features like eye color or height.
10. Plant	J. To make something look exactly the same

3. Fill in the blanks.

Instructions: Use the words below to complete the sentences.

**clone, DNA, scientists, animals, plants,
medicine, copy, traits, nature, technology**

1. A _____ is an exact copy of something.
2. _____ is the code inside every living thing.
3. _____ study cloning and other sciences.
4. Some _____ are cloned to help scientists learn more about

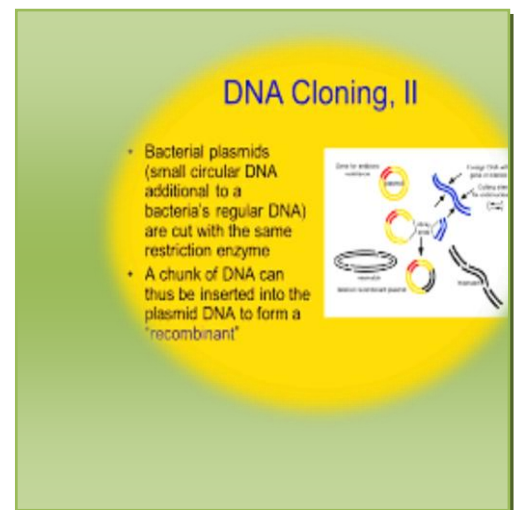
them.

5. Farmers use cloning to grow more _____.
 6. Cloning helps doctors make better _____ for sick people.
 7. A clone is a _____ of the original living thing.
 8. Hair color and eye color are examples of _____.
 9. Cloning can help protect _____ by saving endangered species.
 10. Scientists use special _____ to clone living things.
-

4. Unscramble the words!

Instructions: Unscramble the letters to find the correct word.

1. LNOCE → _____
 2. ANTLP → _____
 3. CSITENIST → _____
 4. NTDIA → _____
 5. LAPNIMAS → _____
 6. YCOP → _____
 7. LCOHGTNEOYT → _____
 8. DEECIMIN → _____
 9. SIRAT → _____
 10. RANEUT → _____
-



5. Rearrange the sentences.

Instructions: The sentences are mixed up! Rewrite them in the correct order.

1. Scientists use special machines to help with cloning.
2. A clone is an exact copy of a living thing.

3. DNA is important because it carries information about traits.
 4. Farmers clone plants to grow more food.
 5. Cloning can be used to help sick people.
 6. Scientists learn more about animals by cloning them.
 7. Clones have the same DNA as the original.
 8. Some people think cloning is good, but others are careful about it.
 9. Cloning helps protect nature by saving some species.
 10. Cloning is an exciting and interesting science!
-

6. Sentence matching.

Instructions: Match the first part of the sentence with the correct ending.

First Part:	Second Part:
1. Cloning means	A. to make a copy of a living thing.
2. Scientists use	B. an exact copy of the original.
3. DNA carries	C. cloned to learn more about them.
4. Cloning helps	D. plants to grow more food.
5. Farmers clone	E. information about traits.
6. A clone is	F. making a copy of something.
7. Cloning can help	G. to help doctors and scientists.
8. Technology is used	H. save some endangered animals.

9. Animals can be	I. used in cloning.
10. Nature gives us	J. trees, plants, and fresh air.

7. Choose the correct answer.

Instructions: Choose the correct answer for each question.

1. What is a clone?

- A) A different animal
- B) An exact copy
- C) A new type of plant

2. What does DNA do?

- A) Helps make clones
- B) Cleans the air
- C) Grows food

3. Where do scientists use cloning?

- A) In schools
- B) In hospitals and research labs
- C) At home

4. What do farmers use cloning for?

- A) To grow more food
- B) To make computers
- C) To clean water

5. What is one example of cloning in animals?

- A) A cloned sheep
- B) A flying dog
- C) A talking cat

6. What helps cloning work?

- A) Special technology
- B) Magic
- C) Guessing

7. What can cloning help with?

- A) Making music
- B) Helping sick people
- C) Cooking food

8. What does a scientist do?

- A) Studies and learns about science
- B) Sleeps all day
- C) Plays games

9. What do farmers want from cloned plants?

- A) Better and stronger crops
- B) New types of cars
- C) More water

10. Why do scientists study cloning?

- A) To learn about animals and medicine
- B) To play with pets
- C) To build houses



LISTENING TIME.

"The Science of Cloning"

Instructions:

1. Listen carefully (or read the script aloud to students).
2. Answer the questions after listening.

Listening Exercises Based on the Listening Script

1. True or False?

Instructions: Write **T** for True or **F** for False. If false, correct the sentence.

1. Cloning means making a different version of a living thing. *True or False*
2. Scientists use DNA to help with cloning. *True or False*
3. Plants cannot be cloned. *True or False*
4. Dolly was a famous cloned dog. *True or False*
5. Cloning is used to help farmers grow strong plants. *True or False*
6. Scientists use cloning to help sick people. *True or False*
7. Every living thing has DNA inside it. *True or False*
8. Scientists already know everything about cloning. *True or False*
9. Cloning makes an exact copy of a plant or animal. *True or False*

10. Some people think cloning should be used carefully.

True or

False

2. Listen again and fill in the blanks.

Instructions: Use the words below to complete the sentences.

scientists	animals	copy	sheep	famous
DNA	cloning	plants	sick	farmers

1. _____ is the process of making an exact copy of something.
2. _____ use cloning to study plants and animals.
3. Every living thing has _____ inside it.
4. Cloning helps _____ grow strong and healthy crops.
5. A _____ named Dolly was the first cloned animal.
6. Cloning creates a _____ of a plant or animal.
7. Scientists clone _____ to learn more about them.
8. Some people think cloning can help _____ people.
9. _____ are often cloned to make more food.
10. Dolly the sheep is a _____ example of cloning.

3. Answer the questions:

Instructions: Listen again and answer the questions.

1. *What is cloning?*
2. *What do scientists use for cloning?*
3. *Why do farmers use cloning?*
4. *Who was Dolly?*
5. *What does DNA do?*

6. *Can animals be cloned?*
7. *How can cloning help sick people?*
8. *Why do some people think cloning should be used carefully?*



SPEAKING TASK: LET'S TALK ABOUT CLONING!

Instructions:

1. Work with a partner or speak on your own.
 2. Answer the questions and practice speaking clearly.
 3. Try to explain your ideas in simple sentences.
-

Speaking task 1. Warm-up Questions

Take turns answering these questions:

1. Have you heard about cloning before? What do you know about it?
 2. What does cloning mean?
 3. What do scientists use for cloning?
 4. Can plants be cloned? Why do farmers clone plants?
 5. What was the name of the first cloned sheep?
 6. Do you think cloning is useful? Why or why not?
 7. Would you want to clone a pet? Why or why not?
 8. Do you think cloning will be more common in the future?
 9. How do you feel about cloning humans? Should it be allowed?
 10. If you could clone one thing, what would it be and why?
-

Speaking task 2. Role Play: Scientist & Reporter.

Instructions: Work with a partner. One person is a **scientist**, and the other is a **reporter**. The reporter asks questions, and the scientist explains cloning.

Example Dialogue:

Reporter: Hello! Can you explain what cloning is?

Scientist: Of course! Cloning is when we make an exact copy of a living thing.

Reporter: How do scientists clone animals?

Scientist: We use DNA, which is like a secret code inside every living thing.

Reporter: Why is cloning important?

Scientist: Cloning helps us grow better plants and study diseases.

Now, switch roles and try again!

Speaking task 3. Debate: "Should Humans Be Cloned?"

Instructions: Divide into two groups. One group supports cloning humans, and the other group is against it. Each group shares their opinion.

For Cloning Humans:

- ✓ It can help sick people.
- ✓ It can help scientists learn more about DNA.
- ✓ It can help families have children.

Against Cloning Humans:

It might be dangerous.

It could cause problems with identity.

It might not be fair to cloned people.

Each person should say one sentence to support their side!

UNIT 22. HUMAN GENOME PROJECT

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Human genome project**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: History of biotechnology**
- **Speaking time.**

NEW VOCABULARY:

genome

project

research

DNA

code

discovery

cells

medicine

scientists

ancestors



THE HUMAN GENOME PROJECT: A BIG SCIENCE PUZZLE!



Have you ever built something by following instructions? Imagine if our bodies had a special instruction book that tells us how we grow, look, and work. This instruction book is called the genome, and scientists worked on a big project to understand it. This project was called the Human Genome Project!

What is a Genome?

A **genome** is like a recipe that makes each person unique. It is made up of a special code inside our cells called **DNA**. DNA decides everything about us, like our eye color, hair type, and even how tall we are.

What did scientists do?

Scientists wanted to read and understand all the DNA inside a human. They worked together from different countries to study the **human genome**. The project took **13 years** and finished in **2003**. It was like solving a huge puzzle with millions of tiny pieces!

Why is the Human Genome Project important?

- ✓ **Better Medicine** – Doctors can now understand diseases better and find new treatments.
- ✓ **Understanding differences** – It helps scientists learn why people look different from each other.
- ✓ **Learning about our past** – The project helps us know more about our history and ancestors.

A big step for science!

The **Human Genome Project** was one of the greatest scientific achievements in history. Thanks to this project, we now know more

about life, health, and what makes each of us special. Who knows? Maybe one day you will be a scientist helping to solve the next big mystery of life!

Answer the following questions:

1. What is the Human Genome Project?
2. What does a genome do in our body?
3. How long did the Human Genome Project take to complete?
4. What does DNA help decide about us?
5. Why did scientists study the human genome?
6. How can the project help doctors?
7. What do scientists learn about people from this project?



DOING EXERCISES:

1. Match the words with their meanings.

Instructions: Match each word with its correct meaning.

WORDS	MEANINGS
1. Genome	A. The tiny building blocks of life.
2. DNA	B. A long study to learn something new.
3. Cells	C. The complete set of instructions for our body.
4. Scientists	D. A secret code that carries genetic information.
5. Code	E. People who study and make discoveries.
6. Project	F. Studying something carefully to learn more.

7. Medicine	G. A way of writing information, like a puzzle.
8. Research	H. Something used by doctors to help sick people.
9. Discovery	I. Finding something new and important.
10. Ancestors	J. Family members from long ago.

2. True or False?

Instructions: Read the sentences and say if they are **True (T)** or **False (F)**.

1. The human genome is like an instruction book for our body.

True/False

2. The Human Genome Project only took 2 years to complete.

True/False

3. DNA tells our body how tall we will be.

True/False

4. Scientists from only one country worked on the project.

True/False

5. The Human Genome Project was completed in 2003.

True/False

6. Cells are the big parts of our body.

True/False

7. Understanding DNA can help doctors cure diseases.

True/False

8. The genome is the same for every human.

True/False

9. DNA can tell us about our ancestors.
10. The Human Genome Project is not useful for medicine.

3. Fill in the blanks.

Instructions: Complete each sentence with the correct word from the table below.

1. The Human Genome _____ helped us understand DNA.
2. A _____ is like a set of instructions for our body.
3. _____ are tiny building blocks of life.
4. _____ studied DNA to learn about humans.
5. The DNA _____ tells our body how to grow.
6. The project helps doctors make better _____.
7. Learning about DNA was a huge scientific _____.
8. The genome can tell us about our _____ from the past.
9. Scientists do a lot of _____ to learn new things.
10. The Human Genome _____ took 13 years to finish.

<i>research</i>	<i>code</i>	<i>project</i>	<i>medicine</i>	<i>DNA</i>
<i>discovery</i>	<i>ancestors</i>	<i>scientists</i>	<i>genome</i>	<i>cells</i>

4. Sentence scramble.

Instructions: Unscramble the words to form correct sentences.

1. genome / The / human / helps / doctors / diseases / understand.

Example: The human genome helps doctors understand diseases.

2. code / DNA / special / carries / a / information.

3. project / The / scientists / many / from / worked / countries.

4. cells / make / tiny / Our / bodies / up.

5. research / do / Scientists / more / to / learn.

6. important / The / is / genome / very / project.

7. ancestors / Our / tell / DNA / can / about / us.

8. years / took / The / project / 13 / complete / to.

9. humans / genome / the / is / unique / for / each.

—

10. doctors / help / can / genome / study / The.

—

5. Match the sentence halves.

Instructions: Match the beginning of the sentence with the correct ending.

FIRST PART	SECOND PART
1. The Human Genome Project	A. is found inside every cell.
2. DNA is like	B. took 13 years to finish.
3. Scientists studied	C. a special code for the body.
4. The genome helps	D. us learn about our past.
5. Doctors use genome research	E. to treat diseases.
6. Each person's genome	F. their ancestors with DNA.
7. People can learn about	G. is mostly the same but slightly different.
8. The project helps scientists	H. learn how humans are different.
9. Cells are	I. the tiny building blocks of life.
10. Research helps scientists	J. make new discoveries.

6. Multiple choice quiz .

Instructions: Choose the correct answer for each question.

1. What is a genome?

- A. A type of food
- B. A set of instructions for the body
- C. A type of animal

2. What does DNA do?

- A. Helps plants grow

B. Tells our body how to grow

C. Changes colors

3. How long did the Human Genome Project take?

A. 2 years

B. 10 years

C. 13 years

4. What year was the project completed?

A. 2003

B. 2013

C. 1995

5. What do scientists study in the Human Genome Project?

A. Human cells

B. Human DNA

C. Human history

6. How can studying DNA help doctors?

A. By making better cars

B. By understanding diseases

C. By teaching math

7. What are cells?

A. Small building blocks of life

B. Big rocks

C. A type of tree

8. Why was the project important?

A. It helped people find treasure

B. It helped understand the human body

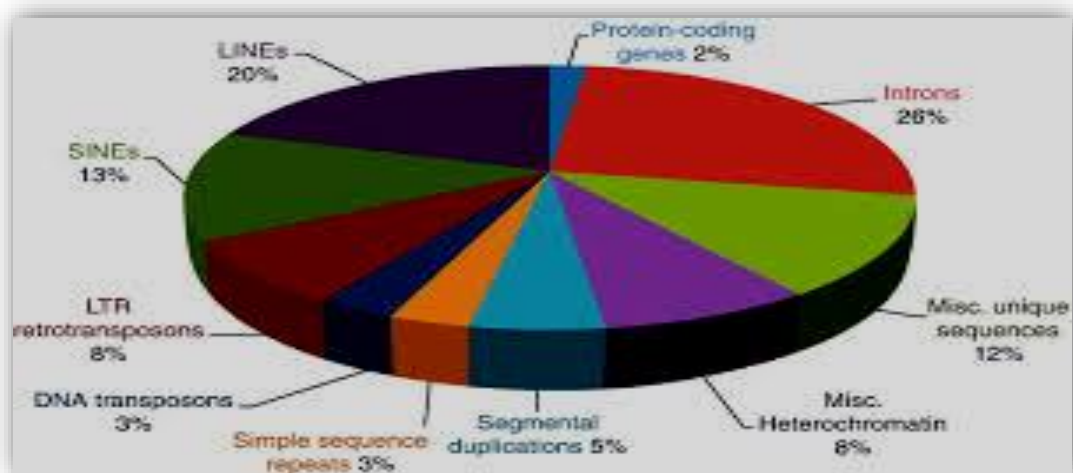
C. It helped make faster cars

9. What does DNA help decide?
- A. A person's favorite food
 - B. A person's height and eye color
 - C. A person's phone number
10. Who worked on the Human Genome Project?
- A. Only one scientist
 - B. Scientists from around the world
 - C. Only students
-

7. Find the mistakes.

Instructions: Each sentence has one mistake. Find it and write the correct sentence.

1. The human genome tells trees how to grow.
- Example:** The human genome tells **humans** how to grow.
2. DNA is found outside the body.
3. The Human Genome Project only studied animals.
4. Scientists finished the project in 2020.
5. The genome has nothing to do with medicine.
6. All people have completely different genomes.
7. DNA does not help us understand our ancestors.
8. Cells are big and can be seen with the eye.
9. The genome is not important for science.
10. Scientists only studied one person's DNA.
-



LISTENING TIME.

"THE HUMAN GENOME PROJECT"

Instructions:

1. Listen carefully (or read the script aloud to students).
2. Answer the questions below.

Listening exercises based on the listening script.

Listening task 1. True or False?

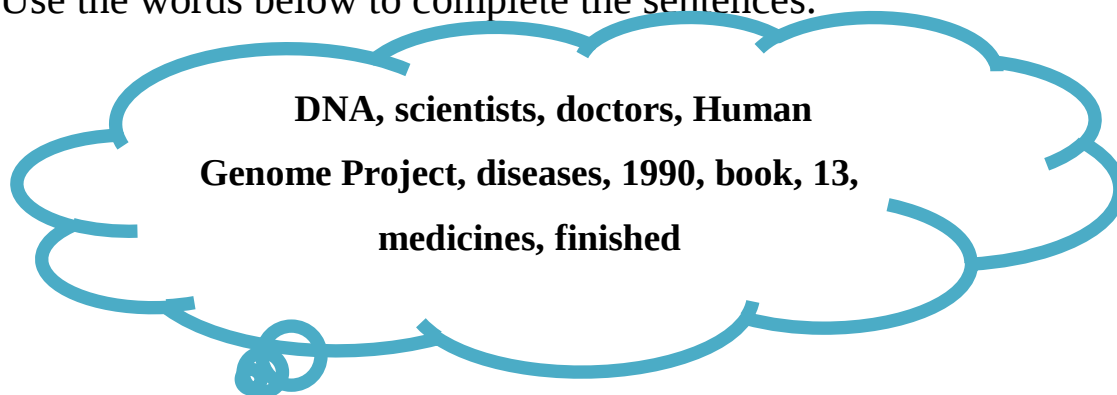
Read each sentence. If it is true, write **T**. If it is false, write **F** and correct the mistake.

1. The Human Genome Project started in **2000**. **T/ F**
2. Scientists worked on the project for **13 years**. **T/ F**
3. DNA is like a **map** that helps scientists understand the body. **T/ F**
4. The Human Genome Project helps scientists create **new planets**.
T/ F
5. Doctors can use the project's discoveries to **treat diseases**. **T/ F**
6. The Human Genome Project is **still not finished**. **T/ F**
7. Scientists found out that every person has **the same** DNA. **T/ F**

8. The project helps explain why people have different **eye colors**. **T/F**
-

Listening task 2. Fill in the Blanks

Use the words below to complete the sentences.



1. The _____ was a big study about human DNA.
2. It started in the year _____.
3. The project took _____ years to complete.
4. _____ is like a set of instructions in our body.
5. _____ worked on the project to map human DNA.
6. The Human Genome Project helps find and treat _____.
7. Doctors use this knowledge to create better _____.
8. DNA is like a _____ filled with tiny letters.
9. Even though the project is _____, scientists still use its discoveries.
10. _____ use this project's information to understand why people get sick.



SPEAKING TIME.

Speaking task 1. Role-Play Activity

Situation: You are a scientist explaining the **Human Genome Project** to a child.

Roles:

- **Scientist:** Explain what DNA is and why the project was important.
- **Child:** Ask simple questions like "Why do I have blue eyes?" or "How does DNA help me?"

Example Conversation:

Child: What is DNA?

Scientist: DNA is like a book that tells your body how to grow!

Child: Wow! So, why did scientists study DNA?

Scientist: They wanted to understand why people are different and how to cure diseases.

(Take turns switching roles!)

Speaking task 2. Picture Talk

Look at the pictures of DNA or a scientist working in a lab.



- Describe one of them what you see.
- Explain what you think the scientist (scientists) is doing.
- How does this relate to the Human Genome Project?

Speaking task 3. Discussion Prompts

Talk about these topics with a friend or group:

1. How can the Human Genome Project help doctors?
 2. Why is it important to understand our DNA?
 3. If you could discover something new about DNA, what would it be?
-

Speaking task 4. Debate Time!

Question: Should scientists be allowed to change human DNA to remove diseases?

- **Side A:** Yes, it can help people live healthier lives.
- **Side B:** No, we should not change nature.

Each side gives **2-3 reasons** to support their idea!

UNIT 23. FORENSIC BIOTECHNOLOGY

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Forensic Biotechnology**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: How forensic biotechnology solves mysteries**
- **Speaking time.**

NEW VOCABULARY:

forensic biotechnology

detective

DNA

evidence

microscope

fingerprint

crime scene

solve

clue



FORENSIC BIOTECHNOLOGY: SOLVING MYSTERIES WITH SCIENCE!

Have you ever watched a detective solve a crime in movies? In real life, scientists help solve mysteries using **forensic biotechnology**!

What is Forensic Biotechnology?

Forensic biotechnology is a special kind of science that helps **find clues** using DNA, fingerprints, and tiny pieces of evidence. It helps police and detectives **solve crimes** and find out what happened.

How Does It Work?

1. **Collecting Clues** – Scientists gather evidence like hair, blood, or fingerprints.
2. **Testing DNA** – DNA is like a special code inside every person's body. Scientists compare DNA to find out who was at the crime scene.
3. **Using Microscopes** – Tiny clues that cannot be seen with the eye are



studied under a microscope.

4. **Solving Mysteries** – Police use these science clues to catch the right person!

Where is Forensic Biotechnology Used?

- ✓ **Crime Solving** – Finding out who committed a crime.
- ✓ **Helping in Court** – Providing proof in legal cases.
- ✓ **Finding Lost People** – DNA can help families find missing relatives.
- ✓ **Studying History** – Scientists use it to learn about ancient people!

Forensic biotechnology is like real-life detective work, but with science!

Answer the following questions:

1. What is forensic biotechnology?
2. How do detectives use forensic biotechnology to solve crimes?
3. What is DNA, and why is it important?
4. What kind of clues do scientists look for at a crime scene?
5. How can fingerprints help solve a crime?
6. Why do scientists use microscopes in forensic biotechnology?



DOING EXERCISES:

1. True or False?

Instructions: Read each sentence and decide if it is **true (T)** or **false (F)**.

1. Forensic biotechnology helps solve crimes. **T/ F**
2. DNA is the same for every person. **T/ F**
3. Fingerprints are unique to each person. **T/ F**

4. Microscopes make small objects harder to see. **T/ F**
5. Police use clues to solve mysteries. **T/ F**
6. Scientists can find DNA in hair and blood. **T/ F**
7. A crime scene is a place where detectives play games. **T/ F**
8. Fingerprints can help find the right person. **T/ F**
9. Forensic biotechnology is not used in court. **T/ F**
10. Detectives do not need science to solve crimes. **T/ F**

2. Match the words.

Instructions: Match the words on the left with the correct definitions on the right.

WORD	DEFINITION
1. DNA	A. A place where a crime happens
2. Microscope	B. A person who solves crimes
3. Crime Scene	C. Tiny clues that help detectives
4. Evidence	D. A science tool that makes small things look bigger
5. Detective	E. The special code inside every person's body
6. Fingerprint	F. The study of living things using science
7. Forensic Science	G. A clue left by a person's fingers
8. Solve	H. Something that helps prove what happened

WORD	DEFINITION
9. Clue	I. A small piece of information that helps find answers
10. Biotechnology	J. To find the answer to a problem

3. Fill in the blanks.

Instructions: Complete each sentence using the words from the table. The first one is done for you:

evidenc e	fingerprin ts	crim e	clue	microscop e
detectiv e	forensic	DNA	biotechnolog y	scientist

1. A forensic scientist studies how to solve crimes using science.
2. Every person has unique _____, which helps police find suspects.
3. A _____ is a small piece of information that helps solve a mystery.
4. _____ is a type of science that helps detectives.
5. Police collect _____ to find out who committed a crime.
6. A _____ is a special tool that makes tiny things look bigger.
7. The police investigated the _____ scene to find clues.
8. A _____ works in a lab to study DNA and other evidence.
9. The _____ Project helped scientists understand human genetics.
10. _____ technology helps keep people safe and solve mysteries.

4. Sentence scramble.

Instructions: Unscramble the words to form correct sentences.

1. biotechnology / Forensic / crimes / solves / science / with.
 2. uses / police / Fingerprints / solve / to / cases.
 3. in / found / blood / DNA / is / hair / and.
 4. help / Clues / scientists / crimes / solve.
 5. looks / A / tiny / at / things / microscope.
 6. detectives / evidence / search / crime / at / a / scene / for.
 7. from / unique / Each / person's / is / DNA.
 8. tools / are / science / Microscopes / forensic / for.
 9. in / Scientists / labs / study / DNA.
 10. helps / find / Forensic / missing / people / science.
-

5. Find the mistakes.

Instructions: Each sentence has **one mistake**. Find it and write the correct sentence.

1. Forensic science makes trees grow. **Correct:** *Forensic science helps solve crimes.*
1. DNA is the same for all people.
2. A detective plays video games to solve crimes.
3. Fingerprints are always the same for twins.
4. A microscope makes things look smaller.
5. Scientists throw away evidence after a crime.
6. DNA can only be found in shoes.
7. Police never use forensic science in investigations.

8. The crime scene is a place where people cook food.

6. Matching sentences.

Instructions: Match the sentence parts correctly.

FIRST PART	SECOND PART
1. DNA is found in	A. a special code in the body.
2. A microscope helps	B. evidence to solve crimes.
3. Fingerprints are	C. blood, hair, and skin.
4. Detectives collect	D. different for each person.
5. Scientists study	E. look at tiny details.
6. Clues help police	F. to solve cases.
7. A crime scene is	G. where a crime happened.
8. Forensic science is	H. fingerprints and DNA.
9. Evidence is used	I. to find the right person.
10. Biotechnology helps	J. study living things.

7. Create a short story.

Instructions: Use **5 of the new words** to write a short story about a detective solving a mystery.

8. Scrabble Exercise: Forensic Biotechnology Words

Instructions: Use the scrambled letters to form the correct words.

1. NISREFOC → _____

2. CODTEETIV → _____

3. EVNCEIDEE → _____
4. OIPECSRMO → _____
5. REFTGPRINI → _____
6. OCLUE → _____
7. VSELO → _____
8. EMAIRCNSEC → _____
9. OYDGBTCHOINOEL → _____
10. NDA → _____



LISTENING TIME. "How Forensic Biotechnology Solves Mysteries"

Instructions:

1. Listen carefully (or have the teacher read the script aloud).
2. Answer the questions based on what you heard.

Interactive Exercises Based on the Listening Script

1. True or False

Instructions: Read the sentences and decide if they are true or false.

If false, correct them.

1. Forensic biotechnology helps farmers grow food.
2. Detectives use fingerprints, DNA, and evidence to solve crimes.
3. A telescope helps scientists study tiny clues.
4. DNA is the same for every person in the world.
5. Forensic scientists use DNA tests to find the right person.
6. Detectives do not go to the crime scene to collect clues.
7. A microscope makes small things look bigger.
8. Forensic biotechnology makes solving crimes slower.
9. DNA is found inside every person's body.

10. Thanks to forensic biotechnology, crimes can be solved more accurately.
-

2. Put the sentences in order.

Instructions: The sentences below are mixed up. Put them in the correct order.

- A. A microscope makes tiny clues look bigger.
 - B. Forensic biotechnology helps detectives solve crimes.
 - C. No two people have the same DNA, except for identical twins.
 - D. When a crime happens, detectives go to the crime scene.
 - E. Scientists use DNA tests to match clues to the right person.
 - F. Detectives look for fingerprints, hair, or drops of blood.
 - G. DNA is a special code inside every person's body.
 - H. Clues help find out who was at the crime scene.
 - I. Thanks to forensic biotechnology, solving crimes is faster.
 - J. DNA helps police find out who committed the crime.
-

5. Multiple choice questions.

Instructions: Choose the correct answer.

- 1. What do detectives look for at a crime scene?
 - a) Toys
 - b) Clues like fingerprints and DNA
 - c) Coins
- 2. What tool helps scientists see tiny things?
 - a) Microscope

- b) Telescope
- c) Magnifying glass

3. What is DNA?

- a) A type of fingerprint
- b) A special code inside the body
- c) A type of crime scene

4. Who uses forensic biotechnology?

- a) Chefs
- b) Scientists and detectives
- c) Artists

5. What helps detectives find out who was at a crime scene?

- a) Fingerprints and DNA
- b) Shoes and clothes
- c) Cars and bicycles

6. Why is forensic biotechnology important?

- a) It helps solve crimes faster and more accurately
- b) It makes crime scenes messy
- c) It helps people grow plants

7. What is a fingerprint?

- a) A pattern on your fingers
- b) A type of crime scene
- c) A special type of DNA

8. What do forensic scientists use to match DNA?

- a) DNA tests
- b) A telescope
- c) A crime scene

9. What happens when DNA from a crime scene matches someone's DNA?
- a) Scientists can find the right person
 - b) The DNA disappears
 - c) The fingerprints change
10. What makes forensic biotechnology helpful?
- a) It helps solve crimes quickly and accurately
 - b) It makes fingerprints disappear
 - c) It hides evidence
-



SPEAKING TIME

Speaking exercise.

Role-Play: One person is a detective, and the other is a scientist.

- **Detective:** Asks questions about evidence.
- **Scientist:** Explains how forensic biotechnology helps solve crimes

UNIT 24. PROTEIN SYNTHESIS

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Protein synthesis**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: The Journey of Protein Synthesis**
- **Speaking time.**

NEW VOCABULARY

protein

amino acids

synthesis

tRNA (Transfer RNA)

DNA

enzymes

mRNA (Messenger RNA)

nucleus

ribosome

cell



PROTEIN SYNTHESIS: HOW OUR CELLS MAKE PROTEINS

Our body needs proteins to grow, heal, and stay strong. But how do we get proteins? Our cells make them through a process called **protein synthesis**!

Step 1: The Recipe (DNA and mRNA)

Inside every cell, there is a tiny instruction book called **DNA**. It tells the cell how to make proteins. But the DNA stays safe in the nucleus, so a special messenger called **mRNA** (messenger RNA)

carries the instructions to another part of the cell.

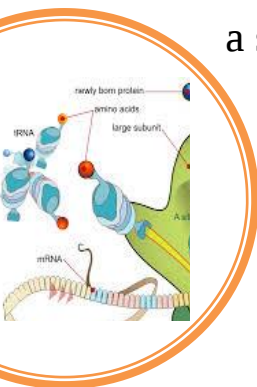
Step 2: The Kitchen (Ribosomes)

The mRNA travels to a small part of the cell called the **ribosome**. Think of it as the cell's kitchen, where

proteins are made! The ribosome reads the mRNA

instructions and gets ready to build the protein.

Step 3: The Ingredients (Amino Acids and tRNA)



The building blocks of proteins are called **amino acids**. A special helper, **tRNA** (transfer RNA), brings the right amino acids to the ribosome. The ribosome puts them together in the correct order, just like following a recipe.

Step 4: The Final Protein



Once all the amino acids are connected, the protein is complete! It then goes to work in the body—helping muscles, making enzymes, and keeping us healthy.

Why Is Protein Important?

Proteins help us grow, repair cuts, fight sickness, and even digest food! That's why eating protein-rich foods like eggs, meat, beans, and nuts is important.

Now you know how your body makes proteins—just like a tiny kitchen inside every cell!

Answer the following questions:

1. What is protein used for in our body?
2. Where are the instructions for making proteins found?
3. What does mRNA do?
4. What is the function of the ribosome?
5. What are amino acids?
6. How does tRNA help in making proteins?
7. Why is protein important for our health?



DOING EXERCISES:

1. Fill in the blanks.

Complete the sentences with the correct words from the table below:

1. Our body needs _____ to grow and stay strong.

*Our body needs **proteins** to grow and stay strong.*

2. The process of making proteins is called _____.

3. The instructions for making proteins are stored in _____.

4. The _____ carries the message from DNA to the ribosome.

5. Proteins are built from small parts called _____.

6. The ribosome is like a _____ where proteins are made.

7. The special helper that brings amino acids is called _____.

8. Proteins help our body by _____ and _____.

9. Some foods rich in protein are _____, _____, and _____.

10. The nucleus is like a _____ because it controls the cell.

tRNA	DNA	amino acids	mRNA	meat	eggs
growing	repairing	factory	protein synthesis	beans	brain

2. Match the pairs.

Match the words in **Column A** to their correct meanings in **Column**

B.

COLUMN A	COLUMN B
1. Protein	A. Carries instructions from DNA

2. DNA	B. The building blocks of proteins
3. mRNA	C. Makes proteins for the body
4. Ribosome	D. Instructions stored in the nucleus
5. tRNA	E. Brings amino acids to the ribosome
6. Amino acids	F. A process of making proteins
7. Synthesis	G. Found in foods like meat and beans
8. Nucleus	H. Controls the cell and holds DNA
9. Enzymes	I. Special proteins that help reactions happen
10. Cell	J. The smallest unit of life

3. True or False?

Write **T** for true and **F** for false.

1. The nucleus is found outside the cell. **T/F**
2. DNA tells the cell how to make proteins. **T/F**
3. mRNA helps deliver instructions to the ribosome. **T/F**
4. tRNA makes proteins all by itself. **T/F**
5. Amino acids are the building blocks of proteins. **T/F**
6. The ribosome is like a factory for proteins. **T/F**
7. Proteins help with growth, healing, and digestion. **T/F**
8. All cells in our body make the same proteins. **T/F**
9. Protein synthesis is a one-step process. **T/F**
10. Eating protein-rich food helps our body build proteins. **T/F**

4. Arrange the steps.

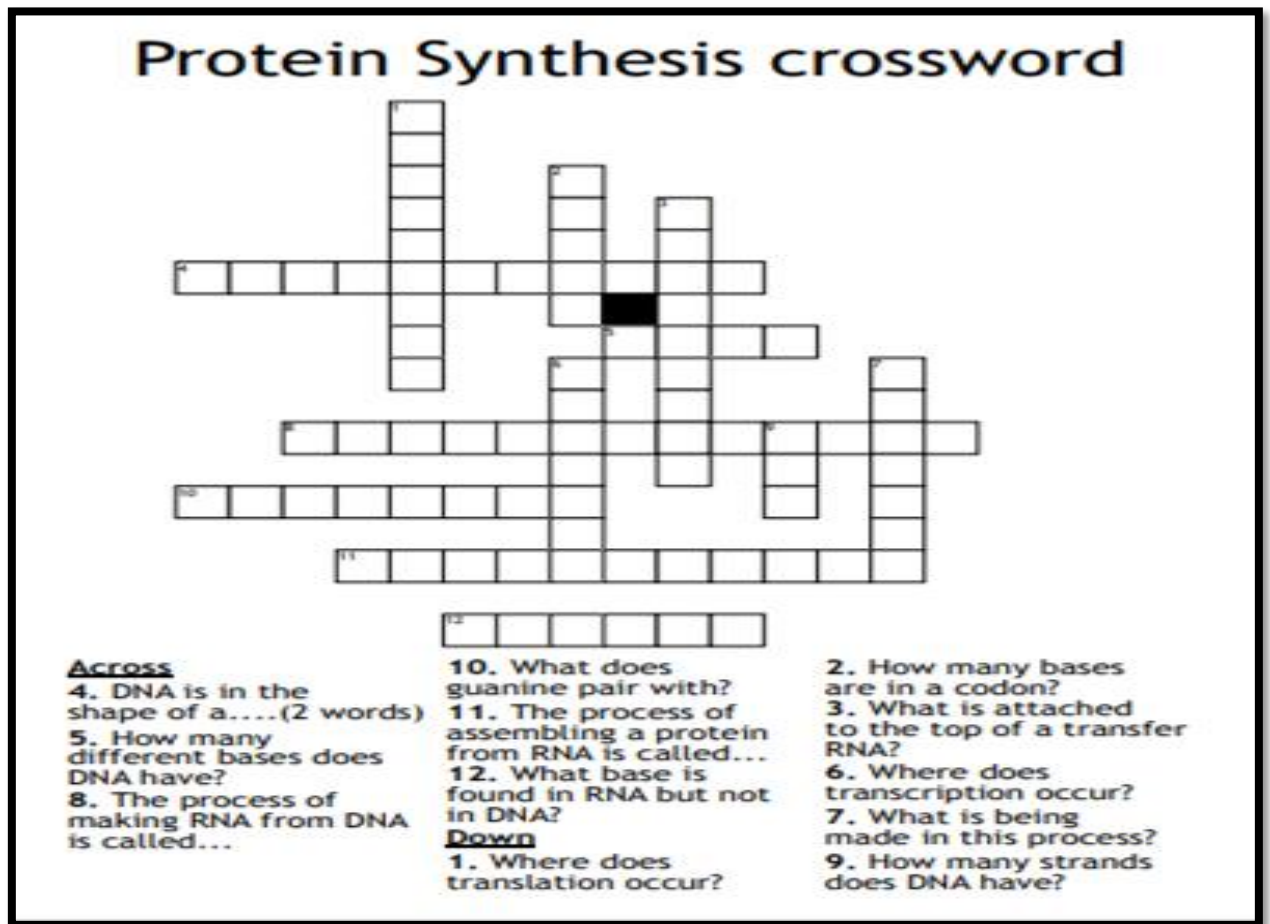
Put the following steps of protein synthesis in the correct order (1-10).

1. The protein is finished and used by the body.
2. mRNA carries the message to the ribosome.
3. DNA gives the instructions for making a protein.
4. tRNA brings amino acids to the ribosome.
5. The ribosome connects the amino acids in the right order.
6. A new protein is built.
7. The cell needs a protein to do a job.
8. The ribosome reads the mRNA instructions.
9. Amino acids are joined together like puzzle pieces.
10. The protein helps with growth and repair.

5. Word search. Find the words hidden in the puzzle: *DNA, mRNA, tRNA, ribosome, nucleus, amino acid, protein, synthesis, enzyme, cell.*



6. Crossword puzzle.



7. Find and fix the mistakes.

Each sentence has one mistake. Find it and correct it!

1. DNA is found outside the cell.
2. The ribosome tells the cell how to make proteins.
3. Proteins are made from sugar molecules.
4. The nucleus makes proteins.
5. tRNA carries instructions from DNA.
6. Amino acids are not important for protein synthesis.
7. Protein synthesis happens inside the stomach.
8. Without proteins, our body will still grow and heal.
9. Enzymes are made of DNA.

10. Protein synthesis has no steps.

8. Draw and label.

Draw a simple diagram of protein synthesis and label the following parts:

- DNA
- mRNA
- Ribosome
- tRNA
- Amino Acids
- Protein



LISTENING TIME.

"The Journey of Protein Synthesis"

Instructions:

1. Listen carefully to the script (or have a teacher read it aloud).
2. After listening, answer the comprehension questions.

Exercises based on the listening script

1. Fill in the Blanks

Complete the sentences with the correct words from the script:

1. Protein synthesis helps to _____ and _____ muscles.
2. The instructions for making proteins are stored in the _____.
3. Since DNA cannot leave the nucleus, it makes a copy called _____.

4. The _____ is like a tiny protein factory where proteins are made.
 5. _____ brings amino acids to the ribosome.
 6. The ribosome puts the _____ together in the correct order to form a protein.
 7. Proteins help our bodies _____, _____, and stay strong.
 8. Some foods rich in protein are _____, _____, _____, and _____.
-

2. True or False

Write **True** or **False** for each statement. If false, correct the sentence.

1. Protein synthesis happens outside of the cells.
 2. DNA can leave the nucleus.
 3. The ribosome helps build proteins.
 4. tRNA carries messages from DNA to the ribosome.
 5. Amino acids are the building blocks of proteins.
 6. Proteins only help with muscle growth.
-



SPEAKING TIME.

Task 1: Picture Description

Instructions: Look at a diagram of protein synthesis (or imagine it).

- Describe each step aloud in **your own words**.
- Use key terms like **nucleus, mRNA, ribosome, tRNA, amino acids, protein**.

Example sentence starters:

- "First, the DNA inside the nucleus makes a copy called..."
 - "Next, the mRNA moves to the ribosome where..."
 - "Then, tRNA brings..."
 - "Finally, the protein is used by the body for..."
-

Task 2: Role play.

Instructions: Act out the process of protein synthesis!

- One student is the **DNA** (giving instructions).
- Another student is **mRNA** (carrying the message).
- One student plays the **ribosome** (building the protein).
- Others can be **tRNA** (bringing amino acids).

Example Dialogue:

- **DNA:** "I have instructions to make a protein, but I can't leave the nucleus!"
- **mRNA:** "I'll copy your instructions and take them to the ribosome!"
- **Ribosome:** "I'm ready! Where are my amino acids?"
- **tRNA:** "Here they are! Let's build the protein!"

UNIT 25. INDUSTRIAL BIOTECHNOLOGY. FERMENTATION

UNIT FOCUS:

- New Vocabulary
- Reading: Industrial Biotechnology. Fermentation
- Reading strategy: Question-Answer Strategy
- Listening task: The Magic of fermentation
- Speaking time.

NEW VOCABULARY:

fermentation

sugar

cheese

microorganisms

gas

rise

yeast

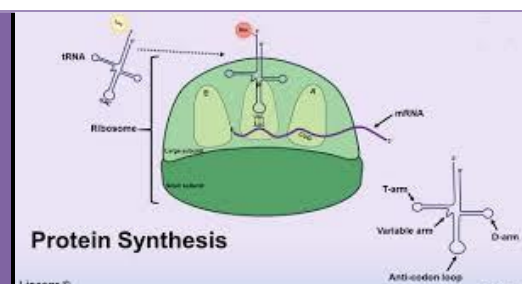
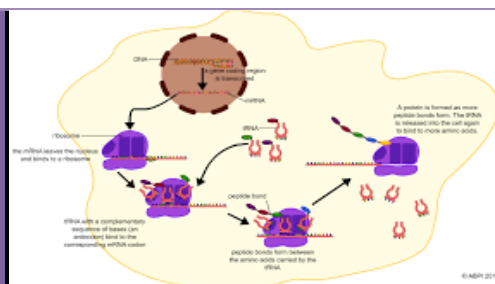
yogurt

bacteria

pickles



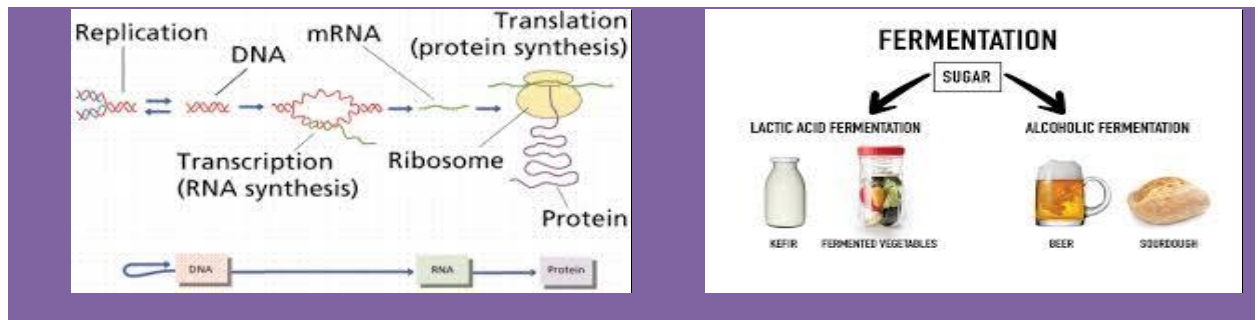
WHAT IS FERMENTATION?



Fermentation is a special process that helps make food and drinks. Tiny living things called **microorganisms**, like **yeast** and

bacteria, help with this process. They break down sugar in food and turn it into something new!

How does fermentation work?



1. **Sugar is the food** – Microorganisms eat sugar from fruits, milk, or grains.
2. **Gas and other products are made** – This can create bubbles (like in bread or soda) or change the taste (like in yogurt).
3. **The food becomes something new** – Fermentation helps make delicious foods we eat every day!

Examples of Fermented Foods

- **Bread** – Yeast helps bread rise by making bubbles.
- **Yogurt** – Bacteria turn milk into creamy yogurt.
- **Pickles** – Cucumbers change into sour pickles with the help of bacteria.
- **Cheese** – Bacteria help milk turn into cheese.

Why is Fermentation Important?

- ✓ It helps make food **taste better**.
- ✓ It makes food **last longer** (like pickles and cheese).
- ✓ It is used to make **healthy foods** (like yogurt).

Fermentation is like magic—it changes food in amazing ways!

Answer the following questions:

1. What is fermentation?
2. What tiny living things help with fermentation?
3. What does yeast do in bread?
4. Name three foods made by fermentation.
5. Why does bread have bubbles inside?
6. How does bacteria help make yogurt?



DOING EXERCISES:

1. Fill in the Blanks.

Complete the sentences using the correct words from the table.

1. _____ is a process where tiny organisms change food.
2. _____ eat sugar and help make food tasty.
3. _____ is used to make bread rise.
4. When yeast works, it produces _____ that makes bubbles.
5. _____ are cucumbers that change in taste because of fermentation.
6. _____ helps turn milk into a creamy food we eat with fruit.
7. _____ is a dairy product that comes in many flavors and is made using bacteria.
8. _____ is made with yeast, and it puffs up when baked.
9. _____ is needed for microorganisms to start fermentation.

fermentation

sugar

bacteria

yeast

gas

pickles

cheese

yogurt

bread

microorganisms

10. Some types of _____ help make cheese, yogurt, and pickles.

3. Matching Game (Draw a line to match the terms with their meanings)

TERMS	DEFINITIONS
1.Fermentation	Tiny living things that change food
2.Yeast	Helps bread rise
3.Bacteria	Turns milk into yogurt and cheese
4.Sugar	The food that microorganisms eat
5.Pickles	Fermented cucumbers
6.Cheese	Made from milk using bacteria
7.Gas	Creates bubbles in bread and soda
8.Yogurt	A healthy food made by fermenting milk
9.Microorganisms	Very small living things
10.Bread	A food that puffs up because of fermentation

3. True or False (Write True or False, then correct the false sentences)

1. Fermentation does not use microorganisms.
2. Yeast helps bread rise by making gas.
3. Bacteria can turn milk into yogurt.
4. Sugar is not needed for fermentation.
5. Pickles are made by fermenting potatoes.

6. Cheese is made with bacteria.
 7. Bread has no bubbles inside it.
 8. Fermentation helps food last longer.
 9. Yogurt is made by adding fruit to milk.
 10. Fermentation is a slow process that happens in minutes.
-

4. Sentence Scramble (Unscramble the words to form correct sentences)

1. food / is / Fermentation / a / changing / process.
 2. makes / Yeast / rise / bread.
 3. small / Microorganisms / very / are.
 4. cheese / bacteria / makes / Fermentation.
 5. bubbles / produces / Gas / in / bread.
 6. sugar / eat / Microorganisms / to / grow.
 7. Cucumbers / into / turn / fermentation / pickles.
 8. yogurt / Fermentation / turns / milk / into.
 9. healthy / Fermentation / makes / food.
 10. foods / can / help / Fermentation / last / longer.
-

6. Word Puzzle (Find the hidden words in this sentence!)

Find fermentation-related words in these sentences.

1. _____ is an interesting process.
2. _____ helps make bread soft.
3. Bacteria turn milk into _____.
4. I love eating pickles and _____.
5. Gas makes _____ in bread.
6. Fermentation needs _____ to start.
7. Cucumbers change into _____ over time.
8. _____ help with fermentation.
9. Bread dough _____ when it ferments.
10. Some types of _____ are good for us.

7. Guess the Missing Word.
(Teacher reads aloud and students guess the word)

Example:

Teacher: "Fermentation happens because of tiny living things called _____."

Students: "Microorganisms!"

1. Yeast helps _____ rise.
2. _____ is used to make yogurt.
3. Fermentation changes food by creating _____.
4. _____ is needed for microorganisms to work.
5. Pickles are made from fermented _____.

bacteria
pickles
yeast
yogurt
bubbles
fermentation cheese
sugar
microorganisms rises

6. _____ is the dairy product made with bacteria.
 7. The gas made by yeast creates _____ in bread.
 8. Microorganisms are very _____.
 9. Fermentation makes food last _____.
 10. _____ is the process of using tiny organisms to change food.
-



LISTENING TIME.

The magic of fermentation.

Instructions:

1. Read aloud the script (or play a recording).
2. Students listen carefully.
3. Answer the questions based on what they heard.

1. Fill in the blanks.

Listen carefully and complete the sentences using the correct words:

sugar	yeast	bread	creamy	microorganisms
bacteria	pickles	gas	fermentation	yogurt

1. _____ is a process that helps change food.
2. Tiny living things like _____ and _____ help with fermentation.
3. These tiny organisms eat _____ to create gas or other products.
4. _____ helps bread rise by making bubbles.
5. Without yeast, _____ would be flat and hard.
6. _____ help turn milk into _____ and cheese.
7. Cucumbers turn into _____ because of fermentation.

8. Fermentation makes food last longer and gives it a _____ taste.

2. Put the sentences in order.

The following sentences are in the wrong order. Number them correctly (1-6) to show how fermentation works.

- Cucumbers soak in water with salt. (____)
 - Fermentation is a process that changes food. (____)
 - Bacteria turn cucumbers into pickles. (____)
 - Microorganisms eat sugar and create gas or other products. (____)
 - Yeast helps bread rise by making bubbles. (____)
 - Bacteria help make yogurt and cheese. (____)
-

3. Choose the correct answer.

Circle or underline the right option.

1. Fermentation is a process that helps (**change food / cook food**).
 2. Yeast makes bread (**soft and fluffy / hard and flat**).
 3. Bacteria help make (**yogurt and cheese / soda and candy**).
 4. Cucumbers turn into pickles because of (**water and air / salt and bacteria**).
 5. Fermentation makes food (**last longer / spoil quickly**).
-



SPEAKING TIME.

Speaking task 1. Role-Playing Game (Act out fermentation!)

Instructions:

- Assign roles to students: **yeast, sugar, gas, bacteria, milk, and bread.**
 - Act out how fermentation works.
 - Example dialogue:
 - **Yeast:** "I eat sugar!"
 - **Sugar:** "Oh no! I'm disappearing!"
 - **Gas:** "I'm forming bubbles in the bread!"
 - **Bacteria:** "I help milk turn into yogurt!"
-

Speaking task 2. Draw and Label.

Instructions:

- Draw **one** of the following: **bread, yogurt, or pickles.**
 - Label important parts using words from the listening script, such as **yeast, bacteria, sugar, gas, microorganisms, fermentation.**
 - Write **one sentence** to describe how fermentation helps this food.
-

Speaking task 3. Storytelling Challenge (Complete the Story!)

Start the story, and students complete it.

"One day, a baker named Sam forgot to bake his bread right away. The next morning, he noticed the dough had tiny bubbles! He wondered, 'What is happening to my bread?' Then, he remembered that yeast..."

Students finish the story in 3-5 sentences!

Speaking task 4. Draw and Explain.

Instructions:

1. Draw how fermentation works in one of these foods: **bread, yogurt, pickles, or cheese.**
 2. Label the drawing with words like **yeast, bacteria, sugar, gas, rise, bubbles.**
 3. Explain the picture to a partner.
-

UNIT 26. ENZYMES IN INDUSTRY

UNIT FOCUS:

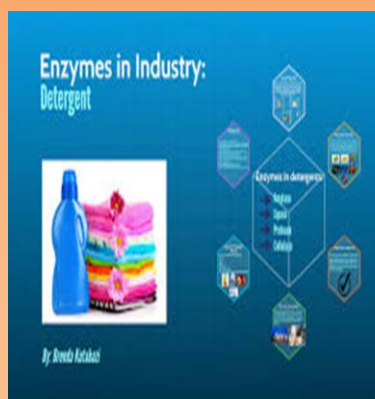
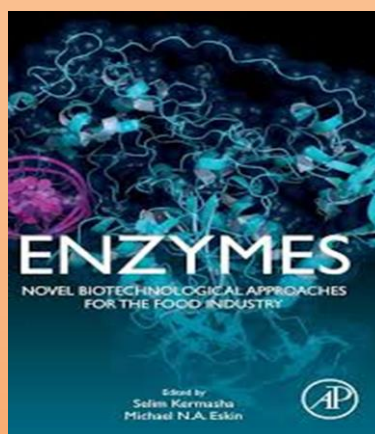
- **New Vocabulary**
- **Reading: Enzymes in industry**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: History of biotechnology**
- **Speaking time.**

NEW VOCABULARY:

enzymes	medicine	detergent
industry	industry	eco-friendly
chemical	cleaning	starch
reaction	industry	
food industry	paper industry	



ENZYMES IN INDUSTRY



Enzymes are special proteins that help speed up chemical reactions. They are used in many industries to make things faster and easier.

One common use of enzymes is in the **food industry**. Enzymes help make bread soft, cheese tasty, and fruit juice clear. They also help break down starch in grains to make sweet syrups.

Enzymes are also important in the **medicine industry**. They help make medicines and even help doctors test for diseases. In the **cleaning industry**, enzymes are found in detergents. They help break down stains from food, grease, and dirt in clothes. This makes laundry cleaner and fresher.

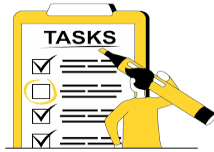
The **paper industry** uses enzymes to make paper smooth and white. They help remove unwanted materials from wood pulp.

Enzymes are useful because they save time and energy. They also work in natural ways, making industries more eco-friendly.

Answer the following questions;

1. What are enzymes?
2. How do enzymes help in the food industry?
3. Why are enzymes used in making bread and cheese?

4. How do enzymes help in the medicine industry?
5. What do enzymes do in detergents?
6. Why do paper companies use enzymes?
7. How do enzymes make industries more eco-friendly?



DOING EXERCISES:

1. Enzyme Role Match-Up.

Instructions: Match the enzyme's role to the correct industry. Write the correct industry (*Food, Medicine, Cleaning, or Paper*) in the blanks.

1. Enzymes break down stains on clothes. (_____)
2. Enzymes help make fruit juice clear. (_____)
3. Enzymes help create medicines. (_____)
4. Enzymes break down wood pulp to make smooth paper. (_____)
5. Enzymes help cheese develop its texture. (_____)
6. Enzymes turn starch into sweet syrup. (_____)
7. Enzymes remove grease and dirt from fabric. (_____)
8. Enzymes are used in testing for diseases. (_____)
9. Enzymes help in making soft bread. (_____)
10. Enzymes help paper become white. (_____)

2. Fill in the Blanks – Enzyme Adventure.

Instructions: Complete the sentences with the correct words:

enzymes, reaction, detergent, industry,

food, medicine, eco-friendly, paper, starch,

1. _____ help speed up chemical reactions.
 2. A chemical _____ happens when substances change.
 3. Enzymes in the _____ industry help make bread and juice.
 4. Doctors use enzymes in the _____ industry to make medicines.
 5. Enzymes in _____ break down stains in clothes.
 6. The _____ industry uses enzymes to make wood into smooth paper.
 7. Enzymes turn _____ into sugar for making syrup.
 8. Enzymes help make _____ soft and delicious.
 9. Many industries use enzymes because they are _____ and safe.
 10. _____ Factories use enzymes to improve the _____ process.
-

3. Odd One Out – Find the wrong word.

Instructions: Find the word that **does NOT belong** in each group.

1. Enzymes, reaction, cheese, air Example: air
 2. Bread, syrup, metal, fruit juice
 3. Starch, sugar, detergent, glass
 4. Paper, medicine, clothes, bacteria
 5. Food, cleaning, medicine, mountain
 6. Enzymes, reaction, television, breakdown
 7. Detergent, cleaning, paper, tiger
 8. Cheese, syrup, plastic, juice
-

4. Enzyme Detective – True or False?

Instructions: Write **T (True)** or **F (False)** for each statement.

1. Enzymes speed up chemical reactions. (___)
 2. The paper industry does not use enzymes. (___)
 3. Enzymes in medicine help test for diseases. (___)
 4. Enzymes help clean clothes. (___)
 5. Fruit juice is made without enzymes. (___)
 6. Yeast is an enzyme used in making bread. (___)
 7. Enzymes only work in hot temperatures. (___)
 8. The food industry uses enzymes. (___)
-

5. Secret Code – Solve the Enzyme Puzzle.

Instructions: Each number represents a letter. Solve the words using this key:

1. $5 - 14 - 26 - 25 - 13 - 5 =$ _____

(It speeds up reactions)

2. $4 - 5 - 20 - 5 - 18 - 7 - 5 - 14 - 20 =$ _____

_____ (Cleans clothes)

3. $16 - 1 - 16 - 5 - 18 =$ _____

(Used for writing)

4. $2 - 18 - 5 - 1 - 4 =$ _____

(Made with yeast)

5. $19 - 25 - 18 - 21 - 16 =$ _____

(Sweet liquid made from starch)

A=1, B=2, C=3,

D=4, E=5, F=6,

G=7, H=8, I=9,

J=10, K=11, L=12,

M=13, N=14, O=15, P=16,

Q=17, R=18, S=19, T=20,

U=21,

V=22, W=23, X=24,

Y=25, Z=26

6. "What Happens Next?" Story Chain.

Instructions: Finish the story by adding what happens next!

- A baker adds **yeast** to his dough.
 - The yeast uses **enzymes** to create bubbles.
 - The bread dough starts to rise because of _____.
 - When the bread is baked, it becomes _____.
 - Without enzymes, the bread would be _____.
-

7. Mystery Word – Scrambled Letters

Instructions: Unscramble the words related to enzymes!

1. ZEMEYN → _____
 2. OTAFDNERI → _____ (Used in cleaning)
 3. TOPCREECA → _____ (Used for writing)
 4. TSRHAC → _____ (Turns into sugar)
 5. HCZEEE → _____ (Dairy product made with enzymes)
-



LISTENING TIME.

The power of enzymes in industry.

Instructions:

1. Read aloud the script (or play a recording).
2. Students listen carefully.
3. Do exercises based on what they heard.

EXERCISES BASED ON THE LISTENING TASK

Listening task 1. Fill in the Blanks

Listen to the script and fill in the missing words:

1. Enzymes are special _____ that speed up chemical reactions.

2. The _____ industry uses enzymes to make bread soft.
 3. Enzymes help turn starch into _____ for making syrup.
 4. Doctors use enzymes to test for _____.
 5. In cleaning, enzymes help remove _____ and dirt from clothes.
 6. The _____ industry uses enzymes to make paper smooth.
 7. Enzymes help industries work faster, _____ and in an eco-friendly way.
 8. Without enzymes, making food would take much _____.
-

Listening task 2. True or False?

Listen again and write **T (True)** or **F (False)** for each statement.

1. Enzymes slow down chemical reactions. (____)
 2. The food industry does not use enzymes. (____)
 3. Enzymes help make fruit juice clear. (____)
 4. The paper industry does not need enzymes. (____)
 5. Enzymes help in making medicine. (____)
 6. Cleaning products use enzymes to remove stains. (____)
 7. Enzymes make industries slower and more expensive. (____)
 8. Enzymes help turn starch into sugar for syrup. (____)
 9. Paper becomes smoother with the help of enzymes. (____)
 10. Enzymes are used in many industries. (____)
-



SPEAKING TIME.

Speaking task 1. Interview an Enzyme! (Role-Play).

Instructions: One student plays **an enzyme**, and another asks questions! Example:

Student A (interviewer): What do you do?

Student B (enzyme): I help break down starch into sugar!

Other questions to ask:

- Which industry do you work in?
 - Why are you important?
 - What food can you help make?
 - What would happen without you?
-

Speaking task 2. "Find the Enzyme" Scavenger Hunt.

Instructions: Look around your home and find **five** products that might have enzymes. Examples:

- **Bread** (enzymes in yeast)
 - **Milk** (enzymes for cheese making)
 - **Juice** (enzymes make it clear)
 - **Detergent** (enzymes for cleaning)
 - **Medicine** (enzymes help in tests)
-

Speaking task 3. Enzyme Superhero – Create Your Own Hero!

Instructions:

- Draw a superhero **based on an enzyme**!
- Give them a **name** (Example: "Super Speed Enzyme").
- Write their **superpower** (Example: "I break down stains in clothes!").

- Describe how they **help the world** (Example: "I make food last longer!").

UNIT 27. BIOTECHNOLOGY IN TEXTILE INDUSTRY

UNIT FOCUS:

- New Vocabulary
- Reading: Biotechnology in Textile Industry
- Reading strategy: Question-Answer Strategy
- Listening task: The Future of Clothing
- Speaking time.

NEW VOCABULARY:

biotechnology

dyeing

sustainable

textile industry

natural dyes

fabric

enzymes

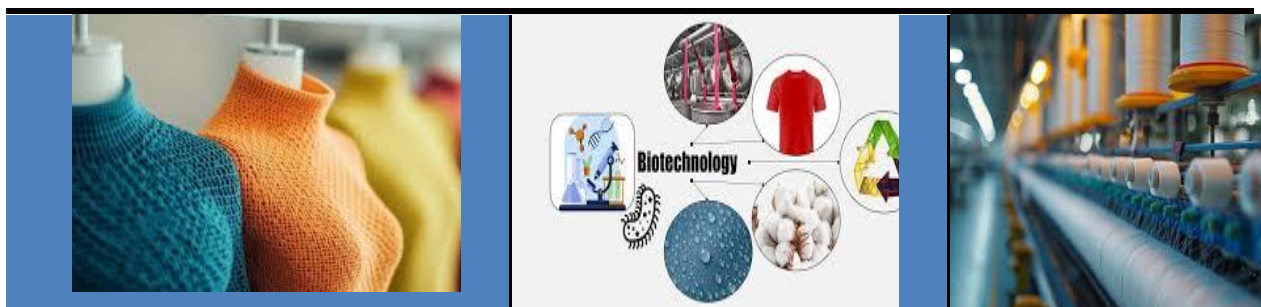
biodegradable

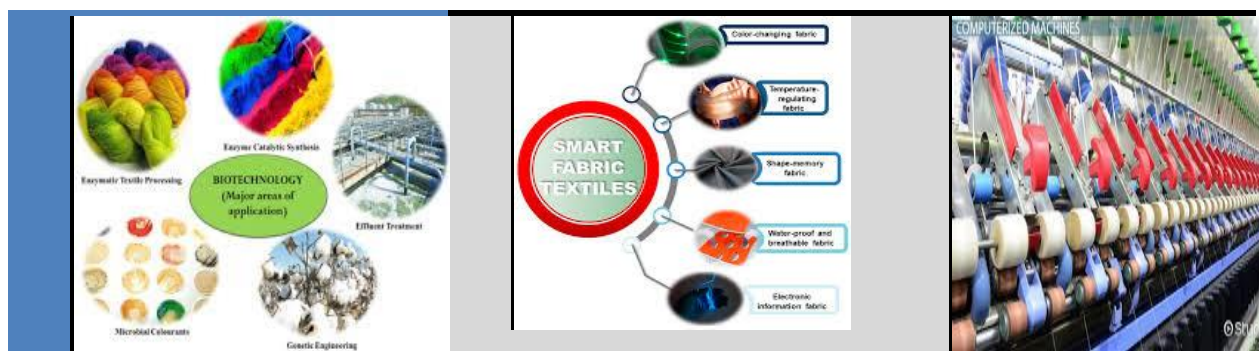
eco-friendly

recycled fibers



BIOTECHNOLOGY IN THE TEXTILE INDUSTRY





Biotechnology is used in many industries, including textiles. It helps make fabrics in a way that is better for the environment. Scientists use tiny living things, like **enzymes**, to improve the production of clothes.

One way biotechnology helps is by making fabrics **softer and stronger**. Enzymes are used to clean, color, and soften fabrics like cotton, wool, and silk. They replace harsh chemicals, making the process **eco-friendly**.

Biotechnology also helps in **dyeing clothes**. Instead of using harmful dyes, scientists create **natural dyes** from plants, bacteria, or fungi. These dyes are safer for people and nature.

Another important use is in making **biodegradable fabrics**. Some clothes are now made from materials like **bamboo, corn, or recycled fibers**, which break down naturally and do not harm the planet.

Thanks to biotechnology, the textile industry is becoming **greener and safer**, making clothes that are both stylish and sustainable!

Answer the following questions:

1. How does biotechnology help in making clothes?
2. What are some benefits of using enzymes in the textile industry?
3. Why are natural dyes better than chemical dyes?
4. What is a biodegradable fabric? Can you name an example?
5. How does recycling help the environment?

6. What are some problems caused by traditional fabric production?
7. What kind of eco-friendly clothes would you like to wear?



DOING EXERCISES:

1. Word Maze.

Find the correct word from the maze to complete the sentences.

Example Maze:

green	fabric	cotton	dye	soft
enzyme	clean	eco	biotech	textile

Sentences:

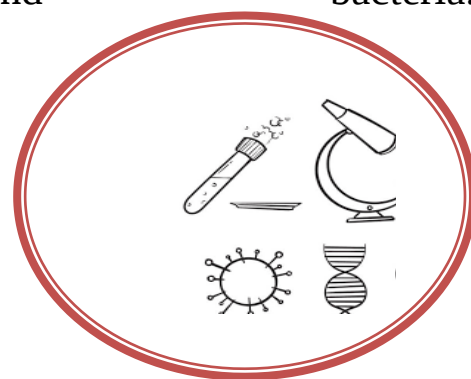
1. The use of science in making clothes is called _____.
2. The textile industry makes different types of _____.
3. _____ help clean and soften fabrics.
4. A type of natural cloth is _____.
5. If something is good for the planet, we call it _____.
6. The process of adding color to fabric is called _____.
7. A special protein that speeds up reactions is an _____.
8. Clothes made without harming the planet are called _____.
9. Old clothes can be reused with _____ materials.
10. _____ helps make the textile industry better for nature.

2. True or False challenge.

Decide if the statements are true (T) or false (F).

1. Biotechnology does not help in making clothes. (____)
2. Enzymes replace harsh chemicals in the textile industry. (____)

3. Natural dyes can be made from plants and bacteria. (___)
4. Recycled fibers help reduce waste. (___)
5. Chemical dyes are safer for the environment than natural dyes. (___)
6. Bamboo and corn can be used to make fabric. (___)
7. Sustainable clothing harms the environment. (___)
8. Biotechnology helps create stronger and softer fabrics. (___)
9. The textile industry never uses biotechnology. (___)
10. Making fabrics without harming nature is called eco-friendly production. (___)

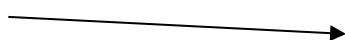


3. Match the pictures.

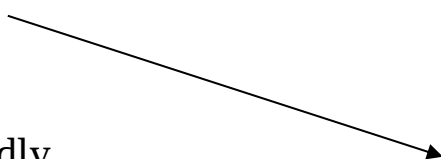
Draw pictures representing these words, then match them to their definitions.

Words:

1. Biotechnology



2. Fabric



3. Enzyme

4. Eco-friendly

5. Natural dye

6. Recycling

7. Biodegradable fabric
 8. Cotton
 9. Sustainable fashion
 10. Textile industry
-

4. The "Odd One Out" game.

Find the word that does not belong in each group.

1. Cotton – Wool – Plastic – Silk
 2. Enzyme – Chemical – Protein – Biodegradable
 3. Dyeing – Weaving – Pollution – Spinning
 4. Recycling – Waste – Sustainability – Eco-friendly
 5. Bamboo – Corn – Polyester – Hemp
 6. Soft – Strong – Colorful – Dangerous
 7. Enzyme – Bacteria – Yeast – Iron
 8. Cotton – Fabric – Paper – Wool
 9. Recycled – Natural – Synthetic – Green
 10. Fast fashion – Slow fashion – Sustainable – Eco-friendly
-

5. Fill in the missing letters.

Complete the words by filling in the missing letters.

1. B _ _ T E _ H _ O _ O G Y
2. T _ X _ I L E
3. E _ _ Y _ E
4. B _ _ D E G R _ D _ B L E
5. R _ C _ C _ E D
6. N _ _ U R _ L D _ _ S

7. E _ _ - F _ _ E _ D L Y
 8. S _ S _ A _ _ A B _ _ _
 9. F _ B _ _ C
 10. S _ _ T A _ N A _ _ _ Y
-

6. Sentence Scramble.

Unscramble the words to form correct sentences.

1. helps / clothes / Biotechnology / making / in.

Correct form: Biotechnology helps in making clothes.

2. are / replace / Enzymes / harsh / chemicals.

3. better / Natural / dyes / are / for / the / environment.

4. recycle / fibers / Industries / use / to / make / fabric.

5. pollution / Sustainable / fashion / reduces.

6. wool / silk / cotton / Fabric / includes.

7. safe / eco-friendly / is / for / nature.

8. faster / Enzymes / make / textile / production.

9. water / Recycling / saves / and / energy.

10. Textile / is / making / industry / clothes / about.

7. Design Your Own Eco-Friendly T-Shirt.

Students design a T-shirt with a slogan and image that promotes sustainable fashion.

Example Slogans:



- "Wear Green, Live Clean!"
- "Eco-Fashion is the Future!"
- "Sustainable Style for a Better World!"



LISTENING TIME.

How biotechnology helps the textile industry.

Instructions:

1. Read aloud the script (or play a recording).
2. Students listen carefully.
3. Answer the questions based on what they heard.

Listening comprehension exercises.

Listening task 1. Fill in the blanks.

Listen to the script and fill in the missing words:

1. Scientists use _____ to replace harsh chemicals.
2. _____ helps clean and soften fabrics.
3. Natural dyes come from _____, _____, and _____.
4. Some clothes are made from _____ materials like bamboo.
5. Biotechnology helps the textile industry become more _____.

Listening task 2. Multiple choice questions.

Choose the correct answer:

1. What do enzymes do in the textile industry?
 - a) Make fabric dirty
 - b) Replace chemicals in fabric treatment
 - c) Stop fabric from being recycled
2. Why are natural dyes better than chemical dyes?
 - a) They are brighter
 - b) They are cheaper
 - c) They are safer for the environment
3. What is an example of a biodegradable material?
 - a) Plastic
 - b) Bamboo
 - c) Metal
4. How does biotechnology help the environment?
 - a) By making more clothes faster
 - b) By reducing the use of harmful chemicals
 - c) By stopping people from buying new clothes
5. What is the main idea of the listening passage?
 - a) Biotechnology is making the textile industry safer and more eco-friendly.
 - b) Clothes are becoming cheaper because of biotechnology.
 - c) Recycling is the only way to save the environment.



SPEAKING TIME.

Speaking task 1. Role-Play activity.

Students work in pairs to act out situations related to biotechnology in the textile industry.

Example Situations:

1. A scientist explaining how enzymes help make clothes.
 2. A customer asking a store worker about eco-friendly fabrics.
 3. A designer choosing natural dyes instead of chemical dyes.
 4. A teacher explaining biodegradable fabrics to students.
 5. A worker in a textile factory talking about recycled fibers.
-

Speaking task 2. Story chain game.

Each student adds a sentence to a story about an eco-friendly textile company using biotechnology.

Example Start:

"Once upon a time, a small clothing factory wanted to help the planet by using natural dyes instead of chemicals..."

Speaking task 3. Debate: Fast Fashion vs. Sustainable Fashion.

Students split into teams and debate:

Topic: *Fast fashion is bad for the environment. Should people only buy sustainable clothes?*

Arguments can include:

- Pros and cons of fast fashion.
- The impact of biotechnology on clothing production.
- How to encourage people to buy eco-friendly clothes.

UNIT 28. BIOFUELS

UNIT FOCUS:

- New Vocabulary
- Reading: Biofuels
- Reading strategy: Question-Answer Strategy
- Listening task: The power of biofuels
- Speaking time.

NEW VOCABULARY:

biofuels

biodiesel

algae

renewable

fossil fuels

climate change

pollution

energy

bioethanol

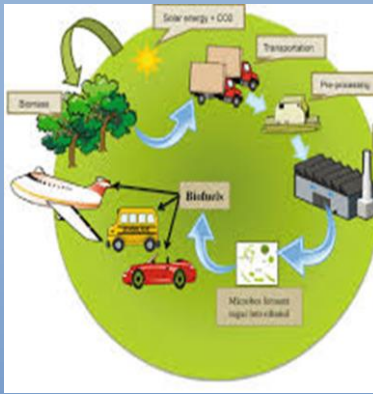
environment



BIOFUELS: ENERGY FROM NATURE

Biofuels are special fuels made from plants and animal waste. They are used to power cars, buses, and even airplanes. Unlike regular fuels, which come from deep underground, biofuels come from natural materials like corn, sugarcane, and vegetable oil.

There are two main types of biofuels: **bioethanol** and **biodiesel**. Bioethanol is made from crops like corn and sugarcane. It is often mixed with gasoline to make fuel for cars. Biodiesel is made from vegetable oils and animal fats. It is used in trucks and buses to help reduce pollution.



Biofuels are important because they are **renewable**, which means they can be made again and again. They also produce less pollution than fossil fuels, making them better for the environment. Many countries are using biofuels to help fight climate change and reduce air pollution.

Scientists are working on new ways to make biofuels **even** better. In the future, we may use algae or even food waste to create cleaner energy for the world!

Answer the following questions:

1. What are biofuels made from?
2. What are the two main types of biofuels?
3. Why are biofuels better for the environment?
4. What crops are used to make bioethanol?
5. What type of biofuel is made from vegetable oils?



DOING EXERCISES:

1. Fill in the Blanks (Complete the Sentences)

Fill in the missing words using the word bank below:

1. _____ are fuels made from plants and animal waste.

2. Biofuels are better than fossil fuels because they are _____.
3. Using biofuels reduces _____ in the air.
4. Some biofuels are made from tiny water plants called _____.
5. _____ is a type of biofuel made from corn and sugarcane.
6. _____ is made from vegetable oils and animal fats.
7. Biofuels give us _____ to run cars, buses, and planes.
8. People want to use more biofuels to help stop _____.
9. Many _____ like soybeans and sugarcane are used to make biofuels.
10. Bioethanol is sometimes mixed with _____ in cars.

crops	climate change	pollution	gasoline	bioethanol
algae	biofuels	energy	biodiesel	renewable

2. Word Association (Match the Pairs)

Match the words in Column A with their correct meanings in Column

B.

A	B
1. Biofuels	a) A type of fuel made from sugarcane and corn
2. Biodiesel	b) A process that makes the Earth hotter
3. Bioethanol	c) Fuel made from vegetable oil and animal fats
4. Renewable	d) Fuels made from plants and animal waste

A	B
5. Pollution	e) When the air, water, or land becomes dirty
6. Algae	f) Tiny plants that grow in water and can make fuel
7. Energy	g) Power that makes things work
8. Climate change	h) Can be used again and again

3. True or False? (Correct the false sentences).

Read the sentences and decide if they are **true** or **false**. If false, correct them.

1. Biofuels come from fossil fuels. (T / F)
2. Biodiesel is made from vegetable oils. (T / F)
3. Using biofuels increases air pollution. (T / F)
4. Algae can be used to make biofuels. (T / F)
5. Bioethanol is made from plastic. (T / F)
6. Biofuels are renewable. (T / F)
7. Biofuels can power cars, buses, and airplanes. (T / F)
8. Gasoline is a type of biofuel. (T / F)
9. Biofuels help fight climate change. (T / F)
10. Sugarcane is used to make bioethanol. (T / F)

4. Sentence Scramble. (Unscramble the words to make correct sentences)

Rearrange the words to form correct sentences about biofuels.

1. (from / Biofuels / plants / are / made / waste / and / animal).
2. (gasoline / mixed / is / often / Bioethanol / with).
3. (fuel / Biodiesel / is / used / in / trucks / and / buses).
4. (biofuels / can / Algae / be / made / from).
5. (air / less / Biofuels / pollution / create).
6. (stronger / Biofuels / help / fight / change / climate).
7. (is / sugarcane / a / Bioethanol / made / from).
8. (cars / use / biofuels / can).

5. Mystery Word (Guess the word based on the clues).

Read the clues and guess the biofuel-related word.

1. I am a fuel made from plants and animal waste. (_____)
2. I am a biofuel made from sugarcane. (_____)
3. I am made from vegetable oil and used in buses. (_____)
4. I help fight climate change by reducing pollution. (_____)
5. I can be made from algae. (_____)
6. I am the opposite of non-renewable. (_____)
7. People use me in cars instead of gasoline. (_____)
8. I am tiny and grow in water, but I can be used for fuel. (_____)

6. Biofuel Word Search Puzzle.

Find the hidden words in the table below! Words can be placed **horizontally, vertically, or diagonally**.

Words to Find:

- | | | |
|-------------|-------------|--------------|
| • biofuel | • pollution | • biodiesel |
| • renewable | • algae | • bioethanol |

- energy
- climate
- gasoline
- environment



LISTENING TIME.

"The power of biofuels"

Instructions:

1. Read aloud the script (or play a recording).
2. Students listen carefully.
3. Answer the questions based on what they heard.

Listening exercises:

Listening task 1. Fill in the Blanks.

Listen to the passage and complete the missing words:

1. Biofuels are made from _____ and animal waste.
2. _____ is a biofuel made from corn and sugarcane.

3. _____ comes from vegetable oils and animal fats.
4. Trucks and buses can use _____ instead of diesel.
5. Scientists are using _____ to make biofuels.
6. Biofuels help reduce _____ and fight climate change.
7. Many countries are using more
biofuels for _____ energy.
8. _____ fuels take millions of years
to form.



Listening task 2. True or False?

Decide if the following statements are
true (T) or **false (F)**:

1. Biofuels are non-renewable. (T / F)
2. Biodiesel is made from fossil fuels. (T / F)
3. Bioethanol comes from plants like corn. (T / F)
4. Algae can be used to produce biofuels. (T / F)
5. Biofuels create more pollution than gasoline. (T / F)
6. Some countries use biofuels to reduce pollution. (T / F)

Listening task 3. Multiple choices.

Choose the best answer for each question:

1. What are biofuels made from?
 - a) Plastic and metal
 - b) Plants and animal waste
 - c) Rocks and water

2. What is bioethanol made from?
 - a) Corn and sugarcane
 - b) Coal and oil
 - c) Trees and sand
 3. Why are biofuels better for the environment?
 - a) They produce less pollution
 - b) They are more expensive
 - c) They take millions of years to form
 4. What type of plant can be used to make biofuels?
 - a) Algae
 - b) Pine trees
 - c) Grass
-



SPEAKING TIME.

Speaking task 1. Role Play (Imagine and Discuss!)

Pair up and act out these situations:

1. You are a scientist explaining biofuels to a group of students.
2. You are a car driver choosing between biofuels and gasoline at a gas station.
3. You are an environmental activist talking about how biofuels help the planet.
4. You are a farmer who grows crops used to make biofuels.



5. You are a scientist discovering a new way to make biofuels from food waste.
-

Speaking task 2. Opinion Poll (Class Discussion and Debate)

1. Should all cars use biofuels instead of gasoline? Why or why not?
 2. Are biofuels the best way to fight pollution?
 3. What are the benefits and drawbacks of using biofuels?
 4. Should the government invest more in biofuels?
 5. Can biofuels completely replace fossil fuels?
-

Writing task. Biofuel Story Writing (Creative writing challenge!)

Write a short story using these words:

biofuel, energy, algae, pollution, car, scientist, climate, renewable, vegetable oil, future.

Example:

"In the year 2050, all cars run on **biofuels**. A young **scientist** named Alex discovers a new way to make fuel from **algae**..."

UNIT 29. ETHICS IN BIOTECHNOLOGY

UNIT FOCUS:

- **New Vocabulary**
- **Reading: Ethics in Biotechnology**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: Making the Right Choices in Biotechnology**
- **Speaking time.**

NEW VOCABULARY:

biotechnology	cloning	fair
ethics	genes	safe
genetically	debate	
modified (gm)	nature	
foods	discovery	

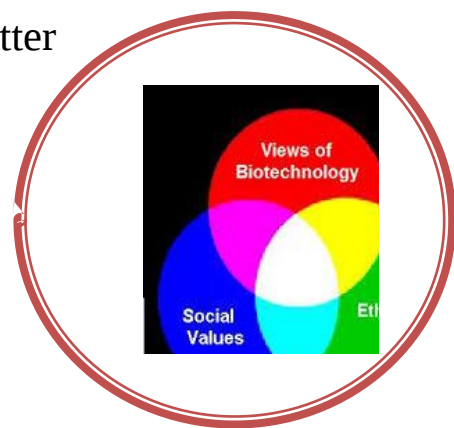


ETHICS IN BIOTECHNOLOGY

Biotechnology is the use of science to change or improve living things. Scientists use biotechnology to make better crops, medicines, and even clean energy.

However, some people worry about how these changes affect nature and humans. This is why ethics is important in biotechnology.

Ethics means deciding what is right or wrong. In biotechnology, ethical questions include:





- Is it safe to change the genes of plants and animals?
- Should scientists clone animals or humans?
- Who should control new scientific discoveries?

One big debate is about **genetically modified (GM) foods**. Some people think GM foods help grow more crops and feed the world. Others worry they might harm nature. Another issue is **cloning**, where scientists copy an animal or plant. Some people believe this is helpful, while others think it is unnatural.

It is important to use biotechnology wisely. Scientists, governments, and people must work together to make sure biotechnology helps the world in a safe and fair way.

Answer the following questions:

1. What is biotechnology, and how is it used?
2. Why is ethics important in biotechnology?
3. What role do scientists play in biotechnology?
4. Why do some people worry about genetically modified (GM) foods?
5. How does cloning work, and why is it a debated topic?
6. What are some benefits of biotechnology in medicine?
7. How can biotechnology help protect the environment?



DOING EXERCISES:

1. Fill in the Blanks (Story Mode!)

Complete the short story using the words from the box:

discovery	cloning	GM foods	debate	biotechnology
nature	safe	ethics	genes	fair

One day, Emma’s teacher asked, “What is _____?” Tom answered, “It is using science to change living things.” The class had a _____ about _____, where scientists copy a living thing exactly. Some students thought it was _____, while others said it was not _____ to the original animal.

Later, they learned about _____, which means changing plants and animals to grow better food. Some thought _____ was a great _____, while others worried about its effects on _____. The teacher said, “We must always ask if science is _____ and helps everyone.”



2. Multiple Choices.

1. What is biotechnology?
 - a) A type of food
 - b) The use of science to change or improve living things
 - c) A new kind of technology
2. What does ethics mean?
 - a) The study of what is right and wrong

- b) A new scientific discovery
 - c) A type of medicine
3. Why do some people worry about GM foods?
- a) They think they might harm nature
 - b) They are more expensive
 - c) They do not taste good
4. What is cloning?
- a) Making an exact copy of a living thing
 - b) Changing the color of plants
 - c) Studying nature
5. Who should decide if biotechnology is safe and fair?
- a) Only scientists
 - b) Scientists, governments, and people together
 - c) Only the government
6. Why do scientists use biotechnology in medicine?
- a) To create stronger plants
 - b) To develop new treatments and vaccines
 - c) To make food taste better
7. What is a possible benefit of genetically modified (GM) foods?
- a) They help crops grow in difficult conditions
 - b) They make food more expensive
 - c) They remove all nutrients from food
8. What is one concern about cloning animals?
- a) It helps protect endangered species
 - b) It might be unnatural and raise ethical questions
 - c) It makes animals stronger

9. How does biotechnology help the environment?

- a) By creating plants that need fewer pesticides
- b) By making all plants the same color
- c) By reducing the need for farming

10. What is one reason why people debate genetic editing in humans?

- a) It could help cure diseases, but it may also be unfair
- b) It makes humans grow faster
- c) It only works on animals

3. Ethical Dilemmas (What would you do?).

Instruction. Read each situation and decide what you would do.

Discuss with a friend!

1. Scientists find a way to make cows produce more milk, but it changes their natural genes. Should they do it?

2. A company wants to clone a rare animal to prevent extinction. Is this right or wrong?

3. A farmer uses GM foods to grow more crops, but some people worry about health effects. Should GM foods be banned?

4. Scientists discover a way to grow meat without killing animals. Should people eat it?

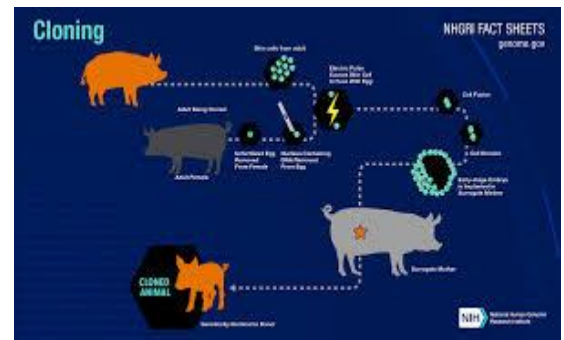
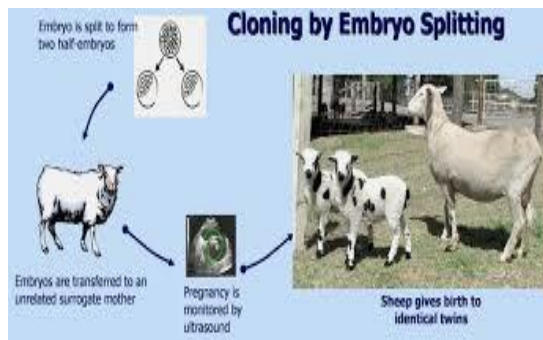
5. A scientist wants to change a baby's genes to make them stronger and smarter. Is this ethical?

4. Match the Pairs (Ethical vs. Unethical)

Instruction. Match the actions with whether they are *ethical (right)* or *unethical (wrong)*.

Action	Ethical or unethical?
1.Using biotechnology to grow food for hungry people	_____
2.Changing a baby’s eye color using genetic editing	_____
3.Cloning endangered animals to stop extinction	_____
4.Selling GM foods without telling people they are modified	_____
5.Creating medicine using biotechnology to save lives	_____

5. Picture Sorting (Right or Wrong?)



Show students pictures of different biotechnology uses (e.g., GM foods, cloning, medicine). Have them **sort** them into categories:

"Good for Society" _____

"Not Fair or Ethical" _____

6. Ethical Choices Game (Yes or No?)

Each student gets a **Yes** or **No** card. Read ethical questions aloud. Students raise their cards and explain their choice.

1. Should scientists be allowed to change human DNA?

2. Is it okay to clone animals?

3. Should all genetically modified (GM) foods be labeled?
4. Is it fair to edit genes to cure diseases?
5. Should we bring back extinct animals using biotechnology?
6. Is it okay to use biotechnology to make animals grow faster for food?
7. Should biotechnology be used to help plants grow in dry areas?
8. Is it right for companies to own the rights to certain genes?
9. Should people use biotechnology to live much longer?
10. Is lab-grown meat a good idea?

7. Who Am I? (Guess the Biotechnology Term!)

Read the clues and guess the correct biotechnology-related word.

1. I am a tiny living thing, like bacteria or yeast that helps with fermentation. Who am I?
2. I carry the genetic instructions for all living things. Who am I?
3. I am a process that changes food, like turning milk into yogurt or cucumbers into pickles. Who am I?
4. I help make bread rise by creating bubbles. Who am I?
5. I am a type of technology that changes or improves living things. Who am I?
6. I am a process that makes an exact copy of a living thing. Who am I?
7. I can be modified to create stronger plants that resist diseases. Who am I?
8. I help doctors cure diseases by fixing genes. Who am I?

9. I am a meat alternative made using biotechnology in a lab. Who am I?
10. I help turn plants and waste into fuel for cars. Who am I?
-



LISTENING TIME.

"Making the right choices in Biotechnology."

Instructions:

1. Read aloud the script (or play a recording).
2. Students listen carefully.
3. Answer the questions based on what they heard.

Listening Exercises

Listening task 1. True or False.

Listen to the text and decide if these statements are true or false.

1. Biotechnology is used only in farming.
2. Some people worry that biotechnology could harm nature.
3. Cloning creates new species of animals.
4. Gene editing can help prevent diseases.
5. Only scientists should decide how biotechnology is used.

Listening task 2. Fill in the Blanks.

Listen carefully and complete the missing words.

1. Biotechnology helps improve _____, _____, and the environment.
2. Scientists can change _____ to cure diseases.
3. Genetic modification makes crops _____ to pests.
4. Some people worry that cloning may not be _____.

5. The goal of biotechnology is to help people while protecting _____.

Listening task 3. Discussion questions.

- Should scientists be allowed to change human DNA? Why or why not?
- Do you think cloning animals is a good idea?
- Who should decide how biotechnology is used?



SPEAKING TIME.

Speaking task 1. Ethical Dilemmas (What Would You Do?)

*Read each situation and answer **Yes or No**. Then, explain why you made that choice.*

1. A scientist discovers a way to make humans immune to all diseases. Should this technology be used?
2. A company creates genetically modified fruits that never spoil. Should people eat them?
3. Scientists can now clone pets so people never have to say goodbye to their beloved animals. Should cloning pets be allowed?
4. A country wants to use biotechnology to make crops grow faster, but some people worry about the effects on nature. Should they still do it?
5. A doctor can edit genes to make sure babies are born without any diseases, but it might lead to people choosing traits like eye color. Should this be allowed?

Speaking task 2. Ethics Sorting Game (Good Idea or Bad Idea?)

Sort each biotechnology action into **“Good Idea”** or **“Bad Idea.”**

Discuss why with a partner or group.

Actions to Sort:

- Using biotechnology to create crops that need less water
 - Cloning an endangered animal to save its species
 - Editing human genes to change physical appearance
 - Creating lab-grown meat to replace traditional farming
 - Allowing companies to own the rights to human genes
 - Using biotechnology to help paralyzed people walk again
 - Designing "super babies" with chosen traits like intelligence and strength
 - Making bacteria that can clean up oil spills in the ocean
 - Changing animals' genes to make them grow faster for food production
 - Developing vaccines using biotechnology to stop deadly diseases
-

UNIT 30. THE FUTURE OF BIOTECHNOLOGY

UNIT FOCUS:

- **New Vocabulary**
- **Reading: The Future of Biotechnology**
- **Reading strategy: Question-Answer Strategy**
- **Listening task: The Future of Biotechnology**
- **Speaking time.**

NEW VOCABULARY:

biotechnology

bacteria

future

medicine

plastic waste

possibilities

crops

biofuels

environment

lab-grown meat



THE FUTURE OF BIOTECHNOLOGY

Biotechnology is changing our world. In the future, scientists will use biotechnology to solve big problems. They will make better medicines to cure diseases and help people live longer. Farmers will grow stronger crops that can survive in dry or cold places.

Biotechnology will also help the environment. Scientists are creating bacteria that can clean dirty water and break down plastic waste. In the future, we may have biofuels made from plants to replace gasoline in cars.

Another exciting idea is growing food in labs. Scientists can already make lab-grown meat without harming animals. In the future, more people might eat this kind of food.

However, some people worry about how biotechnology will change nature and human life. That is why scientists, governments, and people must work together to make good choices. The future of biotechnology is full of possibilities!

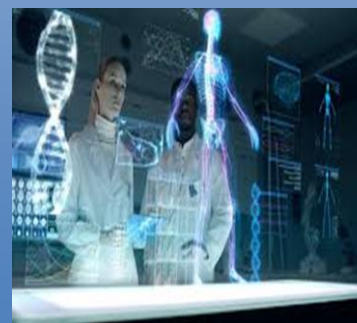
Answer the following questions:

1. What is biotechnology?
2. How will biotechnology help doctors in the future?
3. What can biotechnology do to help farmers?
4. How can scientists use biotechnology to clean the environment?
5. What is biofuel, and why is it important?
6. What is lab-grown meat, and how is it different from regular meat?
7. Why do some people worry about biotechnology?



DOING EXERCISES:

1. Fill in the Future (Complete the sentences)



Complete the sentences with the correct words from the text.

ethical	plastic	crops	lab-	polluted
			grown meat	
possibilities	nature	plants	biofuel	medicines

1. In the future, biotechnology will help _____ grow in dry places.
2. Scientists are making better _____ to cure diseases.
3. Some bacteria can help clean _____ water.
4. _____ is a kind of fuel made from plants.
5. _____ is meat made in a lab without using animals.
6. Biotechnology can help reduce _____ waste.
7. Some people worry about how biotechnology will change _____.
8. Farmers will use biotechnology to grow stronger _____.
9. Scientists, governments, and people must work together to make _____ choices.
10. The future of biotechnology is full of _____!

2. Odd One Out (Find the word that doesn't belong)

Circle the word that doesn't fit in each group.

1. Bacteria – Virus – Crop – Biofuel

2. Medicine – Cure – Plastic Waste – Vaccine

3. Lab-Grown Meat – Farm – Scientists – Technology

4. Environment – Plastic – Clean Water – Pollution

5. Future – Possibilities – Past – Innovation

6. Biotechnology – Nature – Genetic
Modification – Engineering

7. Car – Biofuel – Gasoline – Tree

8. DNA – Protein – Fuel – Cells

9. Doctor – Researcher – Scientist – Painter

10. Clean – Pollute – Protect – Restore

plastic waste

genetic modification

biotechnology bacteria

dna

biofuel

lab-grown meat

environment

medicine

farm

3. Who Am I? (Guess the biotechnology term)

Read the clues and guess the word.

1. I help sick people get better. Who am I?
2. I am a fuel made from plants. Who am I?
3. I help break down waste and clean water.
Who am I?
4. I am meat made without animals. Who am I?
5. I am tiny and can change genes. Who am I?
6. I am a place where crops grow. Who am I?
7. I help plants grow stronger using science. Who am I?
8. I help the earth by removing pollution. Who am I?
9. I make it possible to cure diseases. Who am I?
10. I can be harmful if not recycled properly. Who am I?

4. True or False (Correct the false sentences)

Decide if each sentence is true or false. If false, rewrite the sentence correctly.

1. Biotechnology will only help farmers.

True/False

2. Scientists are making bacteria that clean water.

True/False

3. Lab-grown meat is made from plants.

True/False

4. Biofuels can replace gasoline in cars.

True/False

5. Plastic waste is good for the environment.

True/False

6. Scientists use biotechnology to make better medicines.

True/False

7. Some people worry about how biotechnology will change the world.

True/False

8. All crops can survive in dry places without biotechnology.

True/False

9. Only scientists should decide how biotechnology is used.

True/False

10. The future of biotechnology has many possibilities.

True/False

5. Ethics Sorting Game (Good Idea or Bad Idea?)

*Sort these biotechnology actions into "**Good Idea**" or "**Bad Idea**" and explain why.*

1. Using bacteria to clean polluted water

2. Creating biofuels from plants

3. Cloning endangered animals
 4. Making crops that never spoil
 5. Using biotechnology to grow food in space
 6. Editing genes to make people taller
 7. Releasing genetically modified animals into the wild
 8. Creating bacteria to break down plastic waste
 9. Selling lab-grown meat in stores
 10. Allowing only scientists to decide how biotechnology is used
-

6. Future Predictions (What will happen)

Complete the sentences using your own ideas about the future of biotechnology.

1. In the future, scientists will...
 2. Lab-grown meat will...
 3. Biofuels will replace...
 4. Farmers will use biotechnology to...
 5. Bacteria will help clean...
 6. Scientists will find a way to...
 7. People will use biotechnology to...
 8. Crops will be able to grow in...
 9. Plastic waste will be...
 10. The biggest change in biotechnology will be...
-

7. Would You Rather? (Choose and Explain)

Choose one option and explain your choice.

1. Would you rather eat lab-grown meat or only plant-based food?
2. Would you rather have a car that runs on biofuels or an electric car?
3. Would you rather use biotechnology to live longer or to cure all diseases?
4. Would you rather work as a scientist or a farmer using biotechnology?
5. Would you rather have crops that grow in space or bacteria that clean the ocean?
6. Would you rather have food that never spoils or water that never gets dirty?
7. Would you rather be the first person to try a new biotechnology product or wait to see if it is safe?
8. Would you rather remove plastic waste from the ocean or stop it from being made?
9. Would you rather live in a world without biotechnology or a world where everything is controlled by it?
10. Would you rather have a robot scientist or a biotechnology expert as your teacher?

8. Match the Picture (Visual exercise).

Match each biotechnology-related picture with its description.

- A photo of bacteria → "Tiny organisms that help with biotechnology"
- A lab-grown burger → "Meat made without animals"
- A scientist working in a lab → "Someone studying biotechnology"

- A clean river → "How biotechnology helps the environment"
- A cornfield → "Crops that can be modified with biotechnology"



LISTENING TIME.

THE FUTURE OF BIOTECHNOLOGY.

Instructions:

1. Read aloud the script (or play a recording).
2. Students listen carefully.
3. Do exercises based on what they heard.

Listening task 1. True or False.

- Biotechnology can help grow food in dry areas. (___)
- Scientists are using biotechnology to make diseases worse. (___)
- Lab-grown meat is made from plants. (___)

- Biotechnology can help clean polluted water. (___)
- Biofuels come from animals. (___)

Listening task 2. Fill in the Blanks.

1. Biotechnology will help farmers grow _____ in dry places.
2. Scientists are making new _____ to fight diseases.
3. _____ can be made in a lab without using animals.
4. Special _____ can clean dirty water.
5. The future of biotechnology is full of _____!



SPEAKING TIME.

Speaking task 1. Debate Time! (Agree or Disagree?)

Read each statement and explain why you agree or disagree.

1. "Biofuels should replace all gasoline."
2. "Lab-grown meat is better than farm-raised meat."
3. "Scientists should be allowed to change human DNA to cure diseases."
4. "We should use biotechnology to grow food on Mars."
5. "Genetic modification should be used to make people stronger and smarter."
6. "All food should be made using biotechnology in the future."
7. "Plastic should be banned since it creates too much waste."
8. "Bacteria can be more useful than harmful."
9. "People should only eat natural food, not lab-made food."

10. "Biotechnology will change the world for the better."



Speaking task 2. Imagine the Future.

Imagine it is the year **2050**. How do you think biotechnology has changed the world? Use these sentence starters:

- "In the future, scientists will...."
- "People will use biotechnology to...."
- "One big change in medicine will be..."
- "The most exciting thing about biotechnology is..."

Do you like speaking activities?

Do You Know?

Unusual Facts about the Future of Biotechnology

1. Lab-Grown Organs.

Scientists are developing ways to **grow human organs** in a lab using stem cells. In the future, we may not need organ donors—doctors could print organs using 3D **bioprinters**!

2. Glow-in-the-Dark Plants.

Some researchers are using biotechnology to create **plants that glow** instead of using streetlights! These plants could help light up cities while saving electricity.

3. Super Bananas.

In the future, bananas might not just be fruit—they could be **vitamin-packed superfoods** that prevent diseases like blindness by providing extra Vitamin A.

4. Self-Healing Materials.

Scientists are developing **bio-engineered materials** that can **heal**

themselves like human skin! Buildings, clothes, and even phone screens may fix their own cracks.
5. Bacteria That Eat Plastic. A special type of bacteria is being modified to eat plastic waste ! This could help clean up pollution and reduce plastic in the oceans.
6. Meat Without Animals. Future burgers may not come from cows! Scientists are working on lab-grown meat that tastes like real beef but is made without harming animals.
7. DNA Data Storage. Instead of using hard drives, future computers might store data in DNA ! A tiny bit of DNA could hold all the world's information in a space smaller than a sugar cube.
8. Edible Vaccines. In the future, we might eat vaccines instead of getting shots! Scientists are working on fruits and vegetables that contain medicine to prevent diseases.
9. Custom-Made Babies? With gene editing , parents might be able to choose their baby's traits—like eye color, height, or even intelligence! This is a big ethical debate in biotechnology.
10. Bionic Plants. Some plants may be modified to produce electricity ! Scientists are studying how trees and leaves can generate power to charge small devices.

LISTENING SCRIPT.

Unit 1. What is Biotechnology?

Hello, everyone! Today, we are learning about biotechnology. But what is it? Biotechnology is the science of using living things to solve problems and make life better. For example, tiny living things, like bacteria, help make yogurt and cheese. Did you know that yeast is used to make bread rise? That's also biotechnology!

Biotechnology helps farmers grow stronger crops that don't get sick easily. It also makes vaccines that protect us from diseases like the flu.

But that's not all! Biotechnology is good for the environment too. It helps clean oil spills in the ocean and creates biofuels, which are cleaner than regular fuels.

So, biotechnology mixes biology and technology to make the world a better place. Isn't that amazing?

Unit 2. The History of Biotechnology

Biotechnology has been used by humans for thousands of years. A long time ago, people discovered how to use yeast, a tiny organism, to make bread rise. They also used fermentation to create drinks like beer and food like yogurt and cheese.

About 10,000 years ago, people started farming. They practiced selective breeding, which means they chose the best plants and animals to grow. This made farming more successful.

In the 1800s, scientists learned about germs and diseases. This led to the creation of vaccines, like the one for smallpox, which saved many lives.

In the 1900s, scientists discovered DNA, the tiny code inside all living things. This discovery helped create new medicines, stronger crops, and better ways to treat diseases.

Today, biotechnology is used in many ways. It helps clean the environment, produce renewable energy, and make healthier food. Biotechnology continues to improve our lives every day.

Unit 3. Branches of Biotechnology.

"Biotechnology is divided into different branches, each helping us in unique ways. Medical biotechnology focuses on making medicines and vaccines to protect people from diseases. It also helps in creating treatments for serious illnesses like cancer.

Agricultural biotechnology helps farmers grow stronger crops and healthier animals. It uses science to make plants resist pests and grow better in different climates.

Environmental biotechnology is all about keeping our planet clean. Scientists in this branch work to clean polluted water, soil, and air. They also find ways to reduce waste and recycle better.

Industrial biotechnology creates useful products like biofuels, biodegradable plastics, and energy from plants. This branch helps replace harmful chemicals with safer, natural ones.

Finally, marine biotechnology studies life in the ocean, like fish, coral reefs, and algae. Scientists use marine biotechnology to find new medicines, protect sea life, and even make food from the ocean.

Each branch of biotechnology plays an important role in improving our lives and protecting the Earth."

Unit 4. Biotechnology in everyday life.

Biotechnology is a powerful tool that helps improve many aspects of our daily lives. It helps us in food production, medicine, farming, and even protecting the environment. Let's explore how it works!

In food, biotechnology is used to make foods like yogurt and bread. Yeast, a tiny living organism, helps bread rise. Bacteria are used to make yogurt, which is a healthy snack. Biotechnology also helps create food that can survive harsh weather and pests.

In medicine, biotechnology helps make vaccines. Vaccines are important because they protect us from diseases like the flu or smallpox. Biotechnology also helps create medicines that help people feel better when they are sick.

Farming benefits from biotechnology too. Farmers use it to grow stronger crops that can fight off pests and grow better in different climates. This helps make sure there is enough food for everyone.

Biotechnology is also important for the environment. It helps clean up pollution in the water, air, and soil. For example, biotechnology is used to

turn waste into useful energy, like biofuels. These biofuels are made from plants and are better for the Earth than regular fuels.

As you can see, biotechnology is all around us, making our world healthier and more sustainable.

Unit 5. "Vaccines and Their Importance"

Vaccines are one of the greatest tools for protecting our health. They help prevent serious diseases, such as measles, polio, and the flu. A vaccine works by teaching our immune system to recognize and fight harmful germs. For example, when you get a vaccine, it introduces a small, safe part of a germ into your body. This part is not dangerous, but it gives your immune system the chance to practice. If you later come into contact with the real germ, your immune system will know how to fight it quickly.

Scientists spend years studying and testing vaccines to make sure they are safe and effective. Before a vaccine is given to people, it goes through many tests and trials. These tests make sure it won't harm us and will work properly. Some vaccines give protection for life, like the polio vaccine, while others, like the flu vaccine, need to be taken every year.

Vaccines don't just protect individuals; they also protect whole communities. When many people are vaccinated, it becomes harder for diseases to spread. This is called "herd immunity." It is especially important for babies and older people, who might not be strong enough to fight off germs on their own.

Thanks to vaccines, diseases that once killed millions, like smallpox, have been completely wiped out. In the future, vaccines may help us fight even more diseases. They are an amazing example of how science can make our lives better and healthier.

Unit 6. Biotechnology in disease diagnosis.

"Biotechnology is a special field that uses science and technology to study the body. It helps doctors find diseases early and treat them better. For example, during the COVID-19 pandemic, doctors used a test called PCR. This test looks for tiny pieces of a virus inside the body.

Doctors also use biotechnology to study cells. Cells are the building blocks of the body. They can show if someone is healthy or sick. Special machines check the cells to find diseases like cancer.

Germs, like bacteria and viruses, can make people sick. Biotechnology helps doctors study these germs to keep people safe. By diagnosing diseases early, doctors can help people get better quickly. Thanks to biotechnology, many lives are saved every day."

Unit 7. Understanding gene therapy in modern medicine.

"Gene therapy is a revolutionary medical treatment that targets the root cause of certain diseases by altering the genetic material within a person's cells. The concept of gene therapy was first explored in the early 1970s, but it wasn't until the 1990s that the first clinical trials began. The main idea behind gene therapy is to replace faulty or missing genes with healthy ones. It can be used to treat genetic disorders, such as cystic fibrosis, hemophilia, and sickle cell anemia, by introducing a healthy version of the gene into a person's cells.

There are several methods of delivering the new genes to the body, and they vary depending on the type of disease being treated. One common method is to use harmless viruses to carry the healthy genes into the patient's cells. These viruses are modified so they can't cause illness but are still able to deliver the therapeutic gene. Another method involves direct injection of the gene into the patient's bloodstream or tissues.

Researchers are also exploring ways to use stem cells, which are capable of becoming any type of cell in the body, to help deliver and integrate the new genes.

Despite these challenges, the future of gene therapy looks bright. As technology improves and more research is conducted, scientists are hopeful that gene therapy will one day be available to treat a wide range of diseases, including common conditions like diabetes and heart disease."

Unit 7. Task 2. Gene therapy

"Gene therapy is a groundbreaking treatment that aims to correct genetic disorders by introducing healthy genes into a person's cells. This can be done using several techniques, including viruses that carry the healthy genes into the body or direct injections of the gene into tissues. The goal of gene therapy is to replace missing or defective genes with functional ones to treat diseases like cystic fibrosis, hemophilia, and sickle cell anemia.

In the past few decades, gene therapy has made significant progress, with clinical trials showing positive results for some rare genetic disorders. Despite its promise, gene therapy is still in the early stages and faces challenges. One challenge is the high cost of treatment, which limits its availability. Another concern is the possibility of side effects, including the risk of The Body Rejecting The New Genes. Additionally, Ethical Debates Continue About The Use Of Gene Therapy, Particularly Regarding Its Potential Application To Modify Human Embryos.

In The Future, Gene Therapy May Become A Standard Treatment For A Variety Of Genetic Disorders, And Researchers Hope To Expand Its Use To Treat Common Conditions Like Heart Disease And Diabetes."

Unit 8. Pharmaceutical Biotechnology.

"Pharmaceutical biotechnology is a branch of science that uses living organisms to create medicines. Scientists often work with bacteria, plants, or cells in laboratories to develop drugs and treatments for various diseases. One major success of pharmaceutical biotechnology is the production of insulin, which helps people with diabetes control their blood

sugar. Another important achievement is the creation of vaccines, which protect people from illnesses like the flu or COVID-19.

To make these medicines, scientists study the DNA of cells to understand how diseases work. They then use this knowledge to develop treatments that target the root cause of the problem. For example, in gene therapy, healthy genes are introduced into a patient's cells to replace faulty ones.

Pharmaceutical biotechnology has also made progress in cancer treatment. Special medicines can now target cancer cells without harming healthy ones, reducing side effects. As this field grows, scientists hope to find cures for even more diseases in the future."

Unit 9.What is crispr and gene editing?

"DNA is like a recipe book found in all living things. It gives instructions on how to grow, look, and work. Sometimes, there can be mistakes in DNA, and these mistakes can cause diseases or problems.

CRISPR is a special tool that scientists use to fix or change DNA. Imagine CRISPR as tiny scissors that can cut out the mistakes or add something new. For example, CRISPR can help cure diseases or make crops stronger and healthier.

Gene editing is the process of using CRISPR to make these changes. Genes are small parts of DNA that decide things like your eye color or how tall you will be. With gene editing, scientists can help people, animals, and plants by fixing problems or making them better.

CRISPR is still very new, and scientists are learning how to use it carefully. It is an exciting tool that could solve many big problems, like curing diseases and helping to grow more food for the world."

Unit 10. Understanding GMOS

"Scientists have found ways to change plants and animals to make them better. These are called genetically modified organisms, or GMOs. They change the DNA of a plant or animal so it can grow faster, be stronger, or resist insects and diseases.

Farmers use GMOs to grow more food. For example, some vegetables are changed to stay fresh longer. Some crops, like corn, are made to fight off insects, so farmers don't have to use as many chemicals.

Some animals are also genetically modified. Scientists can help cows produce more milk or make fish grow faster.

But not everyone agrees about GMOs. Some people worry about how safe they are for people and nature. Scientists are still studying them to make sure they are good for the environment.

GMOs can help the world by giving us more food, but it is important to use them carefully."

Unit 11. Biotechnology in pest control

In many farms, pests like insects and weeds can harm crops. Farmers often use chemicals to kill these pests. However, these chemicals can also harm the environment and other living things.

Biotechnology offers a safer way to control pests. Scientists can change plants so they can fight pests naturally. For example, some plants can produce substances that kill insects but are safe for humans and animals.

Another method is using friendly insects. These insects eat harmful pests, helping to protect crops without chemicals. This approach is good for the environment and helps farmers grow healthy food.

Unit 12. Biotechnology and food production

"Biotechnology helps farmers grow more food. Scientists use biotechnology to make crops stronger, healthier, and tastier. Some plants are changed to survive bad weather, grow faster, or fight diseases.

One example of biotechnology is Golden Rice. This special rice has extra vitamin A, which helps people stay healthy. Many countries use Golden Rice to prevent blindness and other health problems.

Biotechnology also helps the environment. It reduces the need for chemicals that can harm nature. Scientists are still learning new ways to use biotechnology to help people and the planet."

Unit 13. Plant Tissue Culture

Plant tissue culture is a technique used to grow plant cells, tissues, or organs in a controlled, sterile environment. This method allows scientists to produce multiple copies of plants with desirable traits, such as disease resistance or higher yield.

The process begins with selecting a small piece of plant tissue, called an explant. This explant is sterilized and placed in a nutrient-rich medium that contains essential minerals, vitamins, and plant growth regulators. Under the right conditions, the cells divide and form a mass of undifferentiated cells known as a callus.

Over time, with the appropriate hormones, the callus develops into shoots and roots, eventually forming a complete plant. This technique is widely used in agriculture, horticulture, and conservation efforts to propagate rare or endangered plant species.

Unit 14. Biofertilizers – Nature's Helpers

Hello, everyone! Today, we will learn about biofertilizers.

Plants need nutrients to grow. These nutrients come from the soil. But sometimes, the soil does not have enough nutrients. Farmers use fertilizers to help plants grow. There are two types of fertilizers: chemical fertilizers and biofertilizers.

Biofertilizers are natural and safe for the environment. They are made from tiny living things like bacteria, fungi, and algae. These tiny helpers

make the soil healthy and strong. One important biofertilizer is called Rhizobium. It helps beans and peas grow better by adding nitrogen to the soil.

Farmers like biofertilizers because they are natural, safe, and good for the Earth. Unlike chemical fertilizers, they do not pollute the environment. Biofertilizers help plants grow strong and give us healthy food.

So, next time you see a green farm, remember – biofertilizers are working hard to keep plants healthy!

Unit 15. Bioremediation – Nature's Cleaner"

Have you ever seen a dirty river or land filled with trash? Pollution is a big problem for our planet. But did you know that nature has its own way to clean up? This process is called bioremediation.

Bioremediation uses tiny living things, like bacteria and fungi, to remove pollution. These small helpers eat harmful chemicals and turn them into safe substances. Scientists use bioremediation to clean oil spills in the ocean, dirty soil, and even polluted air.

For example, when oil spills into the sea, some special bacteria break it down, making the water clean again. Some plants also help by taking harmful chemicals from the ground. This natural process makes our planet healthier without using dangerous chemicals.

People can help too! Recycling, throwing trash in the right place, and using less plastic can stop pollution before it starts. Together, with bioremediation and good habits, we can keep the Earth clean and safe for everyone!

Unit 16. The Story of Bioplastics"

Plastic is everywhere! We use it for bottles, bags, and containers. But did you know that regular plastic is made from oil? It takes hundreds of years to break down, and it pollutes the Earth. Many animals, like sea turtles and birds, eat plastic by mistake. This is very dangerous for them.

But there is a better solution—bioplastics! Bioplastics are made from plants like corn, sugarcane, and potatoes. Unlike normal plastic, bioplastics can break down much faster. Some types disappear in just a few months!

Many companies now use bioplastics to make cups, plates, and bags. Some countries are also passing laws to reduce plastic waste. But we all need to help! We can choose products made from bioplastics, recycle when possible, and use less plastic in our daily lives.

By making small changes, we can protect nature and keep the Earth clean. Every little action helps!

Unit 17.The Journey of Wastewater"

Hello, everyone! Have you ever wondered what happens to the water after you wash your hands or flush the toilet? This water, called wastewater, needs to be cleaned before it can return to nature. Let's follow the journey of wastewater through a treatment plant!

First, the wastewater travels through pipes to a treatment plant. The first step is screening, where big objects like plastic, leaves, and sticks are removed.

Next, the water goes to a settling tank, where heavy dirt and sand sink to the bottom. This helps separate the solids from the water.

After that, tiny bacteria help clean the water by eating the harmful waste. These bacteria break down the dirt, making the water much cleaner.

Then, the water goes through filters that remove tiny particles. The final step is disinfecting, where chemicals or ultraviolet (UV) light kill any remaining germs.

Now, the water is clean and safe! It flows back into rivers and lakes, ready to be used again. Thanks to wastewater treatment, we can protect nature and keep our water clean!

Unit 18. "How Biotechnology Creates Renewable Energy"

Hello, everyone! Have you ever wondered how we can make energy without using coal or oil? The answer is biotechnology!

Biotechnology helps us use living things like plants, bacteria, and waste to make clean renewable energy. Let's explore some ways this happens!

First, we have biofuels. These are special fuels made from plants like corn and sugarcane. Scientists turn these plants into liquid fuel, which can power cars, buses, and airplanes!

Next, there is biogas. This comes from food waste, animal poop, and dead plants. When these things break down, they release a gas. This gas can be used for cooking and making electricity.

We also have algae power! Tiny green plants called algae grow in water. Scientists can turn algae into fuel for machines and cars!

Another amazing way to create energy is by using waste. Instead of throwing garbage away, some of it can be turned into electricity. This helps reduce pollution and gives us more power!

Thanks to biotechnology, we can make energy without harming the Earth. It helps keep our air clean and protects nature. Wouldn't it be great if we all used more renewable energy?

Unit 19. How Biosensors Help Use.

Have you ever seen a doctor check someone's blood or a scientist test food? They use a special tool called a biosensor!

A biosensor is a small device that helps find and measure things. It works like a tiny detective! First, it finds something special, like sugar in blood or germs in water. Then, it measures how much is there. Finally, it shows the result on a screen or paper.

Doctors use biosensors to check blood sugar levels for diabetic patients. Scientists use them to make sure food is fresh and safe to eat. People also use biosensors to check if water and air are clean.

Biosensors help us stay healthy, keep food safe, and protect nature. Even though they are small, they do a very big job!

Unit 20. The amazing world of DNA.

Did you know that a tiny code inside your body makes you who you are? This special code is called DNA! DNA is found inside cells, the tiny building blocks of all living things.

DNA looks like a twisted ladder. Scientists call this shape a double helix. The steps of this ladder are made of four special letters: A, T, C, and G. Adenine (A) always pairs with Thymine (T), and Cytosine (C) always pairs with Guanine (G).

DNA is like a recipe for the body. It decides your eye color, hair type, and even your height! It also helps your body grow and work properly.

DNA gets passed from parents to children. This is why you might look like your parents! Scientists use DNA to study diseases, solve mysteries, and learn about life.

Even though DNA is super small, it is one of the most important parts of life!

Unit 21. The Science of Cloning.

Have you ever heard of cloning? Cloning means making an exact copy of a living thing. Scientists use cloning to make copies of plants and animals.

Cloning is possible because of DNA. DNA is the special code inside every living thing. It carries information about how we look and grow. When scientists clone a plant or an animal, they copy its DNA to make a new one that looks the same.

Farmers use cloning to grow strong and healthy plants. Scientists also study cloning to help sick people. One famous clone was a sheep named Dolly. She was the first cloned animal!

Even though cloning is useful, some people think it should be used carefully. Scientists are still learning more about how cloning can help the world.

Unit 22. The human genome project"

Have you ever wondered what makes you unique? Every person has a special set of instructions inside their body called DNA. The Human Genome Project was a big scientific study that helped scientists understand these instructions.

Scientists started the project in 1990 and worked for 13 years to map all the DNA in humans. DNA is like a book filled with many tiny letters, and this project helped scientists read and understand it.

Why is this important? The Human Genome Project helps doctors find out why people get sick and how to treat diseases. It also helps us learn why people have different eye colors, heights, or even talents.

Thanks to this project, scientists can create better medicines and help people live healthier lives. Even though the project is finished, scientists are still using its discoveries to learn more every day!

Unit 23. "How Forensic Biotechnology Solves Mysteries"

Forensic biotechnology helps detectives solve crimes! Scientists use special tools to find clues, like fingerprints, DNA, and tiny pieces of evidence.

When a crime happens, detectives go to the crime scene. They look for fingerprints, hair, or even drops of blood. These clues help them find out who was there.

One important tool is the microscope. It makes tiny clues look bigger so scientists can study them better. DNA is another important clue. It is a special code inside every person's body. No two people have the same DNA, except for identical twins!

Forensic scientists use DNA tests to match clues to the right person. This helps the police find out who committed the crime. Thanks to forensic biotechnology, crimes can be solved much faster and more accurately!

Unit 24. "The Journey of Protein Synthesis"

Protein synthesis is an important process in our bodies. It helps build and repair muscles, make enzymes, and support our immune system. This process happens inside our cells.

First, inside the nucleus, the DNA holds instructions for making proteins. But DNA cannot leave the nucleus. So, it makes a copy called mRNA (messenger RNA). The mRNA carries the instructions to the ribosome, which is like a tiny protein factory.

At the ribosome, another helper, called tRNA (transfer RNA), brings small building blocks called amino acids. The ribosome puts these amino acids together in the correct order to form a protein.

After the protein is made, it travels to where it is needed in the body. Proteins help us grow, repair cells, and keep us strong. That is why eating protein-rich foods, like eggs, fish, beans, and meat, is important for our health.

Unit 25. The magic of fermentation.

Fermentation is a special process that helps change food. Tiny living things called microorganisms, like yeast and bacteria, do the work. They eat sugar and create gas or other products that make food taste different.

Yeast helps bread rise by making tiny bubbles. Without yeast, bread would be flat and hard. Bacteria help make yogurt and cheese. They change milk into something creamy and delicious. Fermentation also helps make pickles. Cucumbers soak in water with salt, and over time, bacteria turn them into pickles.

Fermentation is important because it makes food last longer and gives it a special taste. Many foods we love, like bread, cheese, yogurt, and pickles, are made using this process.

Unit 26. The power of enzymes in industry.

Enzymes are special proteins that help speed up chemical reactions. Many industries use enzymes to make their work easier and faster.

In the food industry, enzymes help make bread soft and fruit juice clear. They also help turn starch into sugar to make syrups. Without enzymes, making these foods would take much longer.

In the medicine industry, enzymes help doctors test for diseases. They are also used to make medicines that treat illnesses.

The cleaning industry also uses enzymes. Have you ever wondered how detergents clean stains so well? Enzymes break down food, grease, and dirt, making clothes fresh and clean.

Even the paper industry needs enzymes! They help make paper smooth and remove unwanted materials from wood pulp. This process helps save energy and water.

Enzymes are useful because they make industries faster, cheaper, and eco-friendly. That's why they are so important in our daily lives!

Unit 27. How Biotechnology Helps the Textile Industry.

Biotechnology is changing the way we make clothes. In the past, the textile industry used many chemicals to clean, dye, and soften fabrics. Now, scientists use tiny helpers called enzymes to do this work in a safer way.

Enzymes help remove dirt from fabric, making it clean and soft. They also replace harsh chemicals in the dyeing process, making colors more natural and eco-friendly. Some enzymes even make fabric stronger and last longer.

Another way biotechnology helps is by using natural dyes instead of chemical ones. These dyes come from plants, bacteria, and fungi. They are safer for people and the environment.

Some fabrics are now made from biodegradable materials like bamboo or corn. These fabrics break down naturally and do not create waste. Recycling old clothes and using recycled fibers is another way to make fashion more sustainable.

Biotechnology is helping the fashion industry become greener and better for the planet. The clothes of the future will be stylish and eco-friendly!

Unit 28. The power of biofuels.

Biofuels are special types of fuels made from plants and animal waste. Unlike fossil fuels, which take millions of years to form, biofuels are renewable and can be made quickly.

One common type of biofuel is bioethanol, made from crops like corn and sugarcane. It is often mixed with gasoline to power cars. Another type is biodiesel, which comes from vegetable oils and animal fats. Trucks and buses can run on biodiesel instead of regular diesel fuel.

Scientists are also exploring the use of algae to create biofuels. Algae grow very fast and produce a lot of oil that can be turned into fuel.

Biofuels are good for the environment because they produce less pollution than fossil fuels. They also help reduce climate change by cutting down carbon emissions. Many countries are using more biofuels to create cleaner energy for the future.

Unit 29. Making the Right Choices in Biotechnology.

Biotechnology is a powerful tool that helps improve medicine, agriculture, and the environment. Scientists use biotechnology to create new medicines, grow stronger crops, and even change DNA to cure diseases. However, some people worry about how these changes might affect nature and society.

For example, genetic modification can make crops resistant to pests, but some fear it might harm other plants and animals. Cloning can help save endangered species, but is it right to create exact copies of living things? Scientists can also edit human genes to prevent diseases, but should they be allowed to change traits like height or intelligence?

These are important ethical questions. Governments, scientists, and the public must work together to make fair decisions. The goal of biotechnology should be to help people while also protecting nature and human rights.

Unit 30. The Future of Biotechnology

Biotechnology is changing the world, and in the future, it will help solve many problems. Scientists are using biotechnology to grow crops that can survive in dry areas. This means more food for people, even in places with little rain.

Medicine is also improving with biotechnology. New treatments and vaccines are being created to cure diseases faster. Some scientists are even working on lab-grown meat, which can provide food without harming animals.

Biotechnology can also help the environment. Special bacteria are being used to clean polluted water and reduce plastic waste. In the future, we may even have biofuels made from plants to replace gasoline.

However, some people worry about the effects of biotechnology. Who should control it? Is it always safe? Scientists, governments, and people must work together to make the best choices for everyone.

The future of biotechnology is full of exciting possibilities!

Acronyms in Biotechnology.

Acronym	Meaning
ATP	Adenosine Triphosphate – The main energy carrier in cells.
cDNA	Complementary DNA – A form of DNA synthesized from mRNA.
CRISPR	Clustered Regularly Interspaced Short Palindromic Repeats – A gene-editing technology.

DNA	Deoxyribonucleic Acid – The molecule that carries genetic information.
ELISA	Enzyme-Linked Immunosorbent Assay – A test used to detect antibodies in biological samples.
EPA	Environmental Protection Agency – Regulates biotechnology applications related to the environment.
FDA	Food and Drug Administration – Regulates biotechnology in food and medicine.
GFP	Green Fluorescent Protein – A protein that glows and is used in cell imaging.
GMO	Genetically Modified Organism – An organism whose DNA has been altered.
HGP	Human Genome Project – A global effort to map the entire human genome.
mRNA	Messenger RNA – A type of RNA that carries genetic instructions for protein synthesis.
NGS	Next-Generation Sequencing – Advanced DNA sequencing technology.
PCR	Polymerase Chain Reaction – A method for amplifying DNA sequences.
rDNA	Recombinant DNA – DNA created by combining genetic material from different sources.
RNA	Ribonucleic Acid – A molecule involved in protein synthesis and gene regulation.

RNAi	RNA Interference – A process that silences gene expression.
rRNA	Ribosomal RNA – A component of ribosomes involved in protein synthesis.
siRNA	Small Interfering RNA – A type of RNA that can silence specific genes.
tRNA	Transfer RNA – Brings amino acids to ribosomes during protein synthesis.
WHO	World Health Organization – Oversees global health, including biotechnology regulations.
USP	United States Pharmacopeia – Sets quality standards for medicines and biotechnology products.
FDA	Food and Drug Administration – Regulates food, drugs, and biotech products in the U.S.
EPA	Environmental Protection Agency – Regulates biotechnology applications related to the environment.
NIH	National Institutes of Health – Conducts and funds medical biotechnology research.
FAO	Food and Agriculture Organization – Oversees biotechnology in food security and agriculture.
OECD	Organization for Economic Cooperation and Development – Promotes biotechnology policies.
RFLP	Restriction Fragment Length Polymorphism – A technique used for DNA fingerprinting.

SNP	Single Nucleotide Polymorphism – A small genetic variation used in genetic studies.
HLA	Human Leukocyte Antigen – A group of proteins important for immune system function.
BLAST	Basic Local Alignment Search Tool – A bioinformatics tool for comparing DNA sequences.
IGF	Insulin-like Growth Factor – A protein involved in cell growth and development.
GCP	Good Clinical Practice – International standards for clinical trials in biotechnology.
GMP	Good Manufacturing Practice – Regulations for biotech production to ensure quality.
GRAS	Generally Recognized As Safe – FDA designation for food and biotech products.
Bt	Bacillus thuringiensis – A bacterium used in genetically modified crops for pest resistance.
HACCP	Hazard Analysis and Critical Control Points – A food safety management system used in biotech.
EST	Expressed Sequence Tag – A short DNA sequence used to identify gene transcripts.
SAGE	Serial Analysis of Gene Expression – A technique for studying gene expression patterns.
LAMP	Loop-Mediated Isothermal Amplification – A DNA amplification technique used in diagnostics.

NMR	Nuclear Magnetic Resonance – A method used to determine molecular structures in biotechnology.
CGMP	Current Good Manufacturing Practices – Regulations ensuring the quality of biotech products.
VLP	Virus-Like Particle – A structure used in vaccine development.
MAB	Monoclonal Antibody – Lab-made antibodies used in disease treatment.
QTL	Quantitative Trait Loci – Regions of the genome associated with specific traits.
HTS	High-Throughput Screening – A method for quickly testing biological samples.
IPR	Intellectual Property Rights – Legal protection for biotech inventions.
BRCA	Breast Cancer Gene – A gene associated with increased cancer risk.
DMD	Duchenne Muscular Dystrophy – A genetic disorder studied in biotechnology.
RTPCR	Reverse Transcription Polymerase Chain Reaction – A technique for studying RNA.
CFTR	Cystic Fibrosis Transmembrane Conductance Regulator – A gene linked to cystic fibrosis.
BiP	Binding Immunoglobulin Protein – A protein involved in stress response in cells.

COMPREHENSIVE BIOTECHNOLOGY GLOSSARY

TERM	DEFINITION
Active Site	The part of an enzyme where the substrate binds and a reaction occurs.
Agar	A jelly-like substance used in laboratories to grow bacteria and other microorganisms.
Agarose Gel Electrophoresis	A technique used to separate DNA, RNA, or proteins based on size using an electric field.
Allele	Different versions of a gene found at the same location on a chromosome.
Amniocentesis	A medical test used to check for genetic disorders in an unborn baby.
Amplification	The process of making multiple copies of a DNA segment using techniques like PCR (Polymerase Chain Reaction).
Antibody	A protein produced by the immune system to fight infections.
Antigen	A substance that triggers an immune response, often used in vaccines.

Antisense RNA	A strand of RNA that can bind to mRNA to prevent protein synthesis.
Apoptosis	The programmed death of cells, which is important for normal development and preventing cancer.
Artificial Chromosome	A synthetic chromosome that can be used to transfer genes into cells.
Bacterial Transformation	The process by which bacteria take in foreign DNA from their surroundings.
Bacteriophage	A virus that infects and replicates within bacteria.
Base Pairing	The specific bonding of DNA bases: Adenine with Thymine, and Cytosine with Guanine.
Biodegradable Plastic	Plastic made from natural materials that can break down without harming the environment.
Bioethics	The study of ethical issues related to biotechnology, such as cloning and gene editing.
Bioinformatics	The use of computer science to analyze biological data, such as DNA sequences.
Bioluminescence	The natural production of light by living organisms, often used in scientific research.

Biomarker	A molecule that indicates a biological condition or disease.
Biopharming	The production of medicines using genetically modified plants or animals.
Biopolymers	Natural or synthetic polymers used in biotechnology, such as DNA and proteins.
Bioprocess Engineering	The use of biological systems to manufacture products like antibiotics and biofuels.
Biosensors	Devices that use biological molecules to detect chemicals or diseases.
Biotechnology	The use of living organisms or biological processes to develop useful products.
Cancer Immunotherapy	A type of treatment that uses the body's immune system to fight cancer.
Carcinogen	A substance that can cause cancer by altering DNA.
Cell Culture	Growing cells in a controlled environment outside their natural setting.
Cell Differentiation	The process by which cells develop into specialized types with specific functions.
Chimera	An organism containing cells or DNA from two different species.

Chromosome Mapping	The process of locating genes on a chromosome.
Cloning	Creating an exact genetic copy of an organism or cell.
Codon	A set of three nucleotides in mRNA that code for a specific amino acid.
CRISPR-Cas9	A revolutionary gene-editing tool that allows scientists to alter DNA with high precision.
DNA Barcoding	Using a short genetic sequence to identify species.
DNA Fingerprinting	A technique used to identify individuals based on their unique DNA patterns.
DNA Ligase	An enzyme that joins DNA fragments together.
DNA Microarray	A technology used to study the expression of thousands of genes at once.
DNA Polymerase	An enzyme that helps copy DNA during cell division.
DNA Replication	The process by which DNA makes an identical copy of itself before cell division.
Embryonic Stem Cells	Stem cells derived from embryos that can develop into any cell type.
Enzyme Engineering	The design and modification of enzymes to improve their function.

Epigenetics	The study of how environmental factors affect gene expression without changing DNA.
Fermentation	A metabolic process where microorganisms break down sugar to produce energy.
Fluorescent Protein	A protein that glows under specific light, used in scientific imaging.
Gene Editing	A technique used to modify genes within an organism's DNA.
Gene Expression	The process by which information from a gene is used to create a protein.
Gene Knockout	A genetic technique where a specific gene is turned off or deleted.
Gene Therapy	The treatment of diseases by introducing, altering, or repairing genes.
Genetic Code	The set of rules by which DNA and RNA sequences determine protein production.
Genetically Modified Organism (GMO)	An organism that has been altered using genetic engineering techniques.
Genome Sequencing	Determining the complete DNA sequence of an organism.
Green Biotechnology	The use of biotechnology in agriculture, such as developing pest-resistant crops.

Human Genome Project	An international effort to map all human genes.
Industrial Biotechnology	The use of biotechnology in industries such as food, chemicals, and energy production.
Microarray	A tool used to study gene expression by analyzing many genes at once.
Monoclonal Antibodies	Identical antibodies produced by a single type of immune cell, used in medical treatments.
Mutation	A change in the DNA sequence that may result in genetic variation.
Nanobiotechnology	The application of nanotechnology in biotechnology, such as drug delivery systems.
Pharmacogenomics	The study of how genes affect a person's response to drugs.
Plasmid	A small circular piece of DNA used in genetic engineering.
Polymerase Chain Reaction (PCR)	A technique used to amplify small amounts of DNA for study.
Proteomics	The large-scale study of proteins and their functions.
Recombinant DNA	DNA that has been artificially created by combining genes from different sources.

Regenerative Medicine	The field of medicine focused on regenerating or repairing damaged tissues.
RNA Interference (RNAi)	A process that silences specific genes to prevent protein production.
Selective Breeding	The process of choosing specific organisms with desirable traits to breed.
Synthetic Biology	Designing and constructing new biological parts or systems that do not exist in nature.
Tissue Engineering	The creation of artificial tissues for medical purposes.
Transgenic Organism	An organism that has had genes from another species inserted into its DNA.
Vaccination	A technique used to protect against diseases by introducing a harmless form of a pathogen.
White Biotechnology	The use of biotechnology in industrial applications, such as biofuel production.
Xenotransplantation	The transplantation of organs from one species to another.

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BIOTECHNOLOGY

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Tasdiqnoma. 210934, 23.01.2024.

Terishga berildi: 18.04.2025 y.

Bosishga ruxsat etildi: 10.06.2025 y.

Ofset qog'oz. Qog'oz bichimi: 60x84 1/16.

“Cambria” gar. Ofset bosma.

Hisob nashriyot t.: 22,50. Shartli b. t.: 22,37

Adadi: 34 nusxa. Buyurtma №81

QarDTU kichik bosmaxonasida chop etildi.
180100. Qarshi shahri, Mustaqillik ko'chasi, 225 – uy.
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