

A2

Biomedical Engineering

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Editor **Rabia Mercan**





Unique English Coursebook Series Biomedical Engineering A2 Developed by Foreign Languages Department, İstinye University

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THE UNIQUE SERIES

BIOMEDICAL ENGINEERING

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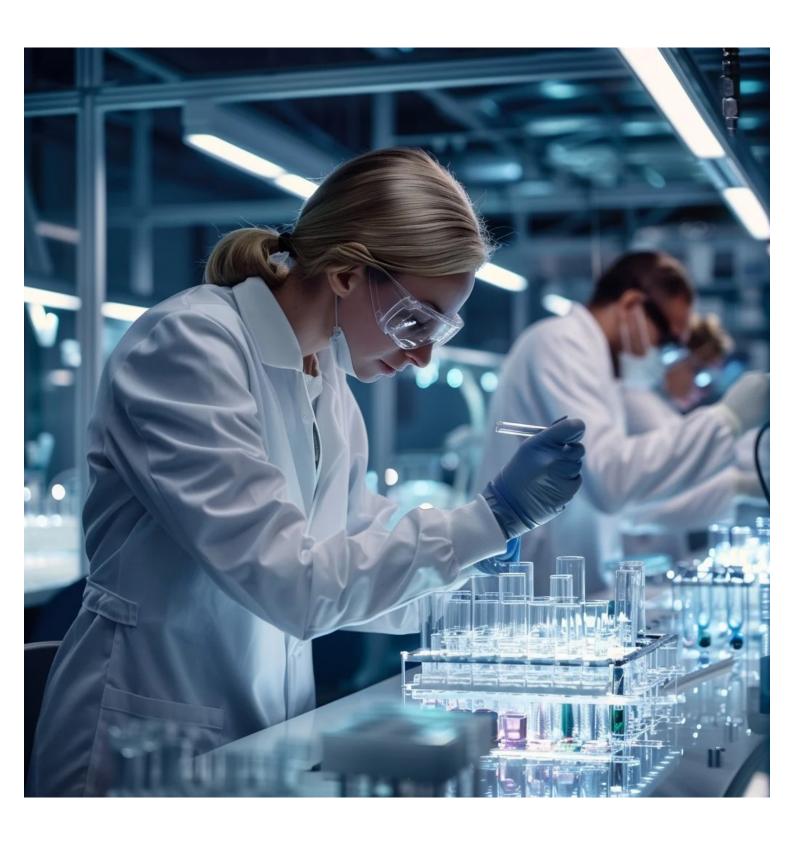
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CONTENTS

MODULE 1 DISCOVERING BIOMEDICAL ENGINEERING	6
UNIT 1 WHAT BIOMEDICAL ENGINEERS DO?	8
UNIT 2 MEET THE HUMAN BODY	18
UNIT 3 SIMPLE MACHINES BIG HELP	30
MODULE 2 TOOLS THAT SAVE LIVES	40
UNIT 4 LOOKING INSIDE THE BODY	42
UNIT 5 HELPING HANDS AND HEARTS	52
UNIT 6 WEARABLE HEALTH HELPERS	62
MODULE 3 BIOMEDICAL ENGINEERING BEYOND THE HOSP	PITAL72
MODULE 3 BIOMEDICAL ENGINEERING BEYOND THE HOSP UNIT 7 KEEPING ASTRONAUTS HEALTHY	
	74
UNIT 7 KEEPING ASTRONAUTS HEALTHY	74
UNIT 7 KEEPING ASTRONAUTS HEALTHY	
UNIT 7 KEEPING ASTRONAUTS HEALTHYUNIT 8 BME IN FACTORIES AND OFFICES	
UNIT 7 KEEPING ASTRONAUTS HEALTHY UNIT 8 BME IN FACTORIES AND OFFICES UNIT 9 BME FOR PETS MODULE 4 THE FUTURE OF HEALTHCARE	



MODULE 1

DISCOVERING BIOMEDICAL ENGINEERING

UNITS

- 1 | WHAT BIOMEDICAL ENGINEERS DO?
- 2 MEET THE HUMAN BODY
- 3 SIMPLE MACHINES BIG HELP

In this module, you will be able to:

- · Understand the role of biomedical engineering
- · Explore medical devices and their functions
- · Compare human organs to machines
- · Describe essential hospital tools and simple machines

Key Concepts

- · Biomedical Engineering
- Healthcare
- · Vital Organs
- Medical Devices

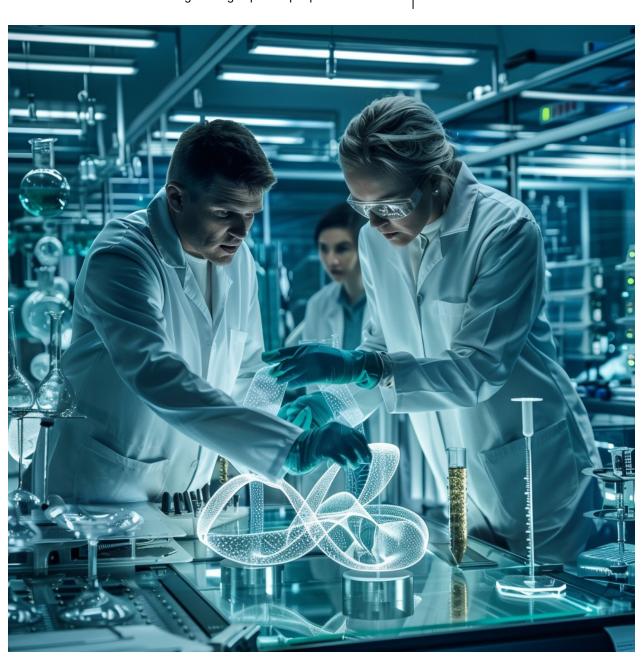
UNIT 1 WHAT DO BIOMEDICAL ENGINEERS DO?

In this unit, you will be able to:

- · Define what biomedical engineering is.
- · Explain why biomedical engineers are important in healthcare.
- · Identify common biomedical devices and their functions.
- Discuss how biomedical engineering improves people's lives

Key concepts:

- · Biomedical engineering
- · World BME Day
- · Healthcare Innovation



WARM UP

TASK 1A

Think about the time when you were choosing your university department (during the university selection period) What made you say, 'Yes, Biomedical Engineering is for me'?

YKS Placement Results

Result Announcement Date: August 31

Placed Higher Education Program	
Name	İSTİNYE UNIVERSITY (ISTANBUL)
	FACULTY OF ENGINEERING AND NATURAL SCIENCES
	BIOMEDICAL ENGINEERING (ENGLISH)

Code	Preference Order	Placement Type
208450823	5	Foundation (Vakıf)

Score Type	Placement Score	Registration Date	Registration Address
SAY			

TASK 1B

Work with a partner. Tell your partner why you chose Biomedical Engineering and how you felt. Then, fill the diagram: write about you on one side, your partner on the other, and shared points in the middle.

READING

TASK 2A

What special days do you know? Which special days do you celebrate throughout the year?

TASK 2B

Why do you think some professions, like doctors and teachers, have special days to celebrate them?

TASK 2C

What kind of contributions do engineers make to society, and why might biomedical engineers deserve a special day of recognition?

World Biomedical Engineering Day

World Biomedical Engineering Day is celebrated every year on December 5th. This special day honors the important contributions of biomedical engineers to healthcare and medical technology. Biomedical engineers play a key rol in improving people's lives. They design, develop, and create innovative tools and solutions to solve problems in medicine and healthcare. Their work is essential for many areas, including rehabilitation, medical treatments, and delivering better healthcare services to patients around the world.



Biomedical engineers are creative and dedicated to finding solutions for the challenges in medicine. For example, they design prosthetic limbs, creat

artificial organs, and develop advanced medical devices such as pacemakers and MRI machines. These tools and technologies make life easier for patients and improve the overall quality of healthcare systems. Their innovative ideas help to make global healthcare safer, faster, and more effective.

On World Biomedical Engineering Day, people take time to recognize and thank biomedical engineers for their hard work and valuable contributions. It is also an opportunity to learn more about their efforts and how their work impacts the world. This day reminds us of the importance of science, technology, and creativity in improving healthcare. World Biomedical Engineering Day not only celebrates their achievements but also inspires the next generation of engineers to continue making progress in this important field. Their dedication and innovation play a significant role in building a healthier future for everyone.

TASK 2D

Read each statement carefully, infer the answer based on the text and keep the bold letter if the statement is true to reveal a hidden message. Rearrange the letters to discover the word about.

- 1. Some biomedical engineers work on solutions for problems that do not exist yet. (R)
- 2. Biomedical engineers' work is mostly useful in wealthy countries with advanced hospitals. (E)
- 3. Because of biomedical engineering, people today live longer than they did in the past. (P)
- 4. If biomedical engineers stopped working, the quality of healthcare would remain the same. (S)
- 5. Biomedical engineers' work indirectly helps people who never visit hospitals. (N)
- 6. Engineers in this field mainly focus on making hospitals more modern, rather than helping individual patients. (I)
- 7. World Biomedical Engineering Day was created because biomedical engineers were not recognized before. (I)

Biomedical engineers	us by creating life-changing innovations!
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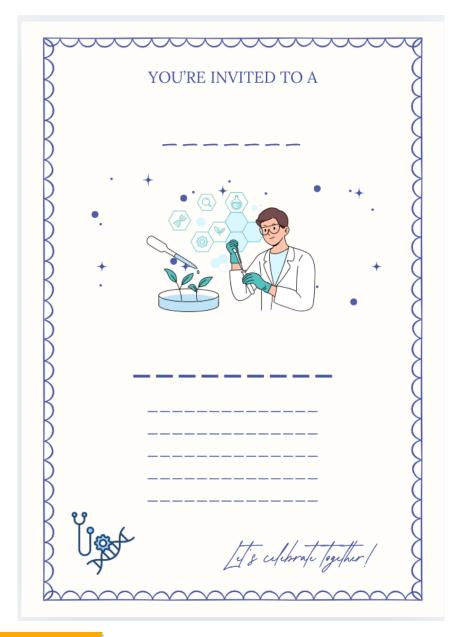
TASK 2E

Read the sentences on the left and match them with the correct endings on the right based on the information from the text.

TASK 2F

Imagine that you are organizing an event for this special day. Write an invitation for the event. Your invitation should include:

- 1. The name of the event
- 2. Date and time
- 3. Location (real or imaginary)
- 4. Purpose of the event (Why are you celebrating?)
- 5. Activities planned (Based on the reading, what could people do on this day?)
- 6. Who is invited (Students, doctors, engineers, etc.)
- 7. A closing message (Encourage people to attend!)



LISTENING

TASK 3A

Look at the picture and imagine how this device could change someone's life. Talk with your partner about who might need it, how it works, and who creates it.



TASK 3B

Brainstorm with a partner how this device works, imagine one improvement or new feature, and share your idea with the class.



TASK 3C

Listen to the song, write three important words related to medical tools or healthcare, compare with a partner to score points (3 same = 5 points, 2 same = 3 points, 1 same = 1 point), then choose one word to explain and share with the class.

TASK 3D

Listen to the song again, then work with a partner to read the situations and write how biomedical engineers can help.

- **1.** A man had an accident and cannot use his leg properly anymore. He wants to move and do daily activities again.
- **2.** A doctor needs to check inside a patient's body but cannot see the problem from the outside.
- **3**. A young girl cannot move freely because of a health condition. She wants to go to school and play with her friends.
- **4.** A person broke their leg and needs support while walking until it heals.

TASK 3E

Work with a partner; one of you is the songwriter, and the other is the interviewer—write three questions about their opinion on biomedical engineers, ask them in a short interview, then switch roles and share your best question with the class

- •
- .
- •

LISTENING

TASK 4A
How do you think biomedical engineering is involved in these pictures?







TASK 4B

Do you think doctors and biomedical engineers work together? When and why?

TASK 4C Listen to the podcast and write down the areas mentioned in it.

Biomedical Engineering Area	Description	
	Studies electrical and chemical activities in the body (e.g., heartbeat)	
	Studies how the body moves	
	Focuses on designing artificial limbs and implants	

TASK 4D Listen to the podcast again and fill in the blanks.

technology, science, pulse, motion, prosthetic, biology, research, equipment, innovation, development

Biomedical engineers design such as artificial limbs and imaging machines to assist medical
professionals.
2. Their work combines principles from, chemistry, and computer systems to create medical
solutions.
3. One area of this field explores how electrical and chemical signals, like a, function in the human
body.
4. The study of focuses on understanding body movements and physical functions.
5. Another important branch works on developing organs and medical implants for patients in need.
6. Students in this field start by learning subjects like mathematics, chemistry, and to build their
expertise.
7. Graduates can enter careers related to, product development, and medical innovations.

TASK 4E

Courses

Based on what you learned from the podcast, create your ideal weekly school schedule for your first year of study and second year study. Then discuss the questions in pairs.

- → Why did you choose this schedule?
- → Which courses do you think are the most important for biomedical engineers?
- → How do you think these subjects will prepare you for future careers?

Mathematics (Calculus, Linear Algebra) Physics (Fundamentals of Mechanics & Electricity) Lab Work English Literature Chemistry (General & Organic Chemistry) Programming (Introduction to Coding) Biology (Basic Human Biology)

Mechanical Engineering [(Materials Science, Mechanics of Solids)

Electrical Engineering (Circuits, Sensors, and Devices)

Software Engineering in (Machine Learning & Al in Medicine)

Biomedical Design (Creating Prosthetics and Medical Devices)

Research & Innovation [(Medical Robotics & Lab Work)

Marketing Strategies (Business & Sales)

History of Art 😍 (Ancient & Modern Art Studies)

Psychology (General Psychology)

First Year

Time	Monday	Tuesday	Wednesday	Thursday	Friday
09:00-10:30					
10:45-12:15					
13:00-14:30					
14:45-16:15					

Second Year

Time	Monday	Tuesday	Wednesday	Thursday	Friday
09:00-10:30					
10:45-12:15					
13:00-14:30					
14:45-16:15					

REAL LIFE TASK

TASK 5

Biomedical engineers work in various fields, from designing medical devices to conducting cutting-edge research. In this task, you will explore real LinkedIn profiles of biomedical engineers to analyze their career paths, skills, and industries.

1. Find Two Biomedical Engineers

- Search for Biomedical Engineers on LinkedIn.
- Choose two professionals with different careers (e.g., one in medical devices, one in research).
- Take notes on their education, job experience, and key skills.

2. Analyze Their Career Path

- What did they study?
- What was their first job?
- Where do they work now?

3. Identify Key Skills & Certifications

- What technical and soft skills do they have?
- Do they have any certifications or extra training?

4. Compare Their Career Journeys

- How are their careers similar or different?
- What skills or experience do you need for a similar job?

5. Create Your Own LinkedIn Profile

- Now, create a LinkedIn profile to prepare for your future career.
- Include:
- Your name and student title (e.g., Biomedical Engineering Student at [Istinye University])
- A short summary about your interests and future goals
- -Your current education and expected graduation year
- -Any projects or research you would like to do in the future

6. Present Your Findings

- Write a short report (1 page) or make a 3-5 slide presentation.
- Include key points about the engineers you researched and your takeaways for your own career path.
- Share your LinkedIn profile with your classmates!

VOCABULARY

TASK 6

Read the clues carefully and fill in the crossword with the correct words based on their definitions.

Across

- 2 When someone gets better after being sick or hurt.
- 4 A person who designs and builds things to help people.
- 7 An artificial arm or leg tht helps people move.
- 8 A strong effect on something or someone.
- 9 When people work together to do something.

Down

- 1 A small tool or object that helps people.
- 2 A new idea or way to do something better.
- 3 To feel better after being sick or hurt
- 5 To understand or see the importance of something.
- 6 A tool that helps people walk when they have a leg injury.

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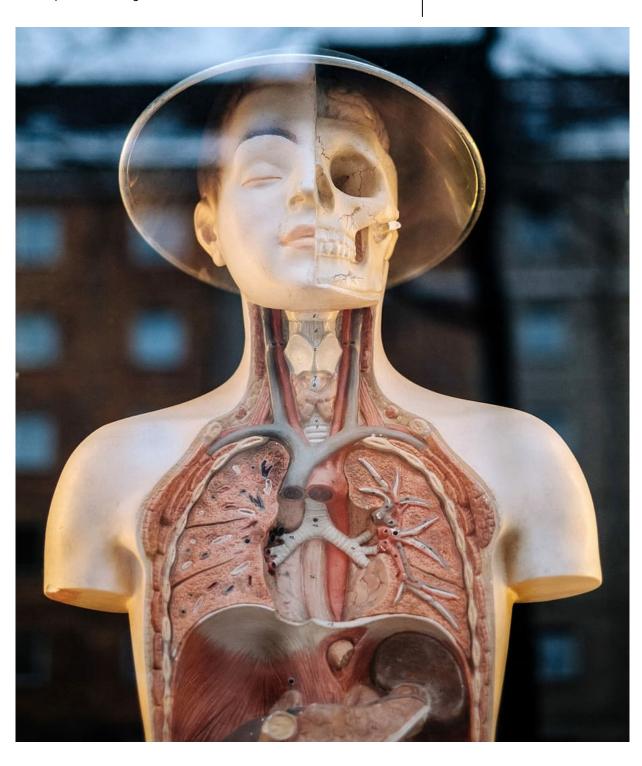
UNIT 2 MEET THE HUMAN BODY

In this unit, you will be able to:

- · Identify major organs in the human body and their functions.
- · Describe how the digestive system works step by step.
- · Compare human organs to machines and understand their similarities.

Key concepts:

- Vital Organs & Their Functions
- The Digestive System
- · Human Body vs. Machines



WARM UP



The Headless Chicken Mystery

Did you know that a chicken once lived for 18 months without a head? It was called 'Mike the Headless Chicken.' Scientists say it survived because some important parts of its brain and body were still working.

TASK 1A Discuss in pairs:

Do you know a similar case for humans?

What are the vital organs in the human body? Give examples.

Can humans live without some organs? If yes, which ones?

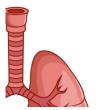
TASK 1B

Write your idea on how Biomedical Engineering helps when an organ stops working, then compare and discuss it with your partner.

WATCHING

TASK 2A

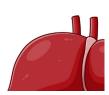
Look at the pictures below. The body parts are hidden! Can you find them? Write your answers in the blanks. You can use a dictionary if needed.











- 1.
- 2.
- 3.
- 4.
- 5.

TASK 2B

Watch the video and list the organs you saw in order.

- 1.
- 2.
- 3.
- 4.
- 5.

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Watch the video again and read each patient's case below. They all have problems with different organs. Match them with the correct organ by writing the number in the blank.

Case 1: The patient feels weak and dizzy all the time. Their body cannot get enough oxygen, so it cannot work
properly.
Organ:
Case 2: This patient has trouble digesting food properly. Their body cannot break down fats well, and they feel
weak after eating
Organ:
Case 3: The patient can eat, but their food is not breaking down properly. Their body is not producing enough
acid to help digestion.
Organ:
Case 4: This person is having difficulty breathing and cannot get enough oxygen. Doctors found that they have
too much carbon dioxide in their blood.
Organ:
Case 5: This patient has trouble recognizing smells and sounds. They also struggle to control their movements.
Organ:

TASK 2D

Watch the video again and match each organ to a similar machine. Then, choose one organ-machine pair and complete the chart by comparing their features. You may use the internet for research.

Organ	Similar Machine
Example: Lungs	Air filter

Feature	Organ:	Machine:
Function		
Material		
Can it repair itself?		
Lifespan		
Needs energy from?		

READING

TASK 3A

Look at the five clues below. Each one describes a different part of the human body. Can you guess what they are?

- 1. I work all the time, even when you sleep. I pump blood to keep you alive. What am I?
- 2. I help you breathe in oxygen and push out carbon dioxide. Without me, you couldn't survive! What am I?
- 3. I break down food into tiny pieces so your body can use it for energy. What am I?
- 4. I control everything you do—your thoughts, your movements, and even your emotions! What am I?
- 5. I support your body and help you move. Without me, you would be like jelly! What am I?

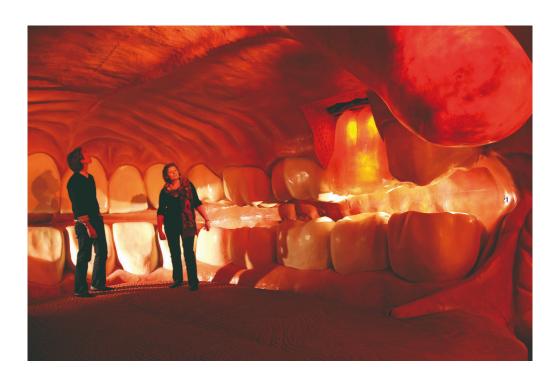
TASK 3B

Discuss in pairs:

Which of these body parts do you think is the most important? Why?

Can we live without any of these organs? If yes, how?

If you could walk inside a human body, what would you want to see first?





Corpus Museum: A Journey Inside the Human Body

- 1- Have you ever thought about traveling inside the human body? In the Netherlands, the Corpus Museum makes this possible. This special museum looks like a giant human body. Visitors can go inside and see different organs and systems. Opened in 2008, Corpus gives a fun learning experience. People start at the knees and move up to the brain to see how the body works.
- 2- Inside the heart, visitors can hear a heartbeat and watch how blood moves. The lungs show how we breathe by taking in oxygen and letting out carbon dioxide. In the brain section, visitors can test their reflexes and memory with fun activities. They also learn how the brain controls the body. In the digestive system section, they follow food from the mouth to the stomach and intestines. They learn how the body uses food and why eating healthy is important. There are also sections about muscles, bones, and the immune system. Visitors can see how the body stays strong and fights sickness.
- 3- Corpus is more than just a museum; it is a place where science comes to life. Throughout the tour, visitors wear headphones to listen to explanations, making the experience engaging and educational. The museum also offers interactive screens, 3D models, and animations to make learning fun. In addition to exploring the body, visitors can learn about the importance of nutrition, exercise, and sleep for maintaining a healthy lifestyle.
- 4- Many schools, teachers, and families visit Corpus because it provides an exciting way to learn about biology and health. The museum also has a health exhibition area, where visitors can explore the latest medical discoveries and technologies. Whether you are a student, a teacher, or just curious about the human body, Corpus Museum offers an unforgettable experience

TASK 3C Match each paragraph with the correct heading.

A. A Unique Museum to Visit	
B. Popular Place for Education	
C. Exploring the Human Body Step by Step	

D. Learning Through an Interactive Experience

TASK 3D

Use the words in the box to complete the sentences.

food, brain, schools, sound, experience, exercise, body parts, knees

2 People hegin their tour	at the and mov	e upwards to explore other body	narts
		of a heartbeat as it moves l	
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memory.			
		and animations to make the	
7. Visitors can also learn	about the importance of a he	althy lifestyle, including good food	I, regular,
and enough sleep.			
8. Many gro	ups visit Corpus because it h	elps students understand biology	in an exciting way.
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TASK 3F

Close your eyes and imagine that you are inside the Corpus Museum, walking through different parts of the human body. You hear different sounds around you. Listen carefully and use what you read in the text to identify where you are!

- 1.
- 2.
- 3.
- 4.

READING

TASK 4A

Below are five statements about foods that look like body organs. Some are myths, and some are facts! Work with a partner to decide if each statement is a myth or a fact.

- 1. Eating walnuts makes you smarter because they look like a brain.
- · Myth or Fact?
- 2. Carrots were originally purple, but they changed color to match the human eye.
- · Myth or Fact?
- 3. Tomatoes keep your heart healthy because they contain a special nutrient called lycopene.
- · Myth or Fact?
- 4. Kidney beans are named after kidneys, but they actually have no health benefits for them.
- · Myth or Fact?
- 5. Ginger looks like a stomach and helps with digestion, nausea, and stomach pain.
- Myth or Fact?

Food That Looks Like the Body: More Than Just a Shape!

Did you know that some foods look like parts of the human body and are actually good for them? Scientists say that many of these foods have vitamins and minerals that help the organ they look like. This idea is called the "Doctrine of Signatures." It is an old belief that the shape of a food can show its health benefits. Today, science has proven that many of these foods really help the organs they resemble.



One example is walnuts. If you look closely, a walnut looks like a small brain with two halves, just like the human brain. Walnuts have

omega-3 fatty acids, which are good for memory, brain function, and focus. Eating walnuts may also lower the risk of brain diseases like Alzheimer's.

Another example is carrots. When you cut a carrot, you will see a round pattern that looks like an eye. Carrots have beta-carotene, which is a type of vitamin A. This vitamin helps keep eyesight strong and protects the eyes. Studies show that people who eat carrots often have a lower risk of eye problems like night blindness.

Tomatoes also have an interesting shape. When you slice a tomato, you can see small sections inside, like the heart's chambers. Tomatoes have lycopene, an important antioxidant. Lycopene helps keep the heart and blood vessels healthy and may lower the risk of heart disease.

Kidney beans are shaped like human kidneys. They contain fiber, protein, and minerals, which help the kidneys remove waste from the body and keep the right amount of fluids.

Ginger looks like a stomach and is very good for digestion. It helps with stomach pain, bloating, and nausea.

TASK 4B

You are creating a super smoothie to help a specific organ in the body.

Read the descriptions of each organ's needs and match them with the correct smoothie ingredients.

TASK 4C

Ingredients: Color:

Create a smoothie recipe using at least two ingredients. Write a fun name for your smoothie.
Organs & Their Needs:
1- Brain Boost Smoothie − I need something to help with memory and focus! →
2- Sharp Vision Smoothie – I need vitamins to keep my eyes healthy! →
3- Heart Health Smoothie − I need ingredients that protect my heart and keep my blood flowing! →
4- Digestive Aid Smoothie − I need something to help my stomach feel better after eating! →
5- Kidney Cleanse Smoothie – I need foods that help me remove waste from the body! \rightarrow
Ingredients
A. Carrots – Great for the eyes! Full of vitamin A to help with vision.
B. Walnuts – Look like a brain and help with memory and thinking.
C. Tomatoes – Keep the heart healthy and strong with lycopene.
D. Ginger – Helps digestion and reduces stomach pain.
E. Beans – Support kidney function and help remove waste.
My Smoothie:
Name:

TASK 4D

Imagine you are selling special foods in a bazaar. These foods look like body organs and help people stay healthy! Your job is to tell customers why they should buy your food.

Step 1: Prepare Your Sales Pitch!

- ♦ Choose one food from the reading (walnuts, carrots, tomatoes, kidney beans, or ginger).
- ♦ Think about which organ it helps and why it is healthy.
- ♦ Write a short and simple sales sentence to sell your food

Example: "Come and try these fresh walnuts! They look like a brain and help you think better.

Eat them to stay smart!"

Step 2: Sell Your Food!

- ♦ Work in pairs or small groups.
- ♦ One student is the seller, and the others are customers.
- ♦ The seller explains why the food is good for the body.

Customers can ask:

- "Why is this food good for me?"
- "Which organ does it help?"
- "How often should I eat this?"



REAL LIFE TASK

TASK 5

Imagine you are a tour guide inside the human body, but instead of people, your guest is a piece of your favorite food! Your job is to guide the food on its journey from the mouth to the stomach and beyond.

Stops

- Mouth
- Esophagus
- Stomach
- ₱ Small Intestine
- P Large Intestine
- PRectum & Anus

Step 1: Prepare Your Tour

- 1. Choose a favorite food (e.g., pizza, ice cream, sushi).
- 2. Research the digestion process and find out what happens at each stop.
- 3. Take notes on how the body breaks down and absorbs the food.

Step 2: Guide the Food Through Its Journey!

- 1. Work in pairs or small groups.
- 2. One person is the Body Tour Guide, describing each stop.
- 3. The others are the food, experiencing the journey.
- 4. The guide explains what happens to the food at each step.

VOCABULARY

TASK 6

Read the definitions and find the correct words by unscrambling the letters. Write your answers in the blanks.

Definitions:

- A. The ability to remember things you have learned or experienced.
- B. A quick and automatic body reaction, like blinking when something comes close to your eyes.
- C. Parts inside the body that have special jobs, like the heart and lungs.
- D. This system helps break down food so the body can use it for energy.
- E. To let something happen or make it possible.
- F. This organ pumps blood through the whole body to keep you alive.
- G. These body parts help you breathe in oxygen and remove carbon dioxide.
- H. The action of changing position, like walking, running, or jumping.

Scrambled Words:		
ocianiblea words.		
1- exIref →		
2- omyrem →	_	
3- rganos →	-	
4- geitsdive →	_	
5- wolla →		
6- traeh →		
7- sglun →		
8- venetomm →		

UNIT 3 SIMPLE MACHINES BIG HELP

In this unit, you will be able to:

- · Identify and describe common medical tools used in hospitals.
- · Understand how simple machines help in healthcare and daily life.
- · Use vocabulary related to medical devices and hospital work in context.

Key concepts:

- · Medical Devices
- Healthcare
- · Stethoscope
- Thermometer



WARM UP

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Watch the video. Answer the questions.

- -What is wrong with the character? What symptoms does he have?
- -What does it need to feel better?

TASK 1B

Identify 3 symptoms the character has (e.g., fever, cough, runny nose). Think about medical devices that can help him.

Symptoms	Medical Device

TASK 1C

In pairs, write a short health advice note for the character.

READING

TASK 2A
Can you guess what is it? What do you think it was used for?



TASK 2B Discuss in pairs:

- · Who do you think used this object? A scientist? A musician? A doctor?
- · Do you think people still use this today? Why or why not?
- · If you could hold this object, how would you use it?

A stethoscope is a tool that doctors and nurses use to listen to the heart and lungs. It helps them check if a patient is healthy or sick. But a long time ago, doctors did not have stethoscopes. They had to put their ears on a patient's chest to hear the heartbeat. This was difficult and uncomfortable.

In 1816, a French doctor named René Laennec had a problem. He needed to listen to a woman's heart, but he did not want to place his ear on her chest. He also found that it was hard to hear clearly. He needed a new way to check his patients.

Then, Laennec had an idea! He saw children playing with a long wooden stick. They scratched one end, and the sound traveled to the other end. This gave him an idea. He rolled up a piece of paper and placed one side on the patient's chest. He listened from the other side and heard the heartbeat loud and clear!



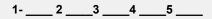
After this, Laennec made a wooden tube to listen better. He called it a stethoscope. Later, other doctors improved the design. In 1851, a doctor named Arthur Leared made a stethoscope with two earpieces, like the ones we use today.

Now, the stethoscope is an important medical tool. Doctors and nurses use it every day to check their patients. Thanks to Laennec's simple idea, millions of lives have been saved!

TASK 2C

Rearrange the sentences to put the story in the correct order.

- a) Laennec saw children playing with a wooden stick.
- b) Laennec used a rolled-up paper tube to listen to a heartbeat.
- c) Laennec made a wooden stethoscope.
- d) A doctor named Arthur Leared improved the stethoscope with two earpieces.
- e) Before stethoscopes, doctors listened by placing their ears on a patient's chest.



TASK 2D

Read the passage carefully, find 5 factual mistakes, underline or highlight the incorrect words or phrases in pairs, and then correct them.

A stethoscope is a tool that helps doctors check a patient's blood pressure. Before it was invented, doctors had to listen to the heart by placing their hands on the patient's chest. This was not always effective. In 1812, a French doctor named René Laurent needed to hear a patient's breathing more clearly. He saw some musicians playing wind instruments and realized that sound travels through tubes. He then rolled up a thin metal sheet and used it to listen to the heartbeat. Later, he designed a long glass tube, which became the first stethoscope. Over time, other doctors improved the design, and in 1851, a doctor named Arthur Lemoine added plastic earpieces. Today, the stethoscope is a very common tool in hospitals. Doctors use it to listen to a patient's stomach movements and heart sounds.

LISTENING

TASK 3A

Think about a nurse's daily routine. What are some things that might make their job difficult or stressful? Write down 3 reasons why being a nurse could be stressful and 3 reasons why it could be rewarding.

My name is Sarah, and I am a nurse in a busy hospital. Every day, I wake up early and get ready for my shift. I arrive at the hospital, change into my uniform, and check my schedule. My job is to take care of patients and make sure they are feeling well.

I start by visiting each patient and asking how they feel. To check their temperature, I use a thermometer. If the temperature is too high, it means the patient has a fever. I also use a blood pressure monitor to measure their blood pressure. If it is too high or too low, I need to inform the doctor. To listen to their heartbeat and breathing, I use a stethoscope. This helps me understand if their heart and lungs are working properly.



If a patient needs medicine, I prepare a syringe to give them the right dose. Some patients have wounds, so I use a bandage to cover and protect them. When a patient has trouble breathing, I place an oxygen mask over their nose and mouth to help them get more oxygen. For some patients, I also use an IV drip to give them fluids and medicine directly into their blood.

The hospital is always busy, and I work with doctors and other nurses to help patients. I write notes about each patient so the doctors know their condition. I also clean my medical tools and prepare for the next patients.

After many hours of work, my shift finally ends. I clean up, change out of my uniform, and prepare to go home. Being a nurse is not easy, but it is a job I love. Every day, I help people feel better, and that makes me happy.

TASK 3B

Listen to the track. Nurse Sarah was so busy today that she forgot to complete her patient notes! Read her unfinished notes and fill in the missing information based on what you heard in the listening. Then, compare with a partner to see if you got the same answers.

TASK 3C

Listen to the track again. Read the sentences about Sarah's day as a nurse. Some sentences are correct, but some have mistakes—find and correct the wrong ones. Then, compare your answers with a partner.

- 1. Sarah starts her shift at 9:00 a.m.
- 2. When she arrives at the hospital, she goes to the cafeteria for coffee.
- 3. She uses a bandage to check a patient's temperature.
- **4.** Sarah listens to a patient's heartbeat using a stethoscope.
- **5.** A patient cannot breathe well, so Sarah gives them a thermometer.
- 6. When a patient has a deep cut, she cleans it and covers it with an oxygen mask.
- 7. During her break, Sarah takes a nap in the hospital room.
- 8. Sarah says that being a nurse is difficult but boring and not important.



TASK 3D

Read the patient cases and choose the correct medical tool for each situation.

Patient Cases:

- 1. A man comes in with a deep cut on his arm. Blood is coming out, and he is in pain. What will you do?
- 2. A little girl has a fever and looks very tired. How will you check her temperature?
- 3. An elderly woman says she feels weak and dizzy. Her blood pressure might be too low. What tool do you need?
- 4. A young man cannot breathe well. He is holding his chest and looks nervous. What will help him?

Hospital Tools to Choose From:

- Bandage
- Thermometer
- Blood pressure monitor
- Oxygen mask
- Stethoscope
- IV drip
- Syringe

Then, act out one case with your partner as a short nurse-patient conversation.

- One student is the nurse giving the right tool.
- One student is the patient describing their problem.

WATCHING

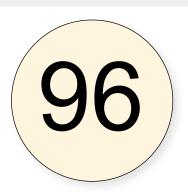
TASK 4A

Look at the numbers 32 and 96. What do you think they mean? Could it be related to:

- A machine?
- A measurement?
- A tool?

Discuss your ideas with a partner, then watch the video to find out.





TASK 4B

Watch the video. Match each term with the correct explanation from the video.

-				
	Р	r	n	п

- 1. Daniel Fahrenheit ____
- 2. Thermometer ____
- **3.** 32°F ____
- 4. Mercury ____
- **5.** 1717 ____

Explanation

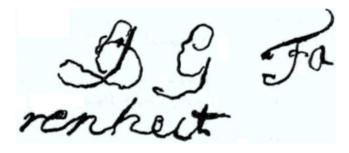
- a) Used mercury to make precise thermometers
- b) A scientist who created a temperature scale
- c) A device that measures temperature
- d) The temperature where ice melts
- e) The year Fahrenheit became a glass blower

TASK 4C

Choose one of the terms and write one sentence explaining why it is important.

is important because	





TASK 4D

Daniel Fahrenheit has traveled through time and arrived in your classroom! But he is confused because modern thermometers look different. Can you help him understand? In pairs, one of you will play Fahrenheit, and the other will be a modern scientist. But before you start, you will do some quick research!

Use your phone, tablet, or class resources to find answers. Take short notes.

Are mercury thermometers still used today? Why or why not?

What do people use instead of mercury thermometers?

How do digital and infrared thermometers work?

Is the Fahrenheit scale still used? Where?

What is the most common temperature scale in the world? Why?

Student A – You are Daniel Fahrenheit. You have time-traveled to 2024 and want to understand modern thermometers. You will listen carefully and ask follow-up questions.

Student B – You are a modern scientist. You will use your research to explain how thermometers have changed.

Fahrenheit asks you:

- 1. "Why don't people use mercury thermometers anymore?"
- 2. "What other types of thermometers exist today?"
- 3. "How do digital thermometers work?"
- 4. "Do people still use my Fahrenheit scale?"
- 5. "What is the most common temperature scale today?"

Now, switch roles! Repeat the conversation with the new roles.

TASK 4E

Compare thermometers from Fahrenheit's time and today by filling in the chart, then discuss which one is better and why.

Thermometers in the Past (Fahrenheit's Time)	Modern Thermometers (Today)
More dangerous if broken	Safer for use

REAL LIFE TASK

TASK 5

Choose a biomedical device that you or someone you know uses. This could be a simple tool like glasses, braces, or a thermometer, or a more advanced device like a smartwatch, insulin pump, or prosthetic limb.

Film a short video (10-30 seconds) where you explain:

- Who uses this device? (Is it for children, adults, or elderly people? Is it used in hospitals or daily life?)
- How does it work? (Does it help people move, see, hear, or monitor their health?)
- How could it be improved in the future? (Could it be smaller, smarter, or easier to use?)

Share your video with the class and discuss:

- What surprised you about this device?
- Would you like to design a better version of it? Why or why not?

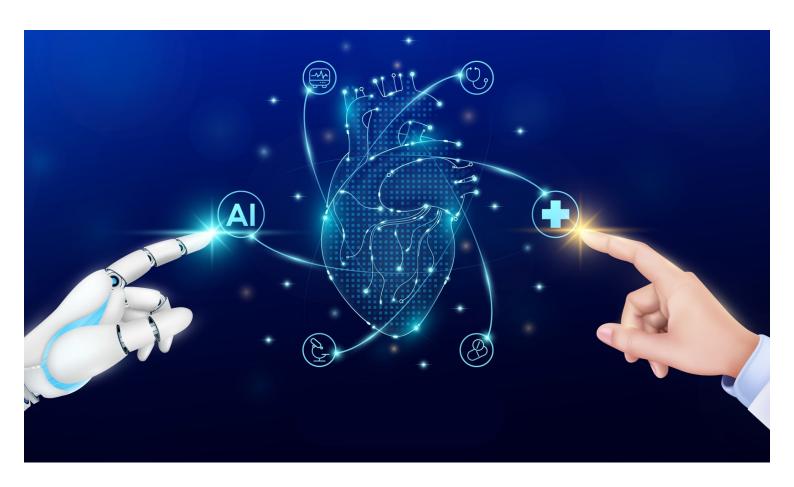
VOCABULARY

TASK 6

A hospital is experiencing major technical failures, and many essential tools and machines are missing. Read the emergency situations, identify the missing tools, and explain how they should be used to solve the problem. Read the crisis report. Fill in the missing words and explain their function:

"Today, the hospital is facing serious technical issues. Several important machines and tools are missing, and the medical staff is struggling to help patients. A patient is burning up with fever, but the nurses have no way to check their body temperature. Another patient is in pain and needs medicine, but the usual tool for giving injections is gone. The emergency team needs to lift a heavy patient onto a bed, but they don't have the right tool to help them. In the ICU, a patient's breathing is getting worse, but the device that delivers oxygen is nowhere to be found. A doctor is checking a patient with heart problems but cannot hear their heartbeat clearly because a key tool is missing. The hospital staff is also unable to monitor blood pressure, which is dangerous for older patients. In another part of the hospital, workers are struggling to move heavy medical supplies to a higher floor because a helpful simple machine is not working."

Missing Tool	What It Does?	Why Is It Important?
	Measures body temperature	
	Gives medicine through an injection	
	Helps lift heavy patients	
	Delivers oxygen to patients	
	Listens to the heart and lungs	
	Checks blood pressure	
	Helps move heavy supplies to a higher floor	



MODULE 2 TOOLS THAT SAVE LIVES

UNITS

- **4 | LOOKING INSIDE THE BODY**
- 5 HELPING HANDS AND HEARTS
- 6 WEARABLE HEALTH HELPERS

In this module, you will be able to:

- · Understand common medical imaging tools and how they help doctors.
- · Explore how prosthetics and artificial organs can support or replace body parts.
- · Describe how wearable health devices help people track and manage their health daily.

Key Concepts

- · Medical Imaging Tools
- Prosthetics
- · Wearable Health Technologies

UNIT 4 SIMPLE MACHINES BIG HELP

In this unit, you will be able to:

- · Identify and describe common medical tools used in hospitals.
- · Understand how simple machines help in healthcare and daily life.
- · Use vocabulary related to medical devices and hospital work in context.

Key concepts:

- · Medical Devices
- Healthcare
- · Stethoscope
- · Thermometer

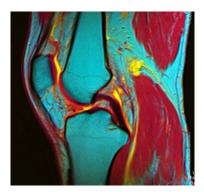


WARM UP

TASK 1

In pairs discuss the questions:

- » What do you think these images show? Is it a bone, an organ, or something else?
- » Do these images look different? How?
- » Which one looks clearer for bones?
- » Which one might be showing muscles and ligaments?







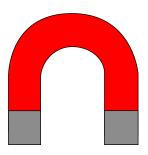
READING

TASK 2A

How do you think magnets could be used in medicine?

TASK 2B

Can a magnet help a doctor see inside the body? How?





Doctors need to see inside the body to find problems and help patients. One of the best ways to do this is with an MRI machine. Unlike X-rays, MRI does not use radiation. Instead, it uses strong magnets and radio waves to create clear images of the inside of the body. Because it does not use radiation, MRI is safe for most people.

MRI is very useful because it can show soft tissues, such as the brain, muscles, and organs. If a person has a knee injury, an X-ray can show only the bones, but an MRI can show the muscles, tendons, and ligaments. This helps doctors understand what is wrong. MRI is also used to check for tumors, brain problems, and other health conditions.

The MRI machine is a large tube. The patient lies on a moving bed inside the machine. The machine uses powerful magnets to take pictures of the inside of the body. When the scan starts, the machine makes loud knocking and buzzing sounds. Patients must stay very still so the images are clear. If they move too much, the scan may not work. The scan can take 20 to 60 minutes, depending on the body part.

Some people feel nervous inside an MRI machine because it is small and enclosed. Patients who are afraid of small spaces may feel uncomfortable. To help them, some hospitals use open MRI machines, which are bigger and make patients feel more relaxed.

Scientists are always improving MRI machines. Today, they are faster, quieter, and more comfortable. In the future, MRI machines will be even better, helping doctors find health problems quickly and easily. MRI is one of the most important tools in modern medicine, and it helps doctors save lives every day.

TASK 2C Use the words in the box to complete the sentences. Each word is used only once.

radiation - muscles - loud - magnets - safe - tissues - still - enclosed - bed - brain

1. MRI does not use, so it is a good option for many patients.
2. Doctors use MRI to see inside the body, such as the heart and liver.
3- The machine can scan, which controls the body.
4- The patient lies on a that moves into the machine.
5- The MRI machine makes noises during the scan.
6- Patients must stay so the images are clear.
7- Some people feel nervous because the machine is and small.
8- MRI works with strong to take images inside the body.
9- MRI is because it does not use harmful rays.
10- MRI can also show, which help the body move.

TASK 2D

Read the sentences. One sentence in each group is false. Find the false sentence and write the correct version.

- **A.** MRI makes pictures using big magnets.
- **B.** MRI works very fast, like taking a photo.
- C. MRI does not use harmful rays.

Which one is false? Correct it:

- **A.** MRI helps doctors look at the brain and muscles.
- **B.** MRI is the best way to see broken bones.
- **C.** MRI can find things that some other scans cannot.

Which one is false? Correct it:

- **A.** The MRI machine makes loud sounds.
- **B.** A patient must stay still during the scan.
- C. The MRI machine is very quiet.

Which one is false? Correct it:

- **A.** Some people feel afraid inside the MRI machine.
- B. All MRI machines are big and open.
- C. Some hospitals have open MRI machines.

Which one is false? Correct it:

TASK 2E

Work in pairs. Read each case carefully. Decide if MRI is the best choice by marking (yes) or (no). If MRI is not the best choice, explain why and suggest a better option.

Case	Is MRI the Best Choice? (✓ / 🗙)	Why? / Why not?
A football player falls and injures his knee. The doctor suspects a torn ligament.		
A 7-year-old child swallows a coin. The doctor needs to see where it is inside the body.		
A doctor needs to check a pregnant woman's baby.		
A patient has a severe headache, and doctors suspect a brain tumor.		
A person has a broken arm after falling from a tree.		
A patient feels sharp chest pain, and the doctor needs to check for heart problems.		
A patient has knee pain that does not come from an injury. The doctor wants to check the soft tissue inside the knee		
A baby is born with a possible heart problem, and doctors need to check the blood flow.		
A person has sudden vision loss, and the doctor needs to check their brain for nerve damage.		
A patient has lung problems and trouble breathing.		

WATCHING

TASK 3A

Work in pairs and guess the full name for each abbreviation. Write your guesses, then search online for the correct names. Take notes and compare your answers.

Device	Name Guess	Real Name
X-RAY		
MRI		
CT SCAN		
PET SCAN		

TASK 3B

Before watching, read the questions below. Try to guess which ones might be asked in the video.

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While watching, tick the questions that are actually asked to the doctor. After listening, check your answers with a partner and discuss which questions were the most important.

answers with a partner and discuss which questions were the most important.
What are the different types of body imaging?
Can X-rays give me cancer?
How much does an MRI cost?
Why can't I just get an MRI instead of other scans?
What does a PET scan show?
Can I eat before a CT scan?
How do doctors decide which imaging method to use?
Is ultrasound only used for pregnancy?
Do all imaging machines use radiation?
How long does an X-ray take?

TASK 3D

Read the list of imaging methods and their medical uses. Match each imaging method with its correct use.

Imaging Method	Best Use
X-ray	A. Checking a baby during pregnancy
MRI	B. Finding a tumor's location
CT scan	C. Detecting brain bleeding after an accident
PET scan	D. Identifying ligament damage in the knee
Ultrasound	E. Looking for broken bones

TASK 3D

Work in pairs. One of you is the doctor, and the other is the patient. The patient asks all the given questions, and the doctor answers based on the video. Once all questions are answered, check your answers together using the answer key. Switch roles with a new set of questions.

Patient A - Questions for the Doctor

- 1. Why are there so many different types of medical imaging?
- 2. What is the biggest advantage of an X-ray?
- 3. What is the main risk of using CT scans?
- 4. Why can't some people have an MRI scan?
- 5. What is the main use of ultrasound?

Patient B - Questions for the Doctor

- 1. What makes MRI different from X-rays and CT scans?
- 2. Why do doctors sometimes inject contrast dye before a scan?
- 3. What kind of health problems can PET scans detect?
- 4. Why do patients have to stay still during an MRI scan?
- 5. What is one reason a patient might feel uncomfortable inside an MRI machine?



LISTENING

TASK 4A

Read the clues below carefully. Based on the hints, try to guess the topic of today's listening. Discuss your ideas with a partner before sharing with the class.

- **Clue 1:** Doctors use me, but I am not a doctor.
- Clue 2: I can see inside your body without touching you.
- ★ Clue 3: I use science, engineering, and technology to improve healthcare.

TASK 4B

Look at the list below. As you listen, put a tick next to the words/phrases that are mentioned in the audio.

Medical Imaging Machines	Biomedical Engineers' Work
MRI	Design medical imaging machines
PET scan	Improve scan speed
X-ray	Make MRI machines quieter
Ultrasound	Perform surgeries
CT scan	Use Al to study images
Blood test	Work as doctors
NAVI - NA - I' - I I I - I - I I - I	
Why Medical Imaging is Important	Problems in Medical Imaging
Helps doctors find diseases	Problems in Medical Imaging MRI machines are noisy
Helps doctors find diseases	MRI machines are noisy
Helps doctors find diseases Helps doctors plan treatments	MRI machines are noisy Some patients feel scared inside MRI machines
Helps doctors find diseases Helps doctors plan treatments Helps check if patients are getting better	MRI machines are noisy Some patients feel scared inside MRI machines Scans take a long time
Helps doctors find diseases Helps doctors plan treatments Helps check if patients are getting better Makes bones stronger	MRI machines are noisy Some patients feel scared inside MRI machines Scans take a long time Medical imaging is dangerous

Listen to the audio again and fill the blanks.

1. The speaker's name is Dr Carter.
2. She is a engineer.
3. Medical imaging machines help doctors see the body.
4. Examples of medical imaging machines are MRI,, and X-ray.
5. MRI machines use strong
6. MRI helps doctors find, brain problems, and injuries.
7. Some people feel inside an MRI machine because it is small.
8. Engineers try to make MRI machines quieter and more
9. Al can help doctors find faster in images.
10. Biomedical engineers help doctors give better to patients.

TASK 4D

Read each question and choose A, B, C, or D. Count how many A's, B's, C's, and D's you have. Check your result to see which medical imaging device you are.

Quiz: "Which Medical Imaging Device Are You?"

1. How do you like to solve problems?

- A) I think a lot before I decide.
- B) I decide fast.
- C) I follow my feelings.
- D) I look at everything first.

2. What do your friends say about you?

- A) I am careful and smart.
- B) I am fast and busy.
- C) I am kind and helpful.
- D) I notice small details.

3. What is your biggest strength?

- A) I see small details.
- B) I work fast in a problem.
- C) I help people feel safe.
- D) I understand things quickly.

4. What is your biggest weakness?

- A) I take too much time to decide.
- B) I work too fast sometimes.
- C) I don't see details sometimes.
- D) I need a lot of space.

5. What type of job do you like?

- A) Research and learning.
- B) Emergency situations.
- C) Helping people feel good.
- D) Working with technology.

6. How do you like to work?

- A) Alone, with no noise.
- B) In a busy place, fast.
- C) With people, helping them.
- D) With experts and machines.

7. If you were a machine, what would be your best feature?

- A) Clear and detailed results.
- B) Fast answers.
- C) Helping people feel calm.
- D) Finding hidden problems.

Your Results!

Mostly A's → You are an MRI!

You think a lot and see small details.

You help solve big problems slowly but carefully.

People trust you

because you give deep answers. thinking.



Mostly B's → You are a CT Scan! +

You are fast and clear. You help people in emergencies.

People need you when they want quick answers.



Mostly C's → You are an Ultrasound!

You are kind and gentle. You like helping people feel safe.

People feel relaxed when they are with you.

Mostly D's → You are an X-Ray! €€

You see everything clearly.

You help people understand problems. People respect your logical way of thinking.







REAL LIFE TASK

TASK 5

Form small groups (3-4 people) and choose one problem from the list of medical imaging issues (X-ray, MRI, ultrasound, or CT scan). Brainstorm a new biomedical device that solves the problem, then create a presentation explaining the issue, your solution, how it works, and why it is better than current devices.

Presentation should include:

- What is the problem?
- What is their solution? (Name and describe their new device!)
- How does it work? (Technology used, how it solves the problem.)
- Why is it better than current devices?

Problems with Current Imaging Devices:

X-RAY PROBLEMS:

- Uses radiation, which can be harmful with frequent exposure.
- Cannot see soft tissues, only bones.
- Old technology, not very advanced.

MRI PROBLEMS:

- Takes a long time (patients must stay still for 30+ minutes).
- Very expensive to operate and maintain.
- Loud and uncomfortable—many patients feel claustrophobic.

ULTRASOUND PROBLEMS:

- Low image quality compared to MRI.
- Does not work well for deep tissues (e.g., deep muscles or the brain).
- Difficult to use on obese patients because sound waves don't travel well through fat.

CT SCAN PROBLEMS:

- Uses high radiation exposure.
- Not good for soft tissues like the brain.
- Expensive and large—not portable.



VOCABULARY

TASK 6

Look at each group of four words. One word does NOT belong—it is the "odd one out." Circle the odd word. Then, write a suitable word to replace it.

1. MRI - CT Scan - Ultrasound - Microscope
Odd one out: →
(Hint: Which one does NOT create body scans?)
2. X-ray - Radio Waves - Magnets - Sound Waves
Odd one out: →
(Hint: Which one is NOT used in any imaging technique?)
3. Biomedical Engineer - Radiologist - Surgeon - Patient
Odd one out:>
(Hint: Who does NOT work with medical imaging devices?)
4. Diagnosis - Treatment - Image - Scan
Odd one out: →
(Hint: Which one happens AFTER medical imaging?)
5. Brain - Muscle - Bone - Blood
Odd one out: →
(Hint: Which one is NOT commonly seen in an MRI scan?)
6. AI - Tumor - Disease - Noise
Odd one out: →
(Hint: Which one is NOT a medical condition?)
7. MRI Machine - X-ray Film - CT Scanner - Stethoscope
Odd one out:>
(Hint: Which one is NOT a medical imaging tool?)

UNIT 5 HELPING HANDS AND HEARTS

In this unit, you will be able to:

- Describe prosthetic limbs and heart assistance devices, including their functions and improvements.
- Discuss and compare traditional and modern medical devices in terms of materials, movement, and technology.
- Create and present an innovative medical device to help people with weak hearts or missing limbs.

Key concepts:

- Prosthetics
- Biolimbs
- · Heart Assistance Devices



WARM UP

TASK 1

Think about a normal day in your life. You wake up, get dressed, eat, walk to school, take notes, and do other activities. But what if one thing was missing? Read the situations and pick one and write down how your day would change.

A day without one arm



How would you eat, write, or carry your school bag?

A day without one leg



How would you move around school or play with friends?

A day without a strong heart



Would you feel tired? Could you run? How would you keep up with daily activities?

A day without healthy kidney



What might happen if your body couldn't remove waste properly?

READING

TASK 2A

Look at the pictures. Who do you think used these prosthetics, and what activities could they do with them? What materials are used, and why do you think these materials were chosen?









Prosthetics

Some people lose an arm, a leg, a hand, or a foot. This can happen because of accidents or illnesses. Moving and doing daily activities becomes difficult. Prosthetics help people move again. Prosthetics are artificial body parts. A person with a prosthetic leg can walk. A person with a prosthetic arm can hold a cup, open a door, or write with a pen.

People used prosthetics many years ago. They made them from wood and metal. These artificial body parts were heavy and hard to use. In ancient Egypt, doctors made a wooden toe for a person. In ancient Rome, some soldiers lost their legs in battles. They got metal legs to walk again. These prosthetics helped them, but they were not comfortable. In the 1500s, people created better prosthetics. Some could move. In the 1800s, prosthetics improved more. People could bend their artificial arms and legs. But they still felt heavy because they had wood and metal.

Today, prosthetics are better. They are made from plastic and other light materials. Some prosthetics use special technology. A small computer inside the prosthetic helps people move it. Some prosthetic hands can open and close. Some prosthetic legs help people walk and run.

Biomedical engineers design prosthetics. They work to make them better and more comfortable. They also use new technology. Some prosthetics connect to the brain. These prosthetics move when the person thinks. Scientists are working on prosthetics that feel like real body parts.

Prosthetics change lives. They help people move, work, and enjoy life again. Thanks to new technology, more people will use better prosthetics in the future.

TASK 2B

Look at each question and all the answer choices.

What is the main idea of the text?

- A) Prosthetics help people move and have improved over time.
- B) Only ancient civilizations used prosthetics.
- C) Prosthetics are expensive and hard to use.
- D) Biomedical engineers only design prosthetics for athletes.

Which of the followings can be inferred from the text?

- A) Future prosthetics may feel like real body parts.
- B) People in the past had difficulty using prosthetics because they were heavy.
- C) Prosthetics have always been made with computers and sensors.
- **D)** Only biomedical engineers can use prosthetics.

TASK 2C

Match each answer with the correct question by writing the correct pairs together. After matching, check your answers with a partner.

Questions

- 1. Who made the first prosthetics?
- 2. How do some new prosthetics move?
- 3. Why do people use prosthetics?
- 4. What materials do modern prosthetics use?
- 5. Who designs prosthetics?

Answers

- A. People use prosthetics to move and do daily activities.
- B. Doctors in ancient Egypt made a wooden toe.
- C. Prosthetics today are made from plastic and other light materials.
- D. Biomedical engineers design prosthetics.
- E. Some prosthetics today can move when a person thinks

TASK 2D

Read the paragraph below. It summarizes the text, but some false statements are included. Find three mistakes and rewrite the paragraph by correcting them.



Prosthetics are new inventions that help people who lose an arm, leg, hand, or foot. In ancient Greece, doctors made the first prosthetic from plastic. In ancient Rome, some soldiers lost their legs and used wooden legs to walk again. Today, prosthetics are heavier than before and do not use any technology. Scientists are not working on future prosthetics because they are already perfect



TASK 2E

Below are five statements related to the text. Read each statement and decide who would say it. Choose from the following:

Statements

- 1. "I lost my leg in battle, but I can walk again with this metal leg."
- 2. "I designed this prosthetic arm with a small computer inside. Now, it can move when the person thinks!"
- 3. "I made a wooden toe for my patient. It will help him walk better."
- 4. "My new prosthetic hand can open and close, so I can hold things again!
- 5. "We are creating prosthetics that will feel just like real body parts."

People

i eopie
A) An ancient Egyptian doctor
B) A Roman soldier
C) A person using a prosthetic today
D) A biomedical engineer
E) A scientist working on future prosthetics

WATCHING

*	
*	
*	
•	
SK 3B	
	prosthetic developments in order from oldest (1) to newest (5).
	nic robotic hand ()
	en prosthetic limbs ()
	ah blades for running ()
	controlled prosthetics ()
Scient	ists grow a rat leg in a lab ()
ASK 3C	
omplete	the sentences using the words in the box.
	brain, carbon fiber, replace, energy, electrodes, movement
l. Cheeta	ah blades are made from and help athletes run faster.
2. Mind-o	controlled prosthetics use placed in the brain.
3. Bebior	nic hands can perform different types of
1. Some	prosthetic legs store and release while walking.

Feature	Old Prosthetics	New Prosthetics
Material		
Movement		
Control		
Power Source		

TASK 3E

Imagine that advanced prosthetic limbs are now stronger, faster, and better than natural limbs. Scientists can grow organic limbs in labs, and some people without disabilities want to replace their natural limbs with prosthetics. Discuss these ethical questions with a partner:

- 1. Should healthy people be allowed to replace their limbs with prosthetics? Why or why not?
- 2. If prosthetic arms become stronger than real ones, should they be allowed in sports?
- 3. What problems might arise if only rich people can afford advanced prosthetic limbs?

 Write a short response (3-4 sentences) about one of the questions and share your opinion.

READING

TASK 4A

Sit comfortably and take a deep breath. Place two fingers on your wrist or neck. Try to feel your pulse. Count your heartbeats for 15 seconds.

Write your	pulse:			
------------	--------	--	--	--

Now, without standing up, do one of these for 30 seconds: Open and close your hands again and again. Move your arms in small circles. Tap your feet under the table.

Count your pulse again and write it:

TASK 4B

Discuss in pairs and answer the following questions.

Helping Weak Hearts: Heart Assistance Devices

The heart is an important organ. It pumps blood to the whole body. Blood carries oxygen and nutrients to help the body work. A healthy heart pumps blood well, but some people have weak hearts. Their hearts do not work properly. This can make them feel tired, weak, or very sick. They may have trouble breathing or walking because their body does not get enough oxygen.

Doctors use heart assistance devices to help these people. These devices do not replace the heart, but they help it work better. They help the heart pump blood more easily. This can give patients more energy and improve their health.

One type of device is a ventricular assist device (VAD). It is a small pump that helps the heart move blood. Some people use a VAD for a short time before heart surgery or a heart transplant. Others use it for many years if they have a very weak heart.

Another device is a total artificial heart (TAH). This device completely replaces the heart. Doctors use a TAH when both sides of the heart stop working. A TAH helps blood move through the body, just like a real heart. Some patients use a TAH while waiting for a heart transplant, and others use it for a long time.

Heart assistance devices can be inside or outside the body. Internal devices are placed inside the chest, while external devices stay outside and connect to the heart with tubes. Most of these devices use batteries or electricity to work. Patients with heart assistance devices need to visit the doctor regularly. Doctors check if the device is working well and if the patient is healthy.

Biomedical engineers help design and improve heart assistance devices. They work to make them smaller, safer, and easier to use. Some engineers work on making wireless heart devices. Others try to make batteries last longer. Their work helps millions of people live longer and feel better.



TASK 4C

Match the halves to complete the sentences.

Beginnings

- 1. The heart pumps blood
- 2. Blood carries oxygen and nutrients
- 3. A weak heart __
- 4. Heart assistance devices help the heart
- 5. A ventricular assist device (VAD) _____
- 6. A total artificial heart (TAH) ____
- 7. Internal devices are placed ____
- 8. Biomedical engineers improve heart devices ____

Endings

- a. and help people feel better.
- b. to the whole body.
- c. to move blood through the body.
- d. to help the body work.
- e. does not work properly.
- f. is a small pump.
- g. inside the chest.
- h. pump blood more easily.

TASK 4D

Match each description to the correct heart device.

Description

Helps pump blood but does not replace the heart

Completely replaces the heart

Used before heart surgery or transplant

Can be inside or outside the body

Needs batteries to work

Device (VAD or TAH)

TASK 4E

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Read each tweet. All tweets are false. Reply by writing "False" and correcting the mistake in one sentence.



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TASK 4F

Work with a partner. Choose one set of words. Write a short paragraph about heart assistance devices. Use all five words in your paragraph. Then, read your paragraph aloud and check if you used all the words correctly.

Set 1: heart – weak – pump – VAD – battery Set 2: TAH – replace – blood – energy – engineer

Set 3: doctor – patient – device – surgery – oxygen

REAL LIFE TASK

TASK 5

Imagine you are a biomedical engineer working on a new medical device to help people with weak hearts or missing limbs. Your device could be a prosthetic limb that improves movement or a heart assistance device that supports circulation. Think about how your invention will work. Will it be placed inside or outside the body? Will it use electricity, batteries, or brain signals? How is it better than old devices?

Create a simple drawing of your device and label its important parts. Then, write 2-3 sentences explaining how it helps people. Share your idea with a partner, describe how it works, and answer one question about your invention.

Would you like to use this device if you needed it? Why or why not?

VOCABULARY

TASK 6
Find the 7 words hidden in the spiral puzzle. Write the correct word next to each meaning.

C	0	I	I	а	g	е	n	p	а	t	i	е	n	t
t	V	q	c	У	q	V	x	t	v	а	d	m	m	m
f	h	k	i	У	р	w	i	d	е	m	1	w	r	u
X	h	g	u	f	t	s	w	S	k	n	c	t	е	s
р	у	s	у	f	n	k	v	n	g	V	h	r	q	C
р	i	t	S	j	а	а	r	у	1	r	е	b	q	1
р	i	k	n	I	е	d	g	I	s	w	е	а	i	е
X	u	m	W	i	X	n	u	у	I	t	р	d	i	s
b	g	k	d	g	V	n	e	g	z	h	s	i	c	s
m	n	h	d	j	w	У	g	h	k	а	X	j	р	u
i	k	р	g	m	u	У	h	X	Z	z	q	s	р	r
I	z	р	w	b	у	e	b	V	٧	V	i	c	c	g
0	g	r	z	n	q	i	u	р	е	j	а	Z	u	е
i	f	g	f	р	а	е	а	b	f	h	е	g	s	r
b	t	n	а	ı	р	m	i	У	r	е	t	r	a	У

1	_ A protein in the body. It helps build skin, bones, and tissues.
2	_ A person visiting a doctor.
3	_ Soft parts inside the body. They help with movement.
4	_ A medical process. Doctors do it to fix or replace something in the body.
5	_ A tube inside the body. It carries blood from the heart.
6	_ A small object inside the body. It helps a person stay healthy.
7	_ A new arm or leg. Scientists grow it in a lab

UNIT 6 WEARABLE HEALTH DEVICES

In this unit, you will be able to:

- Describe different types of wearable health devices and how they work.
- · Discuss and compare traditional vs. modern health monitoring methods.
- · Analyze the benefits and challenges of using wearable technology in daily life.

Key concepts:

- Wearable Technology
- · Health Tracking
- · Heart Monitoring
- Smart Sensors
- · Battery & Power



WARM UP

TASK 1A

Answer the survey questions about wearable health devices. Write "Yes" or "No" for each one. Work in pairs and compare your answers.

TASK 1B

As a class, discuss: How many students use wearable devices?

- Which question had the most "Yes" answers? ______
- Do the results show that wearable health devices are popular?

1. Do you wear a smartwatch or fitness tracker? YES				
2. Do you check your step count every day?	YES	NO		
3. Have you ever used a device to measure your heart rate?	YES	NO		
4. Would you like a device that tracks your sleep?	YES	NO		
5. Do you think wearable health devices are useful?	YES	NO		
6. Would you trust a smartwatch to detect a health problem?	YES	NO		
7. Do you want to try a new health device in the future? YES				

READING

TASK 2A

Imagine your body can send you text messages to tell you what it needs. Read the messages from your body and think about the problem and the device it might need. Then, write a short reply in the blue box.

Hey, you slept 8 hours... but I'm still tired. We didn't go deep enough. Can you check what's wrong???

Hi. I need help. I'm always too high or too low after meals.

Pricking me all the time is not fun!

Please move. You sit too long. I feel tight and slow.!



TASK 2B

Work with a partner. Look at the form. Guess the answers together before reading the case studies. Write your guesses. After reading, check if your guesses were correct!

Profile	Name and Age	Health Problem & Risk	Device Used	How the Device Helped?
Case 1				
Case 2				



CASE 1

Sarah is a 32-year-old teacher. She often felt tired during the day, even after 8 hours of sleep. She thought it was just stress from work. Her friend suggested trying a smart sleep tracker. The tracker showed that Sarah moved a lot during the night and woke up many times. It also showed that she didn't get enough deep sleep. She went to a doctor, who told her she had a sleep problem called sleep apnea. Now, Sarah uses a small device to help her breathe better at night. She also uses the sleep tracker to check her sleep quality. After a few weeks, she says she feels more awake, focused, and healthy.



CASE 2

Ahmed is 60 years old and lives in a small town. He has had type 2 diabetes for ten years. Every day, he needed to check his blood sugar by pricking his finger. It was painful and made him feel tired and stressed. Sometimes he forgot to check it before meals or while he was working outside. One day, his doctor told him about a new wearable blood sugar monitor. It is a small patch that he wears on his upper arm. The patch checks his blood sugar every few minutes and sends the results to his smartphone. Now, he doesn't need to use a needle, and he can check his levels anytime with just one look. The monitor also shows

charts and alerts, so Ahmed knows when his sugar is too high or too low. He learned that white bread and sweet tea make his levels go up quickly. He changed his meals and started eating more vegetables and drinking water. His doctor is happy with his progress. Now, Ahmed feels more in control. He says, "This small patch changed my life. I don't feel afraid anymore.

TASK 2C

Work with a partner. Choose one case study and write a short news report about it in 2–3 sentences, as if you are a news reporter. Then, write a one-sentence headline for your news report. After you finish, exchange your work with another pair. Read their summary and headline carefully, and give feedback by writing one positive comment and one suggestion. Make sure your feedback is short, clear, and helpful.

TASK 2D

Read the 8 short quotes below. Decide if Sarah or Ahmed would say it. Draw an arrow to match.

- "I didn't know I had a sleep problem."
- "I check my sugar levels with my phone now."
- "My students laugh when I yawn."

AHMET

- "I wear a patch on my arm."
- "Sweet tea makes my sugar go up."

SARAH

- "I feel better because I sleep deeper."
- "My wife says I always forget to check my health."
- "My friend told me to try a sleep tracker."

TASK 2E

Read the chart below. Give each category 1 to 5 stars (\bigstar) for Sarah and Ahmed. Then, write one short reason for each rating.

Name	Device Name	Usefulness ★	Easy to Use 🛨	Life Change 🛨	Your Reason

LISTENING

TASK 3A

Discuss in pairs:

- · What do you see in the pictures?
- Who are the people? Can you guess their jobs?
- · Where are they?
- · What products can you recognize?



TASK 3B

Read the dialogue or listen to it carefully. Then, choose the best answer (A, B, or C) for each question.

- 1. What does the customer want a device?
- A) To replace their doctor completely
- B) To check their health at home
- **C)** To buy something for a family member
- 2. What are two traditional tools the seller mentions?
 - A) Smart watch and sweat sensor
 - B) Thermometer and heart monitor
 - C) Thermometer and blood pressure monitor
- 3. What is special about modern devices?
 - A) They only work at night
 - B) They check health all day
 - C) They are difficult to use

- 4. What can a smartwatch do, according to the seller?
 - A) Call an ambulance
 - B) Check blood sugar
 - C) Remind you to walk or drink water
- 5. Why is the sweat sensor interesting?
 - A) It uses blood samples
 - B) It sends data to your phone
 - C) It checks your brain
- 6. How much does the sweat sensor cost?
 - **A)** 30 euros
 - **B)** 80 euros
 - **C)** 100 euros

TASK 3C

Listen to the dialogue again. Which tools belong to traditional or modern? Put each word in the correct group.

Traditional Tools

Modern Devices

TASK 3D

You listened to a conversation about different health tools and wearable devices like smartwatches and sweat sensors. Work in pairs and do some quick research (online or using classroom materials).

- Find another modern wearable health device that was not in the dialogue.
- Prepare a very short presentation about the device.

WATCHING

TASK 4A

Work with your partner. Talk for 2–3 minutes and guess: How can sweat help doctors find health problems? Write one or two ideas together.

Some people have infections or illnesses inside their body. These problems can make their CRP (C-Reactive Protein) levels go very high. But it is not easy to know about CRP without taking blood from the body. Doctors need an easier and faster way to check CRP levels without blood tests. Imagine if your sweat could tell doctors what is happening inside your body without any needles



TASK 4B

Each clue below is a hint about a keyword from the video. Read the clue and guess which word it describes.

gold- sweat - sensor - detect protein - electrical signal-inflammation

I come out of your skin when you're hot or exercising
I am something scientists want to find or see
I can sense things like heat, light, or tiny particles in your body
I'm a sign your body is not okay — I come with pain, heat, or swelling
I help build your body — muscles, blood, even skin
I'm a shiny metal — scientists use tiny versions of me in this sensor
I'm a message that travels using power — the sensor sends me when it finds CRP

TASK 4C

Watch the video. Then, complete the sentences using your own words. Write full, simple sentences to show what happens in the process.

1. The sweat sensor is designed to					
2. CRP is important because					
3. It is hard to find CRP in sweat because					
4. Gold nanospheres are used to					
5. When CRP touches the sensor, it					
6. This technology is useful because					

TASK 4D

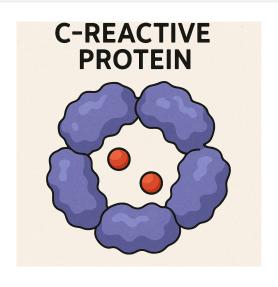
Work with a partner. Take turns asking and answering the questions below. You can use the sentence starters to help you. Be ready to share one idea from your partner with the class.

- ightarrowDo you think sweat sensors are useful? Why or why not?
- →Would you like to wear a health device that checks your body every day?
- ightarrowWhat are the advantages of using sweat instead of blood for health checks?
- "I think it's useful because..."
- "I learned that..."
- "Maybe I would use it if..."
- "My partner said that..."
- "We both think it's good for..."

TASK 4E

CRP (C-reactive protein) is being interviewed by a health magazine. Below are the answers from CRP. Work in pairs. Read each answer and write the question that the interviewer probably asked.

1. "I live in the blood, but a little bit of me goes into swe \rightarrow Q:	at."
2. "Yes, I appear more when the body has inflammation. → Q:	•
3. "No, I'm usually hard to detect in sweat." $\rightarrow \mathbf{Q} : \underline{\hspace{2cm}}$	
4. "Scientists now use gold nanospheres to find me." \rightarrow Q:	
5. "When I connect with the sensor, it creates an electric \rightarrow Q:	al signal."



REAL LIFE TASK

TASK 5

Your mother/father/grandparent got a new health smartwatch. But they don't know how to use it. You read the manual and help them. Switch roles and repeat.

You look at the screen and see:

- W Heart rate
- 👣 Steps
- Orink water reminder
- Battery: 20%

Work with a partner. One person is a family member. One person is you.

You can use these examples:

Family Member:

- "What is this heart symbol?"
- "Why is it beeping?"
- "How do I charge it?"

You:

- "That is your heart rate."
- "It tells you to drink water."
- "Battery is low. Let's charge it now."



Write a note for your family member. They can read it at home.

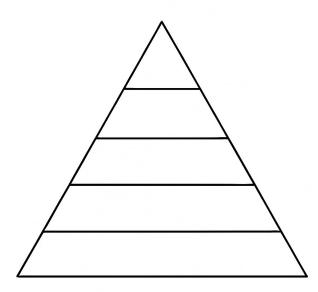
VOCABULARY

TASK 6

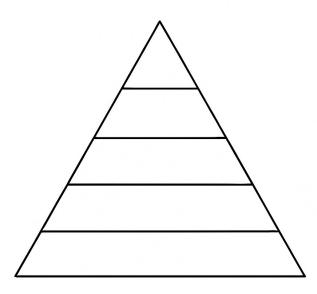
Choose three important words from the unit. Then, create a Word Pyramid by filling in each line from top (Line 1) to bottom (Line 5).

- Line 1: The word
- Line 2: A synonym or definition (in your own words)
- Line 3: An example sentence
- Line 4: A small drawing or emoji
- Line 5: A personal connection

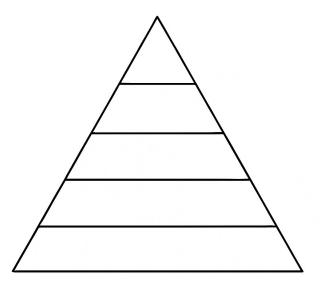
WORD PYRAMID



WORD PYRAMID



WORD PYRAMID





MODULE 3

BIOMEDICAL ENGINEERING BEYOND THE HOSPITAL

UNITS

- **7 | KEEPING ASTRONAUTS HEALTHY**
- 8 BME IN FACTORIES AND OFFICES
- 9 BME FOR PETS

In this module, you will be able to:

- · Learn how BME creates health solutions to help astronauts.
- Understand how technology improves workplace health through special tools.
- · Recognize how biomedical devices support animal health

Key Concepts

- · Space health
- · Ergonomics
- · Prosthetics for animals

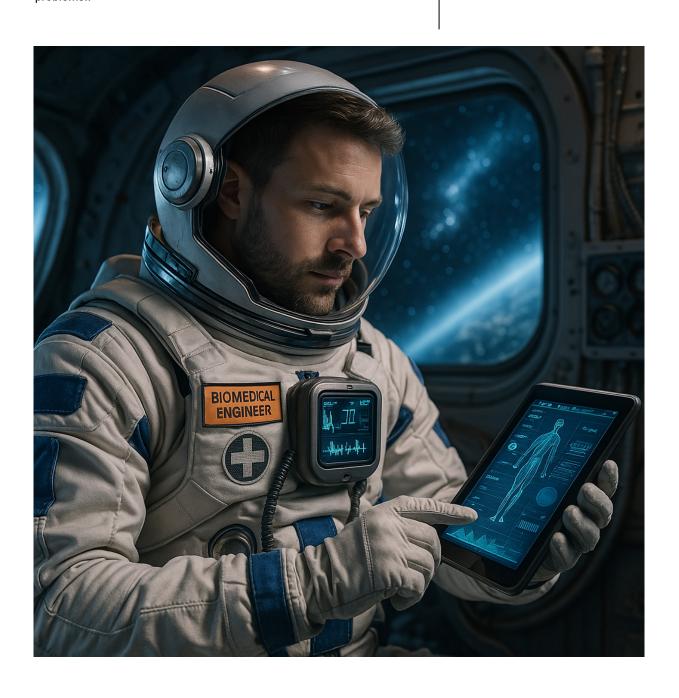
UNIT 7 KEEPING ASTRONAUTS HEALTHY

In this unit, you will be able to:

- · Identify the challenges astronauts face during and after space missions.
- · Recognize how biomedical engineers support astronaut health.
- Develop creative and team-based solutions for space-related health problems..

Key concepts:

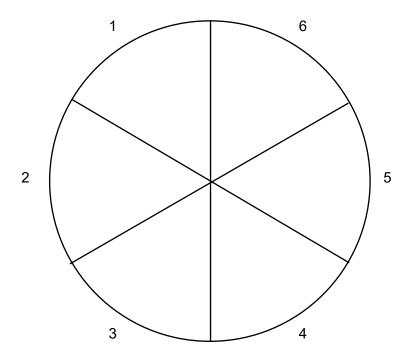
- · Biomedical engineering and space
- · Health challenges in zero gravity
- · Innovative technologies



WARM UP

TASK 1

Read the statements carefully, decide if the situation requires the help of a biomedical engineer, color the related section of the wheel, and discuss which situations surprised you the most and why.



- 1. "For astronauts to grow plants that provide fresh oxygen and food in space."
- 2. "For astronauts to hear warning alarms if their oxygen levels drop."
- 3. "For astronauts to sleep comfortably and avoid dizziness in zero gravity."
- 4. "For astronauts to test their vision after spending months in space."
- 5. "For astronauts to prevent skin irritation caused by space suits."
- 6. "For astronauts to avoid feeling lonely by simulating conversations with Al."

READING

TASK 2A

In pairs, discuss how you would spend or invest your salary as a biomedical engineer at NASA. What do you think biomedical engineers do in their job description to earn these salaries?

TASK 2B

Does knowing about these salaries make you feel more excited about your future as a biomedical engineer? Share your ideas.

Entry-Level Salary:

• "If you start as a biomedical engineer at NASA with a bachelor's degree, you can earn around \$70,000 – \$85,000 per year."

With a Master's Degree:

• "Biomedical engineers with a master's degree and some experience can earn around \$90,000 – \$110,000 per year."

Senior and Experienced Engineers:

• "As you gain experience, senior biomedical engineers at NASA can earn up to \$130,000 – \$150,000 per year or more!"



Biomedical engineers design special machines that help people with health problems. They work in hospitals to create equipment that helps doctors and patients. But did you know that biomedical engineers can also work for NASA? They help astronauts stay healthy and safe during space missions.

In space, astronauts cannot breathe normal air like on Earth. Biomedical engineers at NASA create life-support machines that help astronauts breathe for a long time. These machines clean the air and control the temperature inside the spacecraft. Without these tools, astronauts would not survive during long missions.



Biomedical engineers also work on water recycling systems. In space,

astronauts cannot bring large amounts of water. So, engineers design systems that clean and reuse water. This helps astronauts stay hydrated and healthy during their journey.

Another exciting area is nanotechnology. NASA uses nanotechnology to make tools that are very small but very powerful. These tiny devices can monitor astronauts' health and even repair equipment. Because they are small and lightweight, they are perfect for space missions.

If you want to become a biomedical engineer at NASA, you need to study biomedical engineering at a university. After that, you can apply for a job at NASA or gain experience by studying and working at the same time. Many biomedical engineers work hard and find amazing opportunities to help astronauts explore space safely.

Working as a biomedical engineer at NASA is an exciting job. You help astronauts stay healthy and explore space for longer periods. If you love science and space, this could be the perfect career for you!

TASK 2C

Aliens from Planet X have intercepted information about NASA's biomedical engineers but they've mixed up the facts and are about to broadcast this misinformation to the entire galaxy! Find the mistakes and correct them. Write a message to the aliens explaining why accurate information about biomedical engineers is crucial for space missions.

Alien Message 1 🦃

Greetings, Earthlings! We learned that biomedical engineers at NASA design rockets to travel into space. They make sure the rockets fly smoothly and land on the correct planet. They also control the engines, so astronauts always arrive safely. Without biomedical engineers, astronauts could never start their missions to the Moon or Mars!

Alien Message 3 🦃

Attention, humans! We discovered that biomedical engineers design water systems that change dirty water into fuel for the spacecraft. This fuel gives energy to the rockets and keeps them moving. Astronauts do not need to recycle water to drink, because they always bring many bottles of fresh water from Earth. In this way, astronauts never worry about thirst during their missions.

Alien Message 2 🦃

Hello, Earth friends! Our transmissions show that astronauts can breathe normal air in space, just like on Earth. Biomedical engineers only fill some tanks with this air, and the tanks are enough for long missions. These engineers do not need to make special machines, because space already has enough air for astronauts to use.

Alien Message 4 🦃

Hello again, Earthlings! Biomedical engineers work with nanotechnology, but this means very big and heavy machines that astronauts carry with them in space. These machines are difficult to move, and they use a lot of space inside the spacecraft. However, they are strong enough to repair all problems during the mission, and astronauts cannot work without them.

Past

TASK 2D Below are the steps to become a biomedical engineer at NASA. However, one step is missing! Find the missing step from the text and place it in the correct order.
Study biomedical engineering at a university.
Gain hands-on experience while studying.
Apply for a job at NASA.
Develop systems that help astronauts stay healthy in space.
TASK 2E Can you solve these astronaut riddles? Read each riddle and write the correct biomedical innovation from the text.
lpha "I keep you strong when there's no floor beneath your feet." $ ightarrow$
pprox "I keep your lungs happy while you float through metal walls." $ ightarrow$
lpha "I clean what you drink when refills aren't an option." $ ightarrow$
lpha "I quietly scan your body to make sure everything's working fine." $ ightarrow$
TASK 2F Place the following biomedical innovations into the correct time category:
• Life-support systems,
Al health monitoring devices,
3D bioprinting of human tissues in space,
Zero-gravity exercise machines,
Water recycling systems,
Self-repairing nanotechnology

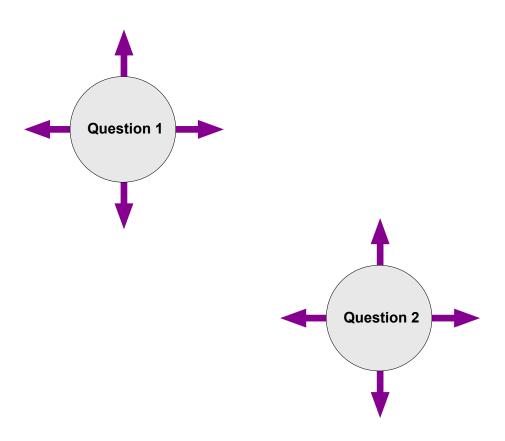
Present

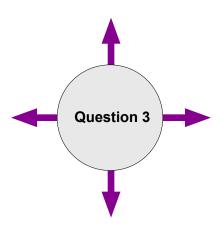
Future

TASK 2F

Work in teams of 2 as biomedical engineers applying for a job at NASA. Prepare answers to the interview questions and write 4 ideas to the questions. Present your answers together and convince the NASA panel that your team is the best choice for the job.

- 1. "Why do you want to work for NASA?"
- 2. "What biomedical problems would you solve for astronauts?"
- 3. "How would your inventions make space travel safer?"





LISTENING

TASK 3A

Imagine what astronauts might write or say in their diaries after a long space mission. Look at the sentence starters below. Choose three and finish them with your own ideas. You can write funny or thoughts. Then, share with a partner.

- 1. Today in space, I left
- 2. The hardest part of mission is
- 3. I really miss
- 4. I wish I had more...
- 5. My legs feel like...
- 6. I can't wait to...

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

TASK 3B

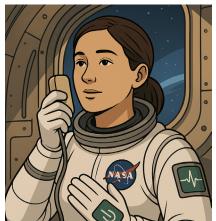
Ask your partner:

- 1- "Which sentence do you think sounds most real for an astronaut?"
- 2- "Do you want to go to space? Why or why not?"

TASK 3C

Listen to the audio diaries and match the pictures with the astronaut names.

Commander Alex, Dr Priya, Astronaut Jake







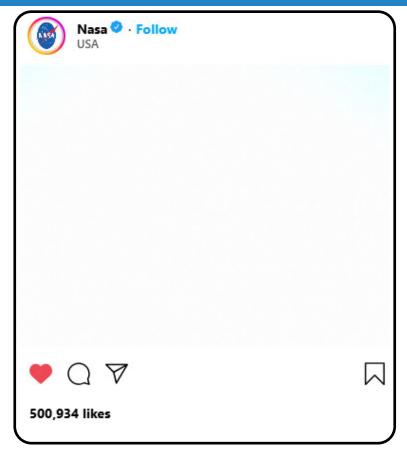
TASK 3C

Listen to the audio again. Put the events in the correct order by numbering them 1-4.

Ommander Alex's Events:
() Biomedical engineers designed a special headset.
() Alex felt dizzy and had trouble balancing.
() Alex used the headset for a few days.
() Alex stopped feeling dizzy and adjusted to space.
🤵 Dr. Priya's Events:
()Priya put the healing patch on her hand.
()Priya got a small cut while fixing equipment.
()The patch helped her wound heal faster.
()Biomedical engineers designed the 3D-printed patch.
Astronaut Jake's Events:
() Jake felt lonely and missed his family.
()Biomedical engineers developed a VR system.
() Jake used the VR headset and felt happier.
()The VR system allowed Jake to connect with his loved ones.

TASK 3D

Thinking about the diary entries from Commander Alex, Dr. Priya, and Astronaut Jake and the challenges they have faced — and biomedical engineers helped them solve it! Choose one astronaut and create a fun and emotional Instagram post from NASA's social media account. Show people what it's really like to live in space!



READING

TASK 4A

Imagine you are an astronaut returning to Earth after spending 6 months in space. What problems do you think your body and mind might face? Make 3 predictions about the challenges you might experience after coming back to Earth.

- → How will your body feel when you try to stand up?
- → Will it be easy to eat normal food again?
- → What emotions will you feel after the mission is over?"

TASK 4B

Discuss your predictions with a partner and compare your ideas.

TASK 4C

Read the interview between a NASA reporter and John Jawish, a biomedical engineer who works on astronaut health.

Interviewer: Hello! Can you tell us who you are and what you do?

John Jawish:Hi! My name is John Jawish, and I am a biomedical engineer. I work on bone density treatment. This is very important for astronauts when they come back to Earth.

Interviewer: What happens to astronauts' bodies in space?

John Jawish: When astronauts spend a lot of time in space, their muscles and bones become weak. There is no gravity in space, so they don't use their muscles like we do on Earth. Their bones lose strength and their muscles shrink.

Interviewer: How do astronauts feel when they come back to Earth?

John Jawish: They feel very weak. Even simple tasks like standing up or sitting down are hard for them. Their bodies need time to adjust to gravity again.

Interviewer: What do astronauts do after returning to Earth?

John Jawish: Day 1: They rest and sleep because they are very tired. Day 2: They do simple exercises like standing up and sitting down. After that: They begin strength training to rebuild their muscles and bones.

Interviewer: How long does it take for astronauts to get strong again?

John Jawish: It takes 6 months to 1 year for astronauts to recover their strength and bone mass. They need to do strength training about 4 days a week to get back to normal.

Interviewer: Do astronauts have problems with digestion too?

John Jawish: Yes, they do. Without gravity, food doesn't move through their digestive system easily. Their stomachs shrink, and they eat less food in space. When they return to Earth, they need to eat nutrient-dense food with lots of vitamins. They also need to eat more protein to get stronger.

Interviewer: What about their mental health? Do astronauts feel different after coming back?

John Jawish: Yes, mental health is also a challenge. In space, astronauts are fighting to stay alive every day. When they come home, they feel empty because the mission is over. It's hard for them to find a new purpose.

Interviewer: Is radiation a danger for astronauts?

John Jawish: Yes, but not too much. Space has more radiation than Earth because there is no atmosphere to protect astronauts. But the amount of radiation they get is not enough to harm them for life.

Interviewer: Astronauts seem to go through a lot! Are they ready for this?

John Jawish: Yes, absolutely! NASA picks people who are mentally strong and problem solvers. Astronauts are trained not to panic. They know how to think carefully and stay calm, even in dangerous situations.

Interviewer: What is the biggest challenge for astronauts after returning home?

John Jawish: The biggest challenges astronauts face after returning to Earth include physical, digestive, and psychological issues. Their muscles and bones weaken significantly in space, and it can take several months to regain strength. Digestive problems are also common, as their stomachs shrink and need time to adjust to regular eating habits. Mental health is another major concern — many astronauts report feeling a sense of emptiness or loss of purpose once the mission is over. Lastly, while radiation exposure is a factor in space, it's

generally not harmful in the long term thanks to current safety measures.

Interviewer: Wow! It sounds like astronauts have to work really hard after coming home.

John Jawish: Yes, they do. But astronauts are prepared for these challenges. They are well-trained and know exactly what to do when they return. They are ready for anything!



TASK 4D

Answer the questions using information from the text. Write no more than 4 words for each answer.

What job does John Jawish have?
What happens to muscles in space?
Why is gravity important?
What do astronauts feel after landing?
What exercise do they start with?
How many days a week do they train?
What kind of food do they need?
What makes digestion hard in space?
How long does recovery take?
Why are astronauts mentally strong?

TASK 4E

Now, imagine you're reading NASA's official Health Support Blog. Below are some questions astronauts have sent in. Read each question carefully and write a helpful answer based on the information from the interview.

TASK 4F

Talk with your partner: Which of these challenges would be the hardest for you if you were an astronaut? Why?

Astronaut Q&A:	
1. "I can't even stand up straight. My legs feel like jelly! What should I do?"	
2. "I didn't eat much in space, and now I feel too weak to even walk. What kind of food should I d	eat to
feel strong again?"	
3. "I miss being in space. Now that the mission is over, I feel empty and unmotivated. Is this nor	mal?"
4. "Since I got back, I feel dizzy and off-balance. How can I fix this?"	
5. "I'm a little scared about the radiation I got in space. Should I be worried?"	

TASK 4G

Read the statements below and decide if they are true or false based on the interview.

Astronauts need very little exercise after returning to Earth because they stay strong in space. ()
NASA prepares astronauts mentally to handle difficult situations in space. ()
Gravity helps astronauts' digestive systems work properly on Earth. ()
Astronauts' muscles and bones become stronger after long space missions. ()
• Radiation in space is extremely harmful and causes long-term health issues for astronauts. ()
Astronauts feel a sense of purpose and excitement when they return to Earth. ()

TASK 4H

Read the questions. Choose one for each question and draw a star next to it. Then, tell your partner why you chose it. Use simple words and your imagination!

- Would you rather sleep floating in the air or sleep in a small bed with seatbelts?
- Would you rather eat space ice cream or drink your food from a bag for one week?
- Would you rather walk like a robot because your legs are weak or do baby exercises every day to get strong again?
- Would you rather do a moon jump or try to sit on a moving chair in space?
- Would you rather carry a pencil that feels heavy or eat your favorite food but it tastes weird in space?
- Would you rather wear a space suit for 8 hours or eat protein shakes for breakfast, lunch, and dinner?

REAL LIFE TASK

TASK 5

Work in groups. Read the space emergency report your teacher gives you. Then, follow the task and design a creative poster showing your solution as biomedical engineers. Finally, present your idea to the class.



VOCABULARY

TASK 6

Choose the correct word from the box to complete each sentence. Use each word only once.

oxygen, nanotechnology, biomedical engineer, life support system, radiation, health monitoring, muscle loss, nutrient-dense, zero gravity, recovery

1. A works on machines that help people stay healthy in space.	
2. In space, causes astronauts' muscles to become weak.	
3. The provides astronauts with clean air and the right temperature	e.
4 is used to create very small tools that help monitor health.	
5. Astronauts breathe from tanks while on spacewalks.	
6. A device checks your heart rate and body temperature.	
7. To stay healthy, astronauts eat food with protein and vitamins.	
8. Astronauts face more in space because there is no atmosphere	э.
9. After a long mission, astronauts need time for and strength trai	ning.
10 means there is no force pulling your body down.	

UNIT 8 BIOMEDICAL HELP AT WORK

In this unit, you will be able to:

- Understand how biomedical engineers support workers in different places (factories, offices, salons).
- Learn key words related to workplace comfort, body pain, and ergonomic tools.
- · Identify common problems at work and suggest simple biomedical solutions.
- · Watch and understand videos about safe movement and posture at work.

Key concepts:

- Workplace pain and movement problems
- · Biomedical tools and solutions
- · Ergonomics and posture



WARM UP

TASK 1A

Look at the pictures. Where are the people? What do they do?

TASK 1B

Work in pairs. Match each picture with the explanations.



This place is big and loud. There are many heavy machines. Workers wear special clothes like gloves and helmets. They move a lot and use tools. It can be dangerous if people don't follow the rules.
 This place is very clean. People wear white coats and gloves. They test things using computers and small machines. They don't help patients, but they work with science and health.
 People spend many hours here sitting at desks. They use computers to write or talk to others.
 Sometimes they feel tired or have pain in their necks or backs. The room is usually quiet and clean.

TASK 1C

Discuss in pairs:

- » Have you been to or worked in these places?
- » Do workers in these places need help? Why?

READING

TASK 2A

Seda is starting her first day at a smart factory. She has a special bag. Inside the bag are 6 things. Look at the items and discuss in pairs:

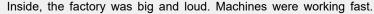


a notebook
a small sensor device
safety glasses
a poster about posture
a chair diagram
a mini first aid kit

- 1. What are these for?
- 2. Why does Seda carry them?
- 3. What do you think she will see or do at the factory?

Seda was very excited. She had studied biomedical engineering for one year. Now, she had a summer internship. On her first day, she visited a smart factory. She was a little nervous, but ready to learn. Before leaving home, she packed her bag: a notebook, safety glasses, a small air sensor, a first aid kit, and some materials about good posture.

At the factory, a man smiled and said, "Welcome! I'm Mr. Demir, the safety manager. Follow me, Seda."



Workers wore helmets, gloves, and safety glasses. Seda quickly took out her own glasses and put them on.

"That's good," Mr. Demir said. "Safety first!"

Seda looked around. Some workers had small devices on their clothes.

"These smart tools check the workers' heart rate," Mr. Demir explained. "If someone feels bad, the system sends an alert. We also have sensors that check air, noise, and heat. When something is wrong, we fix it fast." Seda opened her bag and showed him the small air sensor she brought from university. "We used this one in class. It checks CO₂."

"Nice!" said Mr. Demir. "We use similar ones here."

In another room, a worker sat in a special chair.

"He had back pain," said Mr. Demir. "So, our team designed an ergonomic chair to help him."

Seda smiled. "I brought some posters about posture. Maybe they can be useful."

"Great idea," he said. "We can put them in the break room."

Later, they passed a first aid area.

"Do you always have medical kits ready?" Seda asked.



"Of course," he said. "We also train workers in emergencies."

As they walked back to the entrance, Seda looked at her notes. So many new ideas, so many problems to solve.

"Mr. Demir," she said, "I didn't know factories could be like this."

"Most people don't," he smiled. "But factories today need smart solutions."

Seda nodded. She looked around one more time — the workers, the machines, the air sensors, the chair, the posters. She felt proud to be there.

"I always thought biomedical engineers only worked in hospitals," she said softly. "But now I see... we can help people anywhere."

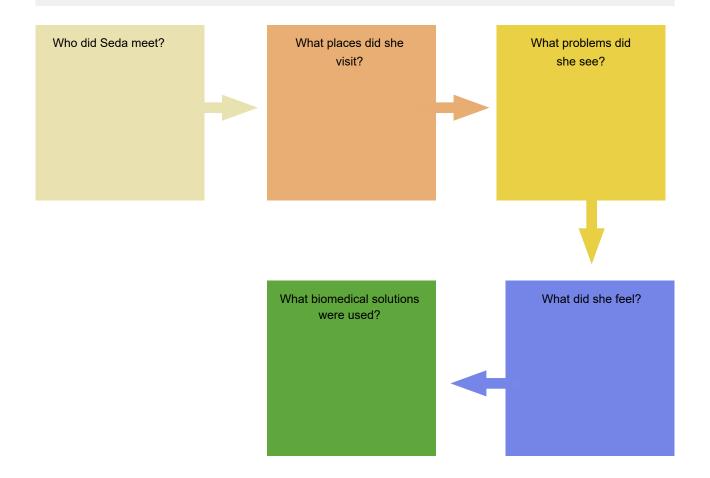
Mr. Demir nodded. "And that's why we need people like you, Seda."

Seda smiled, full of new energy. Her first day was over — but her journey was just beginning.

TASK 2B

Look at the mind map below. Use the story to complete it.

- » Have you been to or worked in these places?
- » Do workers in these places need help? Why?



TASK 2C

Seda saw and learned new things during her visit to the smart factory. Read the situations below. What do you think Seda would say in each one?

- » Write 1 or 2 short sentences in the blanks
- » Use words from the story or your own ideas

Scene	What would Seda say?
Seda brings her own safety glasses and wears them before entering the factory. Mr. Demir says, "That's good. Safety first!"	
Mr. Demir shows a helmet that checks heart rate. It can give an alert if someone feels dizzy or tired.	
Seda shows the portable air sensor from her university class. Mr. Demir says it's similar to what they use.	
Seda sees a worker with back pain and gives Mr. Demir a poster about good posture.	
Seda reflects on everything she saw.	

TASK 2D

Read the short parts from the story. Each part gives a message or idea. Match the part with the correct main idea. There is one extra idea you don't need. Be careful, some are similar!

1. "This helmet checks the worker's heart rate. If someon	ıe
feels dizzy or tired, the system gives an alert." ()	

- 2. "The worker had back pain, so our engineers designed a better chair to support his body." (___)
- 3. "We also use sensors. They check the air, heat, and noise in the room." (__)
- 4. "I always thought biomedical engineers only worked in hospitals. But now I see—factories need them too." (__)

- A. Biomedical engineers only work in hospitals.
- B. Engineers help workers stay safe and healthy.
- C. Factories use sensors to check the environment.
- **D.** Special tools can help with physical pain.
- **E.** Smart safety tools protect workers in real time.

TASK 2E

Imagine you are starting your internship as a biomedical engineering student. You need to pack a special bag for your first day. Think of 5 useful items and either draw them or write a list. Then, share your bag with your partner and explain why you chose each item

WATCHING

TASK 3A

Look at the pictures of these tools. Work in pairs and guess:

- →What is this?
- →Who uses it?
- ightarrowWhy does it look different?

How does it help the body? Why is it designed like this?







TASK 3B Watch the video.

TASK 3C

Below are some important words from the video but in random order! As you listen, circle the word when you hear it. You will hear each word only once or twice, so listen carefully!

helmet balance forces gravity posture screeching injury repeat stand joint

Choose 1 word and say:

"This is about _____. It means _____."

TASK 3D

Below are some common problems at work. Match each problem with the correct ergonomic solution from the video.

Problems

- 1. I sit for many hours and my back hurts. (__)
- 2. I lift heavy things and feel tired. (__)
- 3. I use a machine again and again. (__)
- 4. I feel pain in my wrist and shoulder (__)

Solutions

- A. Take breaks to move or stretch.
- B. Use better posture when you sit or stand.
- C. Use tools like a hand truck.
- D. Change your position or work area.

TASK 3E

Read the actions below carefully. Which category does each action belong to? Write each action under the correct group.

- 1. Sitting with your back straight
- 2. Typing for many hours without a break
- 3. Lifting a box without bending your legs
- 4. Looking down at your screen for a long time
- 5. Pulling a heavy box by yourself

- 6. Stretching every 30-60 minutes
- 7. Turning pages over and over with your hand
- 8. Standing with your shoulders and hips in line
- 9. Carrying something heavy without help

Proper Posture

Repetitive Motion

Managing Forces

TASK 3F

In this game, you will act out ideas from the video. Your group will guess what you're doing. No talking! Just move!

- 1. Work in teams.
- 2. One student picks a card and acts it out.
- 3. The group watches and guesses the action.
- 4. If they guess right, they get 1 point.
- 5. Then it's the next team's turn!



LISTENING

TASK 4A

Work with a partner:

- 1. Have you ever had a pain or injury that made it hard to move or work?
 - \rightarrow If yes: What was the problem?
 - ightarrow If no: What do you think would be difficult with a movement problem?
- 2. Have you ever used something (like a brace or support) to help your body?
 - → If yes: What did you use? Did it help?
 - \rightarrow If no: What kind of tool do you think could help with pain?
- 3. Do you know anyone who had help from a doctor or engineer for body pain?
 - \rightarrow If yes: What did they do?
 - → If no: Would you like to talk to someone about body comfort at work?

TASK 4B

Listen to the voice messages. Fill the chart accordingly. Some parts are given.

Person	Body Part	Device	
Linda			
		band	

TASK 4C

Listen to the voice messages again. Complete the paragraph with words from the box.

better - design - pain - thank - rest - strong - helpful - everyday

Three people shared how a biomedical engineer helped them. They all had in their bodies because
of work. One person works at a computer, one moves a lot, and one uses their arms all day. The engineer listened
and made a special for each person. After using it, they felt and could work again. One
person said the tool was soft and Another said they still take short breaks to They all
said you and were surprised by what engineers do in life.

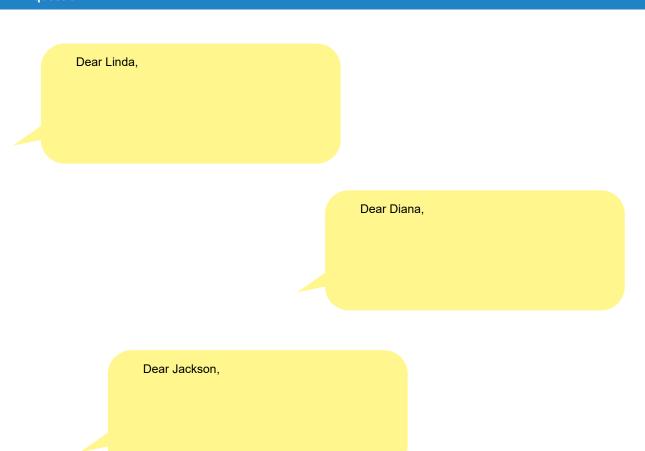
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ш.	п	v	и	-7	/■
	21	O)	w	-	::

Read the sentences below. Write T, F, or NM (not mentioned) next to each sentence.

1. One person says they couldn't even hold a cup of coffee
1. One person says they couldn't even hold a cup of conee.
2.The engineer sent two devices to Jackson
3. A person says the tool is easy to wear
4. Someone talks about shoulder pain
5. A person thanks the engineer for listening
6. One of the devices is described as "strong but small."
7. The engineer visits Diana's salon
8. A person says they are now working again, little by little
9. One person still takes breaks during work
10. Someone says they are surprised by what biomedical engineers can do

TASK 4E

You are a biomedical engineer. You just received 3 voice messages from workers who used your devices. Listen to the messages again. Now decide what you would say back to each person. Write a short reply (1–2 sentences) to each person. Be friendly and helpful. You can say thank you, give advice, or ask a question.



REAL LIFE TASK

TASK 5

Find a short video clip or movie scene where people are working (in an office, factory, salon, etc.). Look carefully at the workers. What are they doing? Is there a problem? What can a biomedical engineer do to help?

Prepare a PowerPoint (4–6 slides). Include the name of the video, the type of workplace, the problems you see, your idea or device, and why it helps. You will present your slides next week. Speak for 2–3 minutes. Use the words and ideas from this unit.



VOCABULARY

TASK 6

Read each situation carefully. Choose the word that fits best and write it on the line. Then, write a short tip give advice like "You should..." or "Remember to..." to help someone in that situation.

injury, safety, posture, joint, wrist

1. You are at work and see a big sign on the w	all: "Wear gloves and helmet!"
Word:	
Tip:	
2. Your friend shows you a photo of their X-ray	v. You can see the place where two bones meet.
Word:	
Tip:	
3. A coworker sits at a desk all day and always	s bends their back while typing.
Word:	
Tip:	
4. Someone falls while working and needs to o	go to the doctor. They hurt their leg.
Word:	, , , , ,
 Tip:	
5. After typing a lot, your hand feels sore. You	touch the area between your hand and arm.
Word:	,
Tip:	

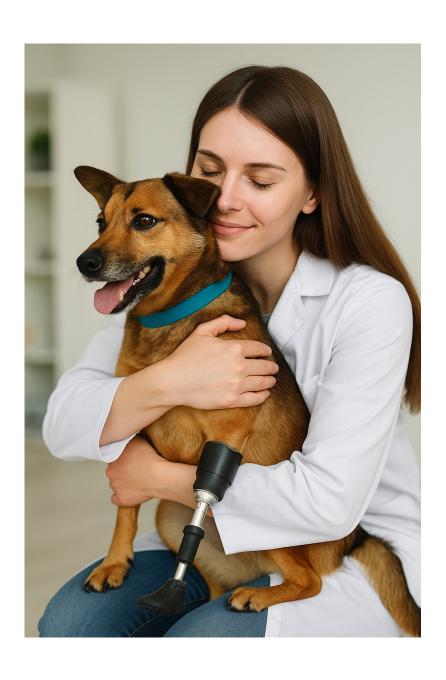
UNIT 9 BM ENGINEERING FOR PETS

In this unit, you will be able to:

- · Understand how biomedical engineers help animals using technology.
- · Learn how prosthetic limbs are designed for animal use
- · Identify the importance of medical treatments in improving animals' lives.

Key concepts:

- Prosthetic Limbs for Animals
- · Medical treatments
- · Animal Recovery
- · BM Engineering for Pet



WARM UP

TASK 1A

Walk around the class and talk to your classmates.

Ask the questions below. If a classmate answers "Yes", write their name in the box.

Use question starters like:

Do you...? Have you ever...? Can you...?"

Find Someone who	Names
has a pet now	
likes dogs more than cats	
has visited a vet	
has seen a pet with a wheelchair or an artificial leg	
knows the name of a tool for pets	
can say three animal names in English	
has watched a documentary about animals or pets	
thinks robot pets are fun	
has helped a sick or hurt animal	
wants to work with animals in the future	

TASK 1B

Work in pairs:

- 1. Tell your partner about one person from your paper. (For example: This person has helped a sick animal)
- 2. Do not say their name! Your partner listens and tries to guess who it is.



READING

TASK 2A

Read this short real story.

Meadow is a Black Angus calf from New Mexico.

She lost both of her back hooves because of frostbite.

A woman named Nancy Dickenson found her and helped.

Veterinarians amputated part of Meadow's back legs and gave her double prosthetics.

Doctors believe she is the first calf in history with two prosthetic legs.



TASK 2B

In pairs, discuss:

What materials do you think they used for Meadow's prosthetic legs? (wood, metal, plastic, leather)

Why do you think Nancy wanted to help Meadow?

What is one problem Meadow might have with her new legs?



By Jane Carter

The Animal Times – June 5, 1899

In recent years, more animals are living longer thanks to science. But animal prosthetics are not new. In the 1800s, some farmers and pet owners in Britain were already helping their animals in unusual ways.

1-

In the countryside, cows helped farmers a lot. They gave milk, meat, and calves (baby cows). Sometimes, a cow broke its leg. Most farmers killed the cow. But some farmers did something different — they gave the cow a wooden leg.

One newspaper in 1859 shared a story. A horse broke a cow's leg. A vet came to help. He removed the cow's leg and made a new leg from wood. After a few weeks, the cow walked again and ate grass. People called the vet a hero. The cow even had a calf after her operation.

Wooden legs were expensive. Farmers helped only the best cows — cows that gave a lot of milk or had special parents. Most farmers didn't have enough money for a vet or a new leg. These stories were in the news. Some people thought they were amazing. Others laughed at them.

2
In the city, some rich people gave their dogs special care. One man was a dentist. He gave his dog gold teeth.
Another person gave a glass eye to his dog because the dog lost its real eye. Some dogs even got fake legs.
People made these legs from leather or metal.
These dogs often went to dog shows. Their owners wanted them to look perfect. Some people didn't like this.
They said it was strange to give dogs gold teeth or new legs. It cost a lot of money.
One newspaper made jokes. It said, "Your milk tastes like wood—did your cow lose a leg?" Another joke said,
"The dog's new teeth cost more than my house.
3
Some people helped animals because they loved them. They wanted the animals to feel better. But other
people wanted to save money.
For example, a cow with a wooden leg could still give milk. The farmer made money from the milk. A dog with
gold teeth or a new leg could look perfect in a dog show. The owner felt proud.
People did not always agree. Some said prosthetics were helpful. Others said they were only for show. In many
cases, both reasons were true.
4
Today, people use 3D printers to make new legs for animals. Some animals get metal tails or plastic beaks.
Biomedical engineers and vets work together. They want to help animals live better lives.
But we still ask the same questions:
Which animals get help?
Why do they get help?
Do people help because they care, or because they want something?

TASK 2C

Read the four headline options below. Then, write the correct headline above each part of the article.

- **A**. A New Problem or an Old Question?
- C. Why People Helped Animals
- **B.** Wooden Legs for Farm Animals
- **D.** Fancy Pets in the City

TASK 2D

Read the clues below. All the answers are in the reading. Write the correct word from the text.

A person who helps animals with medical problems	A show where people bring their dogs to win prizes
→	→
A young cow	What people drink from cows
→	→
A strong material used in fake legs	A body part for walking
→	→
A person who owns a pet	What some dogs got in their mouths instead of real teeth
→	→
A machine that makes plastic legs	The animal that broke the cow's leg in the newspaper story
→	→

	n		п

Each statement in Column A tells you something that happened in the story. Match it with the reason, result, or explanation in Column B.

A. WHAT HAPPENED	B. WHY / WHAT HAPPENED NEXT
1. Some farmers gave cows wooden legs.	() So the animal could walk and eat grass again.
2. A dentist gave his dog gold teeth.	() Because they wanted their pets to win dog shows.
3. Only special cows got help.	() Because those cows gave more milk or had good genes.
4. Some dogs got fake legs or eyes.	() Because most people couldn't afford a vet or a wooden leg.
5. Many cows with broken legs were killed	() Because the owners couldn't pay for treatment

TASK 2F

Ask your partner questions, listen carefully, and fill out the form with THEIR ideas, not your own! Later, you will present your ideas and your partner's opinion to the class.

1. Does your partner like the idea of animal prosthetics?
Yes
□ No
□ Not sure
Why does your partner say yes or no?
(Choose two reasons from the list below or write a short idea.)
□ They help animals walk again.
□ It is kind and caring.
□ It's good for shows or competitions.
□ It is too expensive.
□ People do it only for money.
□ Other:
3. Does your partner think rich people help animals for love or for sh
□ For love
□ For show
□ Both
4. My partner thinks that animal prosthetics are
□ a good idea
□ a bad idea
□ sometimes good, sometimes bad
because

LISTENING

TASK 3A

Look at Derby's picture. Tick (\checkmark) the sentences you think might be true. Later, listen to the podcast and check if you were right!

Sentences

- 1. Derby's favorite thing is chewing everything. \checkmark
- 2. Derby doesn't need prosthetic legs because he sleeps all day like a couch potato.____
- 3. Engineers created Derby's new limbs using human skin.____
- 4. Derby's first tool to move was a small cart with wheels.
- 5. Derby's new prosthetic legs had a full loop shape.____
- 6. Derby got a medal after using his prosthetics.____



TASK 3B

While you listen to the podcast, catch and write down 10 important words you hear. These should be key words not small words like "and," "the," or "but."

1.

6.

2.

7.

3.

8.

4.

9.

5.

10.

TASK 3C

Which sentence best tells what this interview is mostly about?

- a) Engineers always work alone to fix animal problems.
- b) A dog with a heart problem got help from a hospital.
- c) The engineering design process helped create better prosthetic legs for a dog.
- d) Veterinarians use 3D printers to make toys for dogs.

TASK 3D

Listen to the podcast carefully again. For each sentence, choose T (True), F (False), or NM (Not Mentioned).

- 1. Diana and her team immediately started designing Derby's prosthetics after seeing him.(T / F / NM)
- 2. The first prosthetic design made Derby walk better but very slowly.(T / F / NM)
- 3. Diana's team spoke with doctors who usually work with human patients.(T / F / NM)
- 4. The running blade idea came from technology used in human sports.(T / F / NM)
- 5. Derby's prosthetics were made from wood to make them lighter.(T / F / NM)
- 6.3D printing helped Diana's team change designs faster.(T / F / NM)
- 7. Diana's team gave up after three tries because Derby was too difficult to help.(T / F / NM)

TASK 3E

Match the people with what they did.

People	Actions
1. Diana	a. Helped understand Derby's body and needs
2. Engineers	b. Asked questions and hosted the show
3. Derby	c. Made different leg designs and tested materials
4. Veterinarians	d. Was born with short front legs
5. The Host	e. Used 3D printing to help a dog walk again

TASK 3F

Work in pairs. Imagine you are part of Diana's engineering team. Discuss together and answer these questions:

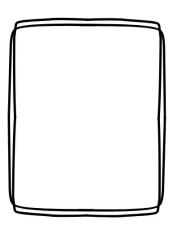
- 1. Would you have given Derby a different type of help?
- 2. What material would you use to make new legs?
- 3. What shape would you design for Derby's prosthetic legs?
- 4. What other problem could Derby have in the future?
- 5. How could you improve his life more?

READING

TASK 4A

Create a pet profile. You can choose any animal you want. it can be a pet you have, a pet you know, or a pet you imagine. Fill in the information: What is the animal's name? What does it love doing? If your pet had a health problem, what could it be? Think of one idea to help your pet medicine, surgery, or a new technology. You can also draw your pet inside the box.

Pet Profile



Pet's Name:

Animal Type:

Age:

Favorite Activities:

Health Problem:

What Problem the Pet Faces Now:

One Idea to Help Your Pet:

TASK 4B

Work in pairs and take turns introducing your pets.

Talk about:

- · What your pet's health problem is
- · How you would help your pet
- · How your pet's story might be similar to the pet we will read about.

Max's Story

Max was a five-year-old Labrador Retriever who lived with his family in a quiet town. He loved running after tennis balls, jumping into the creek, and sleeping by the fireplace. But one autumn morning, Max's energy disappeared. After short walks, he was very tired. He struggled to climb the stairs, and even his favorite game of fetch left him lying on the grass, breathing heavily.

Worried, Max's family took him to Dr. Carter, a veterinarian at the local animal hospital. After some tests, Dr. Carter explained that Max had a serious heart problem. His heart was weak and could not pump blood properly. Without help, Max's condition would get worse, and he might not live long.



Dr. Carter offered some hope. A nearby research center was working with biomedical engineers on a new machine called a ventricular assist device, or VAD. The VAD could help Max's heart push blood through his body. It was not a full artificial heart, but it worked together with the real heart. The VAD had already helped a few other dogs in special studies.

The engineers had designed the VAD specially for large dogs like Max. They used strong but light materials like titanium and medical plastics. The pump would be placed inside Max's chest and connected to his heart. A thin cable under his skin would link the pump to a small battery pack that Max could wear on his back. The engineers had studied dogs carefully to make sure the pump would not stop Max from moving or feeling comfortable.

Max's family decided to give him this second chance. The surgery was long. Dr. Carter and the veterinary surgeons worked closely with the engineers to place the VAD and connect it properly. When the pump started, Max's breathing became easier, and his gums turned pink again — a good sign.

Max stayed at the hospital for many weeks. The doctors and engineers checked his heart every day. His family learned how to care for the battery and clean the cable to prevent infections. Max had to be careful. He could not swim anymore, and he could not run as fast as before because the device needed to stay dry and safe. But Max adapted. The engineers adjusted the pump so Max could live more comfortably.

A few months later, Max returned home. He could not play exactly like before, but he was happy. He chased tennis balls slowly, slept in the sun, and stayed close to his family. Thanks to science, medicine, and love, Max had a second chance at life.

TAS	K 4	IC	
Fill	in	the	blanks.

1. On sunny days, Max loved jumping into the cool near his house.		
2. Max's favorite game was, where he chased after balls his family threw.		
3. Because Max's heart was weak, it couldn't	blood through his body easily.	
4. The engineers built a special machine to	Max's heart so he could feel stronger again.	
5. After the surgery, Max was able to	slowly, but not as fast as before.	

TASK 4D

Read the mixed up sentences carefully and put them in the correct order to recreate the real story flow.

- A. Max's family learned how to take care of his battery and cable.
- B. Max's family decided to give him a second chance by trying the VAD.
- C. Max's breathing became easier after the surgery.
- D. Max became very tired and couldn't play fetch anymore.
- E. Biomedical engineers designed a special pump to help Max's heart.

1	 , 2-	3-	, 4-	. ,	5-	

TASK 4E

Read the sentences about Max's story.If the sentence can be answered "YES", write the sentence number inside the "Yes! Circle." If it is "NO" or "Not Sure", do not write anything.

- 1. Max's heart problem made him stop playing his favorite games.
- 2. Max probably needed help eating and walking after his surgery.
- 3. The engineers made the VAD device heavy so Max would move less.
- 4. After the surgery, Max's family had to learn some new skills to take care of him.
- 5. Max could swim again after he received the VAD.
- 6. Biomedical engineers probably studied other animals before working with Max.
- 7. Max's new device worked together with his real heart, not instead of it.
- 8. Without the surgery, Max might have gotten better on his own.
- 9. Max's family loved him very much and wanted him to live longer.
- 10. Max needed to visit the hospital often even after coming back home.



TASK 4F

Think about how Max feels at different moments. Talk with your partner and fill in each part with the feeling words that match.

Part 1 – Max's Life Before	
Max plays, runs, and sleeps by the fire.	
→ Max feels:	
Part 2 – When Max Gets Sick	
He is tired and cannot play or climb stairs.	
→ Max feels:	
Part 3 – After the Surgery	
The pump starts working. Max can breathe more	e easily.
→ Max feels:	
Part 4 – Back at Home	
Max plays again, stays with his family, and enjoy	rs the sun.
→ Max feels:	

REAL LIFE TASK

TASK 5

You have just opened a new pet health clinic that specializes in biomedical engineering treatments for pets. Your task is to create an advertisement for your clinic and present it to the class.

Clinic Name & Logo:

- Create a name for your clinic.
- Design a simple logo for your clinic (you can draw it, or describe it).

Services:

In your advertisement, explain three or more services that your clinic offers. These services could include things like:

- Prosthetics for pets with missing or injured limbs
- Heart devices like ventricular assist devices (VADs)
- Surgeries (e.g., for heart conditions or organ replacement)
- Consultations with engineers and vets
- Recovery plans and physical therapy
- Specialized medical technology for pets' health needs

Clinic Benefits:

Explain why pet owners should choose your clinic:

- What makes your clinic special?
- How do you use technology and innovation to help animals?
- What makes your clinic different from others?

Presentation Format:

- Flyer: Create a simple flyer (hand-drawn or on a computer).
- Video: Record a short video explaining your clinic's services. You can act as the clinic's director or advertiser and talk directly to the camera.

VOCABULARY

TASK 6A

Draw a line to match each word to its meaning.

Words	Meanings
1. leather	a leg or an arm
2. amputate	when part of the body freezes from cold
3. afford	strong skin from an animal
4. hooves	a health problem
5. condition	to have enough money to buy something
6. calf	a baby cow
7. frostbite	the hard part on a horse's or cow's foot
8. adapt	to live with a new situation
9. limb	to cut off a body part
10. fancy	special, expensive, beautiful

TASK 6B

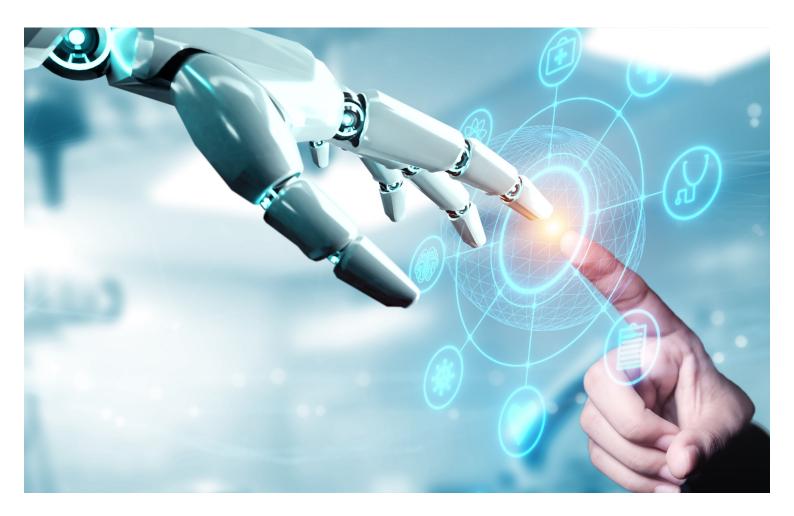
You will play a memory game in a circle or in small groups.

- 1. The first student says one vocabulary word from the unit (for example: "prosthetic").
- 2. The second student repeats the first word and adds a new word (example: "prosthetic, device").
- 3. The third student repeats both words and adds a third word (example: "prosthetic, device, engineer").
- 4. Each student must repeat the full chain and add one new word.

If a student forgets a word or says the wrong order, they are out of the round.

The last student remaining wins the game





MODULE 4 THE FUTURE OF HEALTHCARE

UNITS

- **10** | ROBOTS THAT CARE
- 11 MIND AND MACHINES
- 12 BUILDING TOMORROW'S HUMANS

In this module, you will be able to:

- · Identify the robots being used in hospitals
- · Understand the difference between biomedical engineering and neuroengineering.
- Explore how memory can be manipulated, boosted, or erased using biomedical tools.
- · Work collaboratively to design, present, and explain innovative healthcare solutions using robotics and technology.

Key Concepts

- Robotic Surgeon
- · Neuroengineering
- Digital Immortality

UNIT 10 ROBOTS THAT CARE

In this unit, you will be able to:

- · Identify the robots being used in hospitals
- · Comprehend the role of the robots in surgeons
- · Discuss how robot pets can be used for treatments
- Compare the benefits and challenges of using robot assistants in hospitals.
- Share personal opinions about robot helpers and discuss emotional reactions to robot care.

Key concepts:

- · Robots in hospitals
- · Robotic surgeon
- · Robot pets



WARM UP

TASK 1

Discuss in pairs:

- -Which of these jobs do you think robots can do? Which ones can't they do? Why?
- -How would you feel if your teacher was a robot? What about a robot doctor? Would you feel safe if a robot doctor did your surgery? Why or why not?









READING

TASK 2A

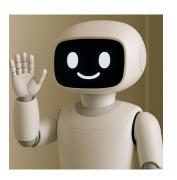
Read the short news story aloud in your group. Choose one role below and do not tell the other group members. Discuss the question according to the role you chose. Speak like your character, and after the discussion, guess each other's roles.

ROBOT NURSE HELPS IN TURKISH HOSPITAL

By Kate Willson

Published on May 7, 2025

Istanbul – A hospital in Turkey is now using a robot nurse called MediBot. The robot can move on wheels, talk to patients, and give medicine. It has a screen with a friendly face and speaks in simple language. Doctors say MediBot helps nurses by doing small tasks like checking temperature and reminding patients to take their medicine. Some patients like the robot because it is polite and never tired. But others miss real people. Experts believe robots like MediBot will be used in more hospitals in the future.



Roles:

- 1. A happy patient who loves MediBot
- 2. A nurse who is worried about robots
- 3. A patient who feels lonely with robots
- 4. A hospital manager who thinks robots are the future

Questions:

- 1. Should all hospitals use robots like MediBot? Why or why not?
- 2. Can robots really understand patients' needs and feelings?

Patient 1



My name is Anna. I've been staying at CityCare Hospital for a week now because I had surgery on my leg. I still can't walk properly, so I need help with simple things like getting medicine, drinking water, and doing small leg exercises. When I first arrived, I thought a nurse would take care of me—and that's true. But what I didn't expect was that my nurse would be... a robot! The robot's name is MediBot. It's small and white, moves quietly on wheels, and has a screen with a smiley face. Every morning at the same time, it comes to my room and says, "Good morning, Anna. Time for your medicine!"

MediBot checks my temperature, gives me pills, and sometimes reminds me to move my legs a little. It even offers to play music when I look bored or sad. At first, I felt nervous. I had never seen a robot in a hospital before. But after a few days, I started to feel better about it.

Now, I actually enjoy having MediBot around. It is always on time, and it never forgets any task. It doesn't get tired or upset like people sometimes do. In fact, I would say it's very smart, even though it doesn't talk like a real person. It helps the human nurses by doing small jobs, so they have more time for patients who need special care.

Hospitals can feel cold and plain, with white walls and quiet halls. But MediBot makes things feel a little warmer not because it has feelings, but because it makes life easier. I still like talking to real people, of course, but I believe robots like MediBot are good for hospitals. They aren't perfect, but they're very helpful.

Patient 2



Hi, I'm Yusuf. Last week, I broke my arm, and now I'm staying in the hospital to rest and get better. The nurses here are friendly and hardworking, but they are also very busy. Because of that, a robot named MediBot helps them take care of some of the patients, including me. MediBot brings me my medicine every day. It also checks my temperature and asks short questions like, "How do you feel today?" or "Do you want music?"

It's here to help the nurses with small jobs, like giving pills or reminding

people to drink water. That way, the nurses can focus on more serious problems.

At first, I thought having a robot helper was exciting. I had never seen anything like it. But after a few days, I began to notice its limits. For example, when I say something simple like, "Can I get more water, please?" MediBot doesn't really answer me. It just says the same sentence again: "I don't understand. Please wait."

It doesn't change how it speaks. It doesn't know when I feel sad or tired. It doesn't laugh or smile in a real way. That's when I realized how much I missed talking to a real person. Robots can't really understand emotions.

Still, I know MediBot is helpful. It does its jobs without stopping, and it never complains. It helps the hospital run more smoothly. But I don't think it can take the place of real people who listen, speak with feeling, and understand us.

Patient 3



My name is Leo. A few days ago, I had a small accident at work and hurt my back. The doctor told me to stay in the hospital for a few days and do special exercises to feel better. I thought a nurse or a therapist would help me, but instead, a robot named MediBot came into my room!

At first, I was surprised. It had a big screen and a soft voice. It showed me pictures and told me what to do. For example, it said, "Now raise your arms slowly. Great. Hold for five seconds."

It helped me follow a regular routine. Every day, at the same time, it reminded me to do my exercises. That made it easier for me to stay focused and not forget what I needed to do.

In the beginning, I wasn't sure I could trust it. It's not a person, after all. But MediBot also did other things to make me feel better. It played calm and relaxing music while I stretched my arms and legs. The music made me feel peaceful and helped with the pain. One night, when I couldn't sleep, it asked, "Would you like to hear the sound of rain or the sea?" I chose rain, and it helped me fall asleep.

MediBot also cleaned my room each morning with a small vacuum. It moved around the floor without bumping into anything. It may be a robot, but it gave me a lot of help during my stay here.

No, it didn't smile at me or ask how my family is doing. But it was very useful. It helped me stay on track with my recovery, and it made my hospital days a little easier. I still think human care is important, but I see how robots like MediBot can really help people not just with their bodies, but with their feelings too.

	n		п
	71		

Read the summary	and fill in	the blanks	using the	correct	words.	Use y	our own	ideas or	check t	he stor	ies
if needed.											

Anna had surgery on her	and needed help. The robot visited her every day, gave her,
and reminded her to move her l	s. At first, Anna didn't expect it, but later she found it Yusuf
had a broken He	so used MediBot, but sometimes it didn't understand him. He wanted to ask
questions, but the robot gave _	responses. He also preferred speaking to nurses. One
day, the robot didn't stop in time	nd almost hit a near his bed. Leo hurt his at work.
MediBot showed him how to do	aily and played music during the sessions. It also cleaned the
regularly. On one	ht, the noise it made woke him up, but later it played audio that
helped him rest. Although their	periences were different, all three patients said that MediBot was a useful
during their stay.	

TASK 2C

Work in pairs. What are three things that all three patients say, experience, or have in common about MediBot. What is different about each person's story? Complete the chart:

- 1-
- 2-
- 3–

Patient	What is different in their story?
Anna	
Yusuf	
Leo	

TASK 2D

Read the stories again. Work in pairs. Look at the emotions below. Find one sentence from each story that shows the emotion. Underline it and write. Share your answers with another pair.

feels confused because Comforted:	
Comforted:	
feels comforted because	_
Ignored:	
feels ignored because	
Surprised:	
feels surprised because	
Cared for:	
feels cared for because	
Frustrated:	
feels frustrated because	
Amused:	
feels amused because	

TASK 2E

Work in pairs. Read the questions and take turns answering them aloud.

After you finish, write two things: One thing your partner said that you found interesting and one thing you both agreed or disagreed on.

- 1. In a hospital, would you rather be helped by a robot or a human nurse? Why?
- 2. What are two things robots can do better than people?
- 3. What are two things people can do better than robots?
- 4. Do you think you would feel safe with MediBot? Why or why not?

Something your partner said that was interesting:

Something you both agreed or disagreed on:

TASK 2F

Work in pairs or groups. Design a robot that can help people. Talk about what it looks like and what it can do. Then, write your answers below.

1. Choose a name for your robot:
2. What does your robot look like? (Shape, size, screen, face?)
3. What are 3 things your robot can do? 1.
2. 3.
4. What is one thing your robot cannot do?
5. Will people like your robot? Why / Why not?
6. Draw your robot here!

WATCHING

TASK 3A

Discuss in pairs:

- 1. What do you know about Leonardo da Vinci?
- 2. Why might a hospital robot be named after him?
- 3. What do da Vinci and this robot have in common skills, tools, or ideas?
- 4. If you could name this robot something else, what would it be?





TASK 3B Watch the video and tick the words you hear that are connected to each person. Some may apply to both!

Word / Phrase	Sylvia (Patient)	Mary (Surgeon)
Lung surgery		
Opioids		
Simulator		
Two operations		
Laparoscopy		
Surgical robot		
Recovery time		
Small incisions		
Operating room		

10. The video was filmed in Germany. (____)

TASK 3C Watch the video again. Read the sentences about the video. They are in the wrong order. Number them (1–6) to show the correct order.
Dr. Maish arrived at Lake Forest and started learning about robotic surgery.
Sylvia had her first surgery with laparoscopy. It was painful, and recovery was slow.
Surgeons used open surgery with large cuts and long recovery times.
The hospital started using the da Vinci robot.
Robotic surgery was used for Sylvia's second operation. She had less pain.
Before robotic tools, doctors also tried laparoscopic surgery. It was better, but had problems with tools and
vision.
TASK 3D Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question:
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences.
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question:
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery?
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery? 1. Surgeons must use both hands and feet to control the robot. ()
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery? 1. Surgeons must use both hands and feet to control the robot. () 2.Dr. Maish started using the da Vinci robot after just one day of training. ()
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery? 1. Surgeons must use both hands and feet to control the robot. () 2.Dr. Maish started using the da Vinci robot after just one day of training. () 3. The da Vinci system helps surgeons see the body in 3D. ()
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery? 1. Surgeons must use both hands and feet to control the robot. () 2.Dr. Maish started using the da Vinci robot after just one day of training. () 3. The da Vinci system helps surgeons see the body in 3D. () 4. Patients always feel more pain after robotic surgery. ()
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery? 1. Surgeons must use both hands and feet to control the robot. () 2.Dr. Maish started using the da Vinci robot after just one day of training. () 3. The da Vinci system helps surgeons see the body in 3D. () 4. Patients always feel more pain after robotic surgery. () 5. Sylvia had two lung surgeries — one with a robot and one without. ()
Write T, F, or NM next to each sentence. In pairs, choose 2 of the true sentences. For each one, answer this question: Why do you think this part is important in robotic surgery? 1. Surgeons must use both hands and feet to control the robot. () 2.Dr. Maish started using the da Vinci robot after just one day of training. () 3. The da Vinci system helps surgeons see the body in 3D. () 4. Patients always feel more pain after robotic surgery. () 5. Sylvia had two lung surgeries — one with a robot and one without. () 6. The training program includes watching videos and using a simulator. ()

WATCHING

TASK 4A

With your partner, ask and answer the questions below. Take notes about your partner's ideas. Then, be ready to introduce your partner to the class.

- 1. If you could change one of your body parts with a robotic extension, which part would you choose?
- 2. What would the robotic version be able to do?
- 3. Why do you want to change that body part?
- 4. How would it help in your daily life?
- 5. Could there be any problems or side effects?

Partner's Name:
Robotic Body Part:
What can it do?:
Why did they choose it?:
Possible problems?:

c) Using it as a weight-loss cheat

TASK 4B Watch the video and cho	ose the correct answers.		
1. Where are tourists using	g robotic exoskeletons?		
a) Mount Everest	b) Mount Tai	c) The Great Wall	d) Mount Fuji
2. What are the robot dogs	s doing in the video?		
a) Guiding tourists	b) Carrying hiking bags	c) Delivering snacks	d) Filming the journey
3. Who mainly rents the ro	obotic suits?		
a) Professional athletes	b) Tour guides		
c) Elderly visitors	d) Mountain reso	cue teams	
4 . How long can the robot	ic suit battery last?		
a) 2.5 hours	b) 5 hours	c) 8 hours	d) 12 hours
5. What is one funny comi	ment mentioned in the vide	o?	
a) Using it for climbing a	at home b) Usin	g it instead of a bicycle	

d) Using it to win a marathon

TASK 4C

Look at the list of robot ideas below. Discuss with your partner:

- 1. Which ones are most useful?
- 2. Which ones are fun but not very necessary?

Together, choose your Top 5 robots and write them in order (1 = most useful). Explain to the class why you chose your top robot.

Robot Ideas List

- A robot that helps you walk uphill (____)
- A robot that carries your schoolbag (____)
- A robot that cleans your room (____)
- A robot that walks your dog (____)
- A robot that helps you study (____)
- A robot that cooks for you (____)
- A robot that plays music for you (____)
- A robot that does your homework (____)
- A robot that helps old people walk (_____)
- A robot that carries shopping bags (_____)



LISTENING

TASK 5A

Look at the sentence starter: "A pet can help people when..." In pairs, think of 2–3 different situations where a pet helps someone. Write your ideas or draw them on sticky notes. Share your favorite idea with the class.



TASK 5B You will hear a list of things about Paro the robot pet. Listen carefully and tick only the things that Paro can do.

Respond to human touch	☐ Make people remember the past
☐ Clean hospital rooms	Answer personal questions
Help people sleep better	☐ Help reduce stress
☐ Bark and meow like a dog or cat	☐ Walk to the kitchen
☐ Show emotions like sadness or anger	React to people's voices

TASK 5C Listen to the track again and fill in the blanks.

1. Paro is shaped like a small animal, not like a machine.
2. The idea for Paro began in, where it was developed.
3. It gives emotional support to people with memory conditions like
4. In some care homes, older adults feel isolated or even
5. The robot can move and react when it hears a or feels a touch.
6. You don't need to take care of Paro like a real pet it runs on
7. Paro is already helping patients in the USA, Australia, and
8. According to a nurse, Paro makes some people laugh or even
9. Care workers are often busy, so Paro gives patients something to during quiet times.
10. Experts describe Paro as a tool for healing feelings, they call it emotional

TASK 5D

Work in pairs and look at the world map together. Mark countries where Paro is used. Discuss and add 2 new countries where Paro could help. Write one short reason for each country you marked.



First country:		
Reason:		
Second country:		
Reason:		

TASK 5E

Work in pairs and choose a patient profile card. Talk together: How did the patient feel before Paro? What changed after? Create a short diary entry with 3–4 lines per person. Perform it for the class one as the patient, the other as the interviewer or nurse.



Mrs. Kato, 82
Used to have a cat



Mr. Amir, 77Lives far from his children



Maria, 69Feels nervous in hospitals



Kenji, 75Used to sing in a choir



Fatma, 84Lost her dog last year



Luis, 71Has dementia



Nina, 65Used to be a teacher



Tom, 73Doesn't like talking to people

- 1. Mrs. Kato 82 years old, used to have a cat. She misses having someone to talk to and often feels silent and sad.
- 2. Mr. Amir 77 years old, lives far from his children. He watches TV all day and rarely speaks unless someone visits.
- 3. Maria 69 years old, feels nervous in hospitals. She doesn't like machines and doesn't trust technology.
- 4. Kenji 75 years old, used to sing in a choir. He feels embarrassed singing now and stays quiet most days.
- 5. Fatma 84 years old, lost her dog last year. She sometimes cries at night and says she feels forgotten.
- 6. Luis 71 years old, has dementia. He often gets confused and asks the same questions again and again.
- 7. Nina 65 years old, used to be a teacher. She feels bored and misses being active or helping people.
- 8. Tom 73 years old, doesn't like talking to people. He prefers silence but still feels something is missing.

REAL LIFE TASK

TASK 6

Work in groups. Then present your robot to the class.



Your hospital has formed a new Technology Innovation Team. You are part of this team. Your job is to evaluate robot options and propose the best one to the hospital board.

You have a budget of \$12,000 to buy one robot assistant. You must choose a robot that fits a real hospital need and justify your decision.

Choose one that your hospital is dealing with right now:

- A. Elderly patients with memory loss (need emotional support + reminders)
- B. Children who are scared during hospital stays
- C. Overworked nurses in busy units
- D. A new high-tech surgery department that needs extra precision

Each feature has a cost — more advanced features cost more money. You must stay under \$12,000 total:

Feature	Cost
Basic movement (wheels/legs)	\$2,000
Voice response (yes/no, hello/goodbye)	\$1,500
Natural conversation (can answer questions)	\$3,000
Music or sound therapy system	\$2,000
Animal-like appearance (fur, cute sounds)	\$2,000
Medication reminders	\$2,500
Facial recognition	\$2,000
Hug feature / physical contact	\$1,500
Screen with touch control + expressions	\$1,500
Sterilization & cleaning functions	\$3,500
Data tracking (for nurses/doctors)	\$2,000
Emotion recognition (reads patient mood)	\$3,000

Team Proposal Sheet			
Hospital Team:		_	
Chosen Hospital Situation (A–D):			
Robot Name:			
Selected Features:			
•			
•			
•			
•			
Total Cost: \$			
-Why did you choose these features?			
- Write 3–4 sentences explaining how th	is robot will solve	the problem.	

VOCABULARY

TASK 7

Work in pairs. One student from each pair comes to the board. The teacher says a word, write it in the center and quickly add five related words around it. When you finish, shout "Apple!" The first student to finish with all correct words wins the round.

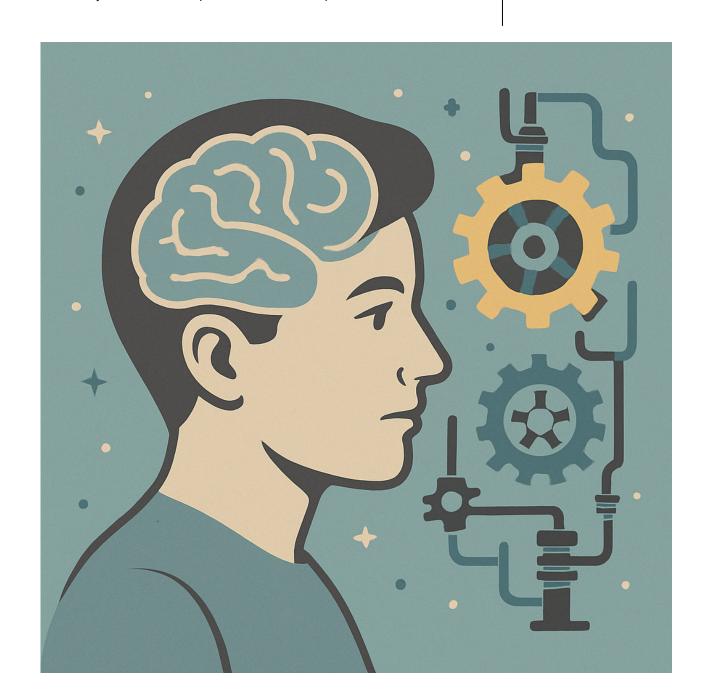
UNIT 11 MINDS AND MACHINES

In this unit, you will be able to:

- Understand what digital twins are and how they are used in healthcare.
- · Explain the difference between biomedical engineering and neuroengineering
- Compare real-life medical uses of digital twins, neuroengineering, and CDSS with their fictional or sci-fi portrayals.
- · Analyze how CDSS helps doctors make better patient decision

Key concepts:

- · Digital twins
- · Neuroengineering
- Clinical Decision Support Systems



WARM UP

TASK 1

In pairs, read the interesting facts below about machines and minds. For each fact, discuss the related questions with your partner. Be ready to share your ideas with the class.

In 2006, a man with paralysis used a robotic arm controlled by his brain to drink coffee.

- What object would you like to control with your brain?
- How could this help people in daily life?



In 2023, scientists used brain signals to recreate part of a song ("Another Brick in the Wall") with artificial intelligence.

- Which do you think your brain signals recreate? Why?
- If a machine could hear your thoughts, would you like it? Why or why not?



READING



In 1996, scientists in Scotland created a sheep named Dolly.

She was the first animal cloned from the DNA of another sheep meaning she was a genetic copy, not born the usual way.

This was not a robot or a computer, but a real, living copy of a body.

TASK 2A

Read about Dolly the sheep the first cloned animal made from DNA and discuss in pairs:

- 1. If we can copy a body with biology, should we also copy it with technology?
- 2. A) Name 1 benefit and 1 danger of cloning.

That means one day, your twin could text you:

"Hey!! You're dehydrated. Drink water. And maybe stop doomscrolling."

- B) Explain the difference between a real and a digital copy.
- C) Would your clone still be you?

_	
Okay, imagine this: You're about to take a new medicine. It might help. Or it might give you a headache, a rash, or well, worse. But wait what if your doctor could test that medicine on <i>you</i> first? Not the real you. The <i>other</i> you. Your digital twin. Yes, that's a thing now. Welcome to the weird but very real world of biomedical engineering, where science fiction is now just science. 2	
3 Ever seen <i>Iron Man</i> ? Tony Stark builds suit after suit but only after running 3D to a digital twin, superhero-style. Or remember <i>Baymax</i> from Big Hero 6? He scans and gives personalized care advice. That's the vibe. In <i>Black Panther</i> , Shuri uses to plan surgeries and control machines. Yep, same idea. These movies are fun, documentary.	s you, analyzes your data s super-smooth holograms
4	guessing or going with tria twin before doing anything ratch how a disease might ast some textbook average asay using a digital twin is
5 We're working on it. Some scientists are creating digital brains to understand all Alzheimer's. Others are building full-body models muscles, bones, maybe even smartwatches fitness trackers, and even smart socks (yes, those exist) can be a smart socks.	en your weird knee click.

6	
owns your to complex as and classroot they're also background	ital twins do raise some big questions and no, you're not the only one wondering. Who actually win? Is all that personal health data truly safe? And can a machine really understand something as you? These aren't just science fiction dilemmas; they're real debates happening in labs, hospitals, oms right now. That's why biomedical engineers aren't just busy coding or building digital hearts thinking deeply, testing carefully, and working under strict rules. And yes, somewhere in the there's always an ethics professor sipping coffee and asking, "But should we?"
soon. But w plan a safer pancreas. S smartest ve	twin won't replace you. It's not going to walk your dog, take your finals, or do your laundry anytime what it can do is pretty incredible. It might save you from the wrong treatment, help your doctor surgery, or even add a few extra, healthier years to your life. Not bad for a glowing outline of your so, the next time you hear the term "digital twin," don't imagine a creepy sci-fi clone picture the resion of you, living on a screen, crunching your data, and quietly making sure you stay alive and pat's a tech upgrade worth keeping.
	ticle. Then, match each paragraph with the correct headline below. Write the correct 7) next to each headline.
a. "Can yo	ur digital twin remind you to drink water?" ()
b. "When բ	oractice makes perfect — on someone else's heart" ()
c. "What if	your doctor met you before meeting you?" ()
ç. "Cool, b	ut who's really in charge here?" ()
d."When s	science fiction forgets it's fiction" ()
e."No, it w	on't take your finals. But it might save your life." ()
f. "The yo	u that doesn't bleed, but still tells the truth" ()
	ticle carefully again. Then, in pairs discuss the questions below. Use clues from the language, ourpose of the text to support your answers.
a) A unive b) A patie	of the following is the most likely original context for this article? ersity-level biomedical engineering textbook, written for future professionals nt education leaflet available in hospital waiting rooms all media article designed to engage curious teens and young adults in science topics ereviewed research article published in a medical engineering journal
d) A peer-	;

		-
		-
4. Find two	expressions that show the writer is using humor or pop culture to engage the reader.	
		-
		-
5. Would th	is article be suitable for a professional doctor's conference? Why or why not?	
		-

TASK 2D

It:

Read the sentences taken from the article. Then, decide what each underlined word refers to in the original text. Write your answer in a short phrase.

1. It lives in a computer.
It:
2. They can try treatments on the model first.
They:
3. This version doesn't eat snacks.
This:
4. These may look futuristic, but they're not so different from what hospitals are doing today
These:
They:
5. That's why biomedical engineers aren't just busy coding or building digital hearts.
That's why:

6. It might save you from the wrong treatment.

TASK 2E

Work in pairs. Choose one movie mentioned (Iron Man, Big Hero 6, or Black Panther). Use the article and your own short research to compare how digital twin–like systems are shown in movies and how they are used in real medicine. Complete the chart with short notes.

Feature / Function	In Movies (Fictional Example)	In Real Life
Who uses the system		
What the system looks like		
What the system is used for		
How the system gives feedback or suggestions		
Can it be updated in real time?		
Is it connected to real body data?		
Is it humorous, dramatic, or realistic?		

LISTENING

TASK 3A

You and your partner will roll two virtual dice. One dice gives you a body part, and the other gives you a type of technology. Match your dice numbers with the lists below. Then, use your imagination and design a futuristic tool, system, or invention that connects them. After that, answer the questions and share your idea with another pair.

- » Would you want this technology in/on your body? Why/why not?
- » Who would this help most? Young people, older people, athletes, students?
- » Could this tech be dangerous or helpful?
- » What could go wrong with this idea?
- » Would it exist in real life or is it more like science fiction?

Dice 1	Dice 2
1. Brain	1. Smartwatch
2. Eye	2. Robot Arm
3. Heart	3. Mobile App
4. Arm or Hand	4. Al Voice Assistant
5. Skin	5. Camera System
6. Spine	6. Health Sensor

TASK 3B

While you listen to the podcast, circle only the words you actually hear mentioned.

digital twinEEGliversensorsbrain signalssurprisesspaceneuronsartificial organkidneysmart implantMRI



TASK 3C

Listen to the conversation again and write whether the information is explained by Nina or Robert.

Talks about building a digital twin of the heart $ ightarrow$
Works with brain signals to control robotic limbs $ ightarrow$
Makes a joke about modeling blood flow in the brain \rightarrow
Says kidneys are easier to model than the brain \rightarrow
Says biomedical engineering is the "big umbrella" \rightarrow
Says brain computer interfaces are no longer science fiction →

TASK 3D

Read the sentences below. Decide whether each task or technology is related to Biomedical Engineering or Neuroengineering.

- 1. Studies how brain signals can control movement
- 2. Creates a virtual model of a human heart to test surgery methods
- 3. Designs the structure of a robotic limb
- 4. Uses EEG to help people speak through technology
- 5. Builds smart implants that monitor your body and send data to a phone
- 6. Translates brainwaves into digital signals for prosthetic control
- 7. Models blood flow inside the brain
- 8. Develops hospital software for digital health systems
- 9. Connects thought-based commands to external devices
- **10.** Combines artificial intelligence with body simulation tools
- 11. Uses sensors to gather data for virtual organ models
- 12. Researches new methods for helping people with speech loss due to brain injury

Biomedical Engineering	Neuroengineering

TASK 3E

With your partner, read each statement below. Decide together whether you agree or disagree with each idea. Discuss your reasons and write one shared explanation using examples or ideas from the podcast. Present one of your answers to the class.

Statement	Agree / Disagree	Our Reason
Neuroengineering is more unpredictable than biomedical engineering.		
2. Digital twins will become common tools in hospitals.		
3. Biomedical engineers focus more on practical tools, while neuroengineers work with theory.		
Technology from sci-fi movies can inspire real medical innovation.		
5. The brain is too complex to be fully copied as a digital twin.		
6. Every biomedical engineer should study neuroengineering too.		

WATCHING

TASK 4A

Work in pairs. Read the medical situations below. Decide who should make the decision in each case: a doctor, a smart computer system, or both together. Then explain your reasons. Choose one situation and act it out for fun. Imagine what the doctor or the system might say!

- 1. A patient has rare symptoms that no one in the hospital has seen before.
- 2. A nurse needs to quickly check if two medicines will interact dangerously.
- 3. A patient has depression but their test results are "normal."
- 4. The hospital wants to reduce mistakes in daily patient care (like wrong dosages).

TASK 4B

Read each word or phrase from the video. Then choose the best meaning (A, B, or C) based on how it is used in context.

1. Adverse drug	errects
------------------------	---------

A. Positive effects

B. Side effects

C. Lab results

2. Clinical workflow

A. Hospital schedule

B. Daily doctor process

C. Surgery type

3. Confidentiality

A. Cost savings

B. Keeping information private

C. Record sharing

4. Spitting out a diagnosis

A. Saying it quickly

B. Instantly generating it

C. Sending by email

5. Relevant data

A. Information related to the patient's case

B. General hospital info

C. Cost details

6. Integration (of systems)

A. Removing old systems

B. Connecting different systems

C. Building hardware

7. Overwhelmed

A. Bored with the system

B. Confused due to too much data

C. Energetic

8. Decision support

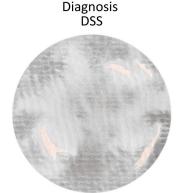
A. A system that makes choices for doctors

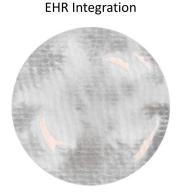
B. A system that helps doctors decide

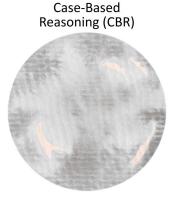
C. A therapy method

TASK 4C

Write 5 key words or short phrases inside the circle that describe what it does, how it works, or what makes it important based on the video.







TASK 4D

Sort the following ideas into benefits or concerns about CDSS and EHRs, based on the video.

Ideas	Benefit / Concern	
1. Faster access to patient information		
2. Possibility of disrupting clinical workflow		
3. Helps avoid prescription errors		
4. Worries about data privacy and confidentiality		
5. Suggests diagnostic options based on symptoms		
6. Too much data can overwhelm clinicians		

TASK 4E

Discuss these questions in pairs. Be ready to share one answer with the class.

- 1. If you were a patient, would you feel safe knowing your doctor used CDSS? Why or why not?
- 2. Should doctors always follow what the system suggests? Explain.
- 3. Do you think digital tools like CDSS will replace some parts of a doctor's job in the future?

REAL LIFE TASK

TASK 5

Go to the e-Devlet symptom checker. (https://giris.turkiye.gov.tr/Giris/gir)
Choose 1–2 common symptoms (e.g., sore throat, dizziness, stomach pain).
Let the system suggest:

- Possible illnesses
- Which hospital department you should visit

Then, in English, write a short summary (3–4 sentences) explaining:

- What symptoms you entered
- What the system suggested and whether you agree with it or not (and why)
- Your overall experience and thoughts about using the application



VOCABULARY

TASK 6

Work in pairs.Look at the words below. For each word, choose a color that you think matches the meaning or feeling of the word. Add two more words from this unit. When you finish, compare your colors and reasons with your partner.Are your choices the same or different?

Word	Color Chosen	Why This Color?
diagnosis		
various		
consider		
disrupt		
humorous		
dilemma		



UNIT 12 BUILDING TOMORROW'S HUMANS

In this unit, you will be able to:

- · Understand the role of biomedical engineers in developing new medical technologies.
- · Discuss futuristic medical concepts such as digital immortality, brain-computer
- · interfaces, and CRISPR.
- · Explore how memory can be manipulated, boosted, or erased using biomedical tools.
- · Evaluate ethical and social questions raised by technologies that alter the human
- · body and mind.

Key concepts:

- · Digital twins
- · Neuroengineering
- Clinical Decision Support
 Systems



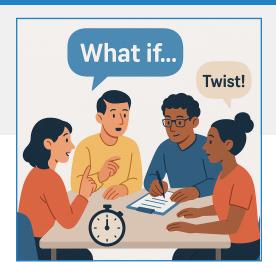
WARM UP

TASK 1

Work in small groups. Your teacher will read a strange "What if..." question about the future of medicine. Your group has 1 minute to discuss and write a creative answer.

Listen to the "What if..." question and discuss quickly. Then listen to the surprise "Twist!" challenge and write one more idea under your first answer.

- What could happen if this were real?
- Would it be good or bad?
- Who would use it?



WATCHING

TASK 2A

Imagine you are biomedical engineers designing a new genetically modified cat. Your cat must be helpful to humans. Use your imagination and draw your cat. Then, present your cat to your pair.

1. Surprise Feature:	to humans. Use your imagination and draw your cat. Then, present your cat to your pair.	
	1. Surprise Feature:	

3. A Little Problem:

2. Funny Habit:

4. Strange Behavior:		

TASK 2B

As you watch the video, listen for any numbers (years, statistics, amounts, percentages...). Each time you hear a number write it down. After the video, work with your partner to explain what each number means.

Number	What does it refer to?
2011	
90%	
	The number of medical conditions linked to mutations
2	
	The number of studies suggesting CRISPR might cause cancer
6	

TASK 2C

Watch the video again. All the key moments from the video are out of order. Your job is to rebuild the timeline. Work in groups. Decide what happened first, next, and last. Line them up in the correct order and explain why.

» A scientist edits two human embryos using CRISPR. ()
» Jellyfish genes are added to cat DNA. ()
» CRISPR cuts a mutation in DNA. ()
» Scientists try to make cats resistant to a disease. ()
» Modified babies are born. ()
» CRISPR finds the target gene. ()
» Healthy DNA is inserted to repair the gene. ()
» Scientists get the protein from bacteria. ()

TASK 2D

Take one minute to think about the events in the video. Then, with your group, start from the final event and work backward. Explain what had to happen before each step.

Retell the whole story in reverse order, going back 4–5 steps. Be sure to include extra details from the video to show your understanding.

tr	video to show your understanding.
	A :
	3.
	k.
	j.
).).

TASK 2E

Work in pairs and create a mini comic or diagram showing the steps of how CRISPR edits a gene and discuss the questions:

- 1. What does CRISPR do in Step 1?
- 2. Why does the DNA need to be cut?
- 3. What happens after the cut is made?
- 4. Do all the cells in the body get changed? Why or why not?

Step 1	Step 2	Step 3

TASK 2F Look at the traits below. For each one, decide with your pair: Delete, keep or upgrade.

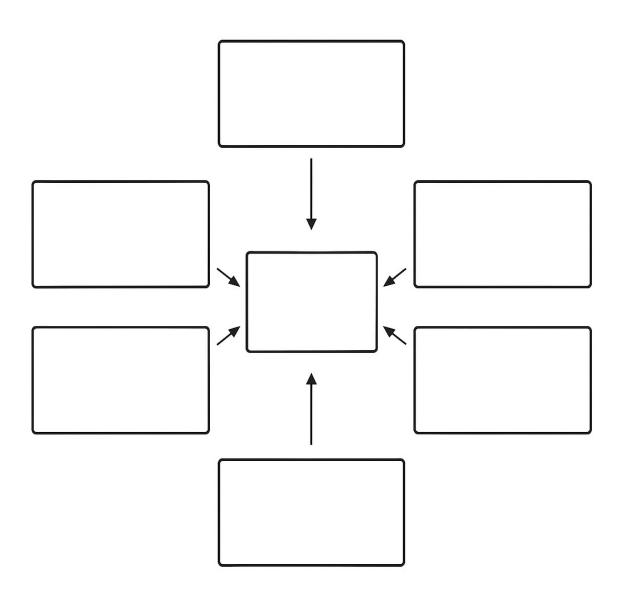
Trait	Delete / Keep / Upgrade?	Why?
Nearsightedness		
Baldness		
Fear		
Allergies		
Sadness		
Forgetfulness		
Shyness		
Anger		
Intelligence		
Aging		
Need for Sleep		
Body Odor		
Jealousy		
Physical Strength		
Sense of Humor		

READING

TASK 3A

Watch a scene from Eternal Sunshine of the Spotless Mind, Eternal Sunshine of the Spotless Mind where Joel Barish decides to erase memories of a past relationship. Now, work in pairs and discuss the questions below. Draw a mind map around that memory. What objects, sounds, places, or people are connected to it?

- 1. What would be the emotional pros and cons of erasing a painful memory?
- 2. If you could erase one memory, would you do it? Why or why not?



For over a century, scientists have tried to understand how our memories work. Now, they are not just studying memory they're learning how to manipulate it.Researchers believe that memories live inside the brain in special groups of neurons called engrams. These are physical networks that "hold" memories by strengthening the connections between neurons. When you remember something, your brain is actually replaying those strengthened paths. But what happens if we could change those paths?

In a recent experiment, scientists removed a fear memory from mice. The memory was connected to an electric shock. By removing certain neurons in the brain's emotional center the amygdala researchers successfully deleted the specific memory of fear. The mice no longer remembered the pain. Even more surprising, other studies have implanted false memories into mice. In one test, scientists first gave a mouse a positive experience in a "safe" cage. Then, in a new cage, they gave the mouse an electric shock but while doing this, they activated the memory of the safe cage. As a result, the mouse began to fear the safe cage, confusing the memory of safety with pain. These experiments show that memory can be moved, confused, or erased. What about humans?

Some people with epilepsy have electrodes in their brains for treatment. Scientists used this opportunity to test whether electrical stimulation could help memory. With the help of machine learning, they measured how well people were learning. When the system noticed weak learning, it sent a small signal to the temporal cortex the brain's memory area. The result? People remembered more. In the future, this technology might help us boost memory, prepare better for exams, or even reduce the pain of traumatic experiences like PTSD. But there is a deeper question:

If memories can be changed, erased, or created...

choose the correct word.

Can we still trust them? According to one study, 47% of people believe that a memory stays the same once it's formed. But modern science says that memories are flexible they can evolve. If our memories define who we are... what happens when they're no longer real?

TASK 3A Complete the summary of the reading using the words from the box. Use the context to help you

Scientists now believe that (1) a	re physical groups of (2) t	hat store me	mories in the
brain. In a recent experiment, scientists mana	aged to (3)	a specific (4) _		memory in
mice by targeting the (5), which	is the brain's emotional	center.		
In human studies, people with (6)	_ had electrodes impla	nted in their bra	ins. Researd	hers used (7)
to detect poor learning moments	s and applied electrical	(8)	to the (9) _	
to improve recall. These experiments sugges	t that even human (10)	ca	n be manipu	lated, raising
both exciting and troubling possibilities for the	e future.			

TASK 3C

Write a news-style headline based on the reading, as if for a science magazine.

TASK 3D

Below are some comments. If the comment is the kind of thing a real reader might say after reading the article, circle it. If it's unrelated or not the type of comment someone would make about the article, don't circle it. Think like a thoughtful reader!

- "I think the idea of erasing a memory is scary."
- "Memory is such a deep topic we all have one."
- "The article says 47% of people believe memories don't change that surprised me."
- "Scientists today are always doing strange things with animals".
- "I never knew memories could be confused or moved that's wild."
- "People with epilepsy sometimes have to take medicine every day."
- "Scientists used brain stimulation to help people remember better."
- "I wonder if this technology could one day help students with memory loss or PTSD."
- "It's amazing how our brains work. We still don't understand everything."
- "The article explained how memories are stored in engrams. That was interesting."

TASK 3E

Read the final line of the article again. Then, complete the sentence in your own words. Write 3–5 sentences sharing your thoughts. You can agree or disagree. Then, compare your answer with a partner.

"If our memories define who we are... what happens when they're no longer real?"

TASK 3F

Work in pairs and pick a memory card from the pile. One student is the Memory Holder (they remember the real event), and the other is the Edited Person (they remember the event with 2–3 changed details). Roleplay a short conversation where the Memory Holder tries to correct the Edited Person, but the Edited Person defends the false memory. After the conversation, switch roles and pick a new card to play again. Make sure you both get a turn in each role.



LISTENING

TASK 4A

Watch the video and discuss in pairs:

- 1. Imagine someone makes a perfect digital copy of your brain all your thoughts, memories, and feelings and puts it into a computer. Is that copy still you? Why or why not?
- 2. Would you accept this technology if it promised you digital immortality living forever in a machine? Why would you accept or reject it?
- 3. If biomedical engineers help copy your brain, what health or safety problems do they need to think about?



TASK 4B

Listen to the podcast. Work in two groups. Group A listens for how the brain is involved in digital immortality. Group B listens for what tools biomedical engineers are creating. After listening, pair up with someone from the other group and share your notes.

TASK 4C

Listen to the podcast again. Answer the questions. (Do not write more than 4 words)

1. What is digital immortality?
2. Who started the 2045 Initiative?
3. What did the U.S. woman create?
4. What does BCI stand for?
5. What does a BCI read?
6. What type of sensors do engineers design?
7. What do neural models simulate?
8. What is the goal of cryonics?
9. What materials do sensors use?
10. Who helps develop these tools?

TASK 4D

Match each person or field to the most accurate description of their role in the development or demonstration of digital immortality.

A. Dmitry Itskov	C. A U.S. woman
------------------	-----------------

B. Biomedical engineers D. Neural algorithms

- 1. Helped create digital simulations of brain function and interpret complex neural signals ____
- 2. Founded a project aiming to upload human consciousness to a non-biological platform ____
- 3. Built practical technologies like brain-computer interfaces, cryonic systems, and neural sensors ____
- 4. Used text data from a deceased friend to build an interactive digital persona ____

TASK 4E

Create a poster with your pair about Digital Immortality.

Add 4 main branches:

- People
- Technologies
- Goals
- Risks

Rule: You can only add items both of you clearly remember from the listening.

Examples to help you start:

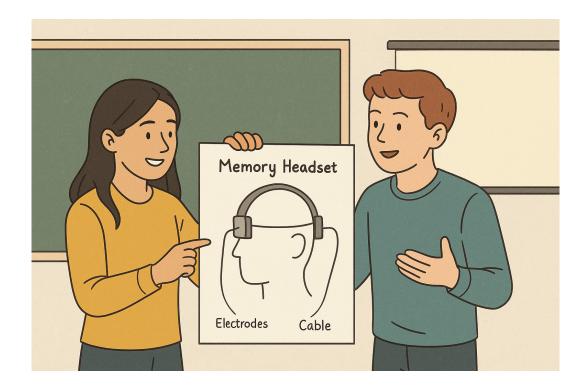
- People → "Dmitry Itskov"
- Technologies → "Brain-computer interfaces, cryonics"
- Goals → "Uploading consciousness"
- Risks → "Ethical concerns, unclear future"

Once your map is finished, swap with another pair and see if they agree with your items.

REAL LIFE TASK

TASK 5

Work in pairs. Imagine you are biomedical engineers creating a new device that helps with memory. First, give your device a creative name. Then, write 2–3 simple sentences explaining what it does and who will use it. Make a drawing of your device and label its important parts. Finally, prepare a short presentation (about 2 minutes) where you explain your idea to the class.



VOCABULARY

TASK 6

Read the story below. Then, write your own ending using at least 3 words from this list:

manipulate, recall, boost, flexible, alter, compound, resistance, behavior, insert

"In a small hospital, a young biomedical engineer named Alex worked on a special glove. The glove was made to help people who had problems moving their hands. One night, Alex stayed late to test the glove. He put it on his own hand and turned on the machine. At first, everything seemed normal. But then, the glove started to move Alex's fingers by itself. His hand opened and closed without him doing anything. The lights on the machine blinked faster and faster. Suddenly..."