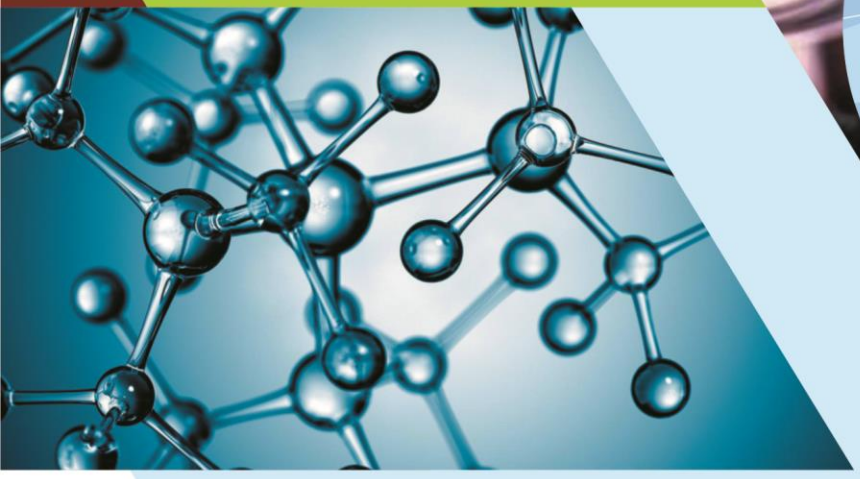
QUAID-E-AZAM ACADEMY FOR EDUCATIONAL DEVELOPMENT

Science

Lesson Plans

For Elementary School Teachers (Grade 6-8)



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This module is developed under Transformation in Access, Learning, Equity and Education Management (TALEEM) programme implemented through the financial support of Global Partnership for Education (GPE) and technical support from UNICEF as Implementing Partner Grant Agent. The training module is prepared for the professional development of teachers from middle schools established by School Education Department (SED) under Afternoon School Programme (ASP). QAED will also use these modules for the professional development of all middle school teachers in the province.

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FORWARD

Quaid-e-Azam Academy for Educational Development (QAED) is rendering its meritorious services in the field of teacher training from almost last 60 years. Since its inception, it is positively contributing to the professional development of teachers to achieve the quality of education in the province. The mandate of QAED is to conduct induction, continuous professional development, in-service, and promotion linked mandatory training of teachers and education managers.

Quaid-e-Azam Academy for Educational Development (QAED) being a training institution is not only catering to the training needs of the workforce of the School Education Department but also other government departments including Higher Education, Education Department of AJK, Divisional Public School Lahore, Thal Public School, Punjab Daanish Schools and Center of Excellence Authority, Punjab Education Initiative Management Authority (PEIMA), Teachers and Principals of schools run under Mines and Mineral Department, etc.

QAED was entrusted to develop Training Modules for Transformation in Access, Learning, Equity and Education Management (TALEEM) Programme. As Grant Agent for the Punjab Education Sector Programme Implementation Grant (ESPIG) of the Global Partnership of Education (GPE) the funding will be channelized through UNICEF's financial management system through a project approach. It is a five-year programme, in the first year (2022) of this programme a four-day refresher Professional Development Course was designed and conducted to polish the professional skills of Assistant Education Officers (AEOs). In the second year (2023), a six day training module for the teachers of Afternoon School Programme has been designed for the subject of Mathematics, English and Science. As the Afternoon School are the schools where the primary school teachers of morning classes will teach the students of elementary classes in the second shift. Consequently, these teachers need support in content and pedagogical skills. So, this training course has been designed in a way that would not only strengthen their subject knowledge but will also polish their pedagogical skills to teach these subjects. This training module is primarily based on the content of elementary level and the topics for the module have been identified by teachers of Afternoon School Programme through Training Need Assessment (TNA). This module has two section: section one has training sessions and section two has lesson plans.

QAED acknowledges and appreciates the commendable inputs of all the developers, reviewers and material development team of QAED in development of this training module.

GENERAL SCIENCE LESSON PLANS

Grade – 8	Lesson Plan 1: Human Nervous System	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Identify the organs, functions and processes of the Human Nervous System

MATERIALS

- Textbook General Science Grade - 8
- Multimedia
- Writing Board
- Poster of different parts of nervous system
- Marker / Chalk

INFORMATION FOR TEACHERS

1. Nervous system carries massages from one part of the body to another and coordinates body functions.
2. Central nervous system consists of a brain and a spinal cord.
3. Peripheral nervous system consists of a network of nerves which connects the central nervous system to all the body parts.
4. Sensory neurons carry messages from sense organs to the central nervous system.
5. Motor neurons carry messages from central nervous system to the muscles and the glands.
6. Inter neurons are present in the brain and the spinal cord. They form a link between the sensory neuron and the motor neuron.

INTRODUCTION

1. Start class with some interesting and simple questions to develop the interest of the learners.
2. Ask the names of different systems of the body(They will tell different names)
3. Which system do you think is the most important of them all?
4. Listen to their options, then ask;
5. Do all the systems of the body work independently or do they need some coordination?
6. Let them think, take few responses then ask;
7. Let's take an example of our school and tell that who controls the entire working of the school?(Headmaster/principal)
8. If the principal doesn't tell and check anything to each person how the things work on their own?
9. What will be its impact on school functions? (It will collapse)

10. Now ask that;
    - Is this central control important for all systems? (yes)
    - Is there any control system in our body, or does every system work on its own?
11. Take responses and conclude the introduction by telling them;

> Like other systems, our body functions are also coordinated and controlled.
> The system that coordinates and control our body functions, is called nervous system.

12. Now announce the SLO to them;
13. Today we will" identify organs, function and processes of the human nervous system".
14. Take a real-life object in hand, pro

∀ DEVELOPMENT

1. Proceed the lesson by asking questions from learners to recall their previous knowledge about how the systems are made.
2. Ask them:
    - What is the basic forming unit of living organisms?
    - What happens when different cells join?
    - How is an organ formed?
3. Write their responses on the board and make a sequence of the level of an organization.
4. Now relate this sequence to complete all levels for the nervous system and ask;
    - What type of cells make nervous system?
    - Name tissues of the Nervous system.
    - Do you know the name of any organ of the nervous system?
5. Write their responses on the board and complete the table.

Board Sample	
1. Level of cellular organization	
2. Organism	Human
3. Organ system	Nervous System
4. Organs	Brain
5. Tissues	Nerves
6. Cell	Neuron

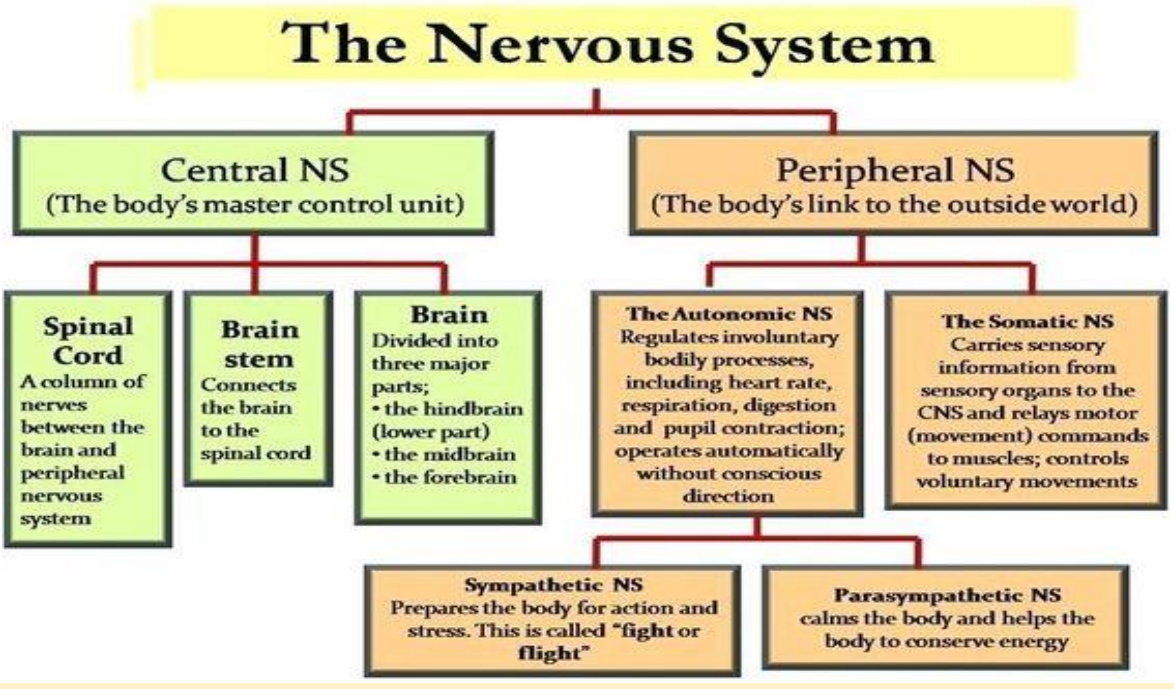
Activity 1:

1. Write their responses on the board and make a sequence of the level of an organization.
2. Now ask them;
    - Is the brain the only controller or are some other organs associated with it?
3. Divide them into pairs.
    - Ask them to see figure 2.1 from Textbook General Science at page#16, discuss with one another that how these different parts are mentioned in the figure control our body system.
    - Give 2-3 minutes for discussion, then ask 3-4 students randomly to tell their findings to

the whole class.

Activity 2:

1. Listen to their responses, then show them using a multimedia/laptop /poster of different parts of the nervous system and explain them in detail.



Explanation:

Nervous system has two main parts:

1. Central Nervous System
   It contains a brain, brain stem and spinal cord.
2. Peripheral Nervous System
   It contains all nerves which connect the brain to all the parts of the body.

Activity 3:

1. Switch off the fan (if it is summer) or open windows and doors (if it is winter).
2. Assume it is summer and the fans are off.
3. Students will ask to switch on the fan.
4. Ask them, why?
5. Ask them how our brain gets to know that it is hot
6. How our hands get to know that we have to switch it on again?
7. Take their responses and then explain them the process that how the nervous system works.
8. Take the same example of feeling hot and write all the steps on the board, starting from the stimulus till the response.

Situation. Feeling hot is called a	**Stimulus Heat**
Stimulus is sensed by our sense organs called	**Receptors Skin**
Receptors send message to brain through	**Sensory neurons**

Message is processed by	**Brain**
Brain send signal through	**Motor neurons**
Action is taken by	**Effectors** **hand and legs muscles**
Action is called	**Response** **you go to switch on fan**

9. Ask them to open Text book science page #19, 20.
10. Ask them to label the figure 2.6 with all stages (stimulus, receptor, Brain, effecter and response).

CONCLUSION / SUM UP/ WRAP UP:

1. Summarize all the points involving learners with you.(see information)

∃ ASSESSMENT

1. Ask them to work in pairs and do activity 2.1 from Textbook General Science 8.
2. Now ask them to write difference between
   - Receptors and effectors
   - Sensory neuron and a motor neuron

% FOLLOW UP

1. Ask them to draw a flowchart on their note books to show different parts of the nervous system.

Grade - 8	Lesson Plan 2: Human Nervous System	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Map various steps involved in the transmission of a reflex arc.

MATERIALS

- A hot cup of water or tea.
- Head bands of key words of reflex arc.
- Multimedia/laptop/poster
- Board
- Marker/chalk.
- Textbook General science 8

INFORMATION FOR TEACHERS

Types of actions controlled by the nervous system;

- **Voluntary actions.**
  - Actions performed under a conscious control. These actions involve thinking. For example; speaking, eating, reading, walking etc.
- **Involuntary action**
  - The body actions which are performed without the involvement of thinking process are called involuntary action. For example; breathing, blinking of eyes, digestion of food etc.
- **Reflex Action**
  - An immediate and involuntary response to a stimulus is called a reflex action.
  - Example: Quick pulling away of hand just after touching a hot object.
- **Reflex Arc**
  - The pathway of nerve impulse which completes a reflex actions is called a reflex arc.
  - It involve s coordination of a receptor, a sensory neuron, an inter neuron (Spinal cord), a motor neuron and an effector.
- **Explanation:**
  - Temperature of a hot object is a stimulus.
  - Skin cells (receptors) receive this stimulus and produce a nerve impulse.
  - This nerve impulse is carried by sensory neurons to the spinal cord.
  - The interneurons of spinal cord transmit the impulse to the motor neurons.
  - The motor neurons carry the signal to the effectors (arm muscles).
  - The arm muscle contract and the hand pulled back as a response.

INTRODUCTION

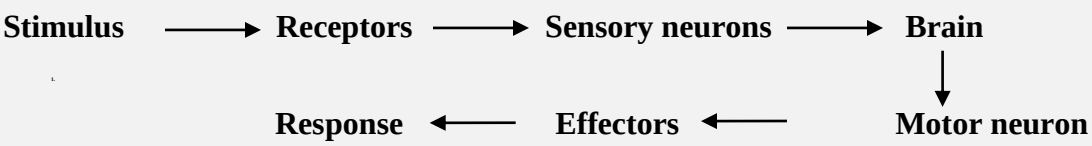
1. Start the lesson with a combination of activities involving voluntary and involuntary actions.
2. Ask the learners to;
   - Arrange their bags.
   - Organize the class.
   - Close the door.
3. Give them 2-3 minutes for these tasks then;
4. Ask any one student to tell that what is whole class doing?
5. Write on the board the list of action told by that student.
6. Now ask the whole class;
   - Very good that you all have followed my instructions.
7. Now say;
   - But I can see that you are also doing many things that I have not asked to do.
8. Create suspense and say,“ why are you doing this?”
9. Pause a little, let them think about what they have done.
10. Then say that now I will write those things on the board that you are doing without my permission. And you will tell that who has done it.
11. Write on the board and say;
    - Who was breathing?
    - Whose heart is beating?
    - Whose eyes are blinking?
12. Students will enjoy these questions .All the students will respond yes.

Board Sample	
List of tasks told by the teacher	Tasks done without teachers permission
Arrange the bag.	Breathing
Close the door.	Heart beating
Organize the class.	Blinking eyes

13. Now ask them what is the difference between the functions of both sides.
14. Take a few responses and then tell them that
    - We perform two types of functions.
15. Tell them about voluntary and involuntary actions.(see teachers information)
16. Now announce the SLO and tell that by the end of this lesson you will be able to:
17. "Define a reflex action and map various steps involved in the transmission of a reflex arc"

DEVELOPMENT

1. Ask them to recall all the steps involved in the working model of the Nervous system
2. Ask them to tell in a sequence.
3. As they tell, write on the board to draw a stimulus response pathway.

Board Sample
Stimulus response pathway 

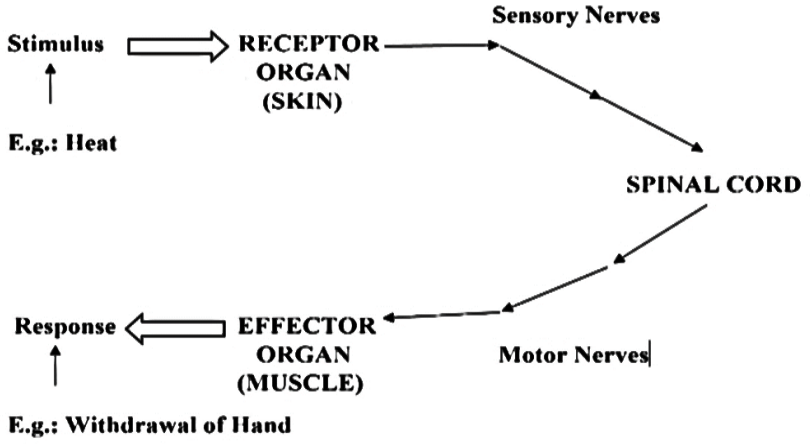
4. Recalling this stimulus response pathway with the student's involvement, move towards your next activity.

Activity 1:

1. Move towards your table.
2. Stop by your table where you just have put a cup of hot water or tea (you will arrange it before class).
3. Act to touch and then instantly pull back your hand. (Demonstration of reflex action)
4. Make sure that all the students have watched you.
5. Then ask them;
   - Has this ever happened to you?
   - Have you ever touched a hot or pointed object by mistake?
   - What was your reaction?

   They will tell that we instantly pulled our hand back.
6. Take their responses and then explain them that;

   An immediate and involuntary response to a stimulus is called a reflex action.
7. Ask them:
   - Is there any difference between a simple response and a reflex action?
8. Ask them to compare a voluntary action with an involuntary action.
9. Ask them that;
   - Is there any difference between the stimulus response pathway of a voluntary and involuntary action?
10. Take few responses
11. Now tell them to open text book page 21, read the topic Reflex action and ask them to discuss with one another (pair work).
12. Give them 5 minutes for it.
13. Take a round of class to ensure that the whole class is engaged in this discussion.
14. After 5 minutes ask randomly from 2-3 students that;
    - What is the pathway given in the picture of a reflex action?
    - Then ask from some other students that;
    - What is the difference between a normal actions pathway and a reflex arc?
15. Take few responses, then:
16. Show them a relevant slide/poster/on laptop or draw a reflex arc on the board.



FLOW CHART OF REFLEX ARC

17. Explain them that:

In a reflex action, the brain is not involved. Instead directions are released from the interneurons of the spinal cord.

Activity 2:

Role Play

1. Take out head bands of the keywords of a reflex arc (stimulus, receptors, sensory neurons, interneurons/spinal cord, motor neurons, effectors, response).
2. (If it cannot make head bands then simply write on a paper and the students can simply hold it in their hands.
3. Divide the participants into 2-3 groups (the number of groups may vary according to the total number of the participants).
4. Give them different situations to perform to show the path of a reflex arc.
5. Each member will wear a head band or hold a card and act for its role.

Example:

- Situation:
- You turn on the tap to wash your hand but the water is very hot.
- Stimulus: I will burn your hand.
- The receptor tells the sensory neuron; water is very hot
- Sensory neuron will tell interneuron/spinal cord that the water is very hot
- Sensory neuron will ask the motor neuron to tell the effectors (hand) to pull back quickly.
- The motor neuron will deliver the message.
- The effector will pull away their hand back quickly.

6. Other situations;
   - A sharp object comes under your feet
   - You sit on some sharp object.
7. This role play will clear all their concept about the reflex action.

CONCLUSION / SUM UP/ WRAP UP:

1. Wrap up the lesson by recalling the definitions of:
2. Voluntary and involuntary actions
3. Reflex action
4. Normal stimulus response pathway and finally
5. Path of a reflex arc (see information).

∃ ASSESSMENT

1. Provide worksheet or write on the board and ask the students to copy and complete the following table and write that the given actions are voluntary, involuntary or reflex action.

Worksheet # 1.

Q. In column "A" different actions are written. Separate voluntary, involuntary and reflex actions from them.

Write V for voluntary, I V for involuntary and R for reflex action in front of every action in column "B"

Sr. #	Action A	B
1.	Withdrawing of hands on touching a hot object.	
2	Eating food.	
3	Watering of mouth on the aroma of food	
4	Speaking in class.	
5	Reading a book.	
6	Blinking of eyes.	
7	Narrowing pupils of the eyes in strong light.	
8	Clapping of hands.	
9	Breathing in air.	

% FOLLOW UP

1. Give the worksheet or ask the students to write this question in their notebook and to write its answer for Homework.

Worksheet # 2.

Read the following situation and answer the questions given at the end

"Shazia stretched out her arm to shake hand with Amna. When Amna shook hands with Shazia, her ring pricked Amna's finger, who immediately pulls her hand back."

Q1. Tell whose action is voluntary and whose action is a reflex action.

Ans. _____

_____

Q.3. Draw a flow charts to show the pathway of:

(i) a voluntary action

Ans. _____

_____

_____

_____

(ii) a reflex arc.

Ans. _____

_____

_____

_____

Grade - 8	Lesson Plan 3: Digestive System	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Sequence the main regions of alimentary canal and associated organs and describe the function of different parts of the alimentary canal:

MATERIALS

- Digestive system: 3 mins 20 seconds
  https://www.youtube.com/watch?v=bFczvJp0bpU
- Vinegar, bread,
- Multimedia/speakers
- Textbook board marker Head bands of key words of reflex arc.

INFORMATION FOR TEACHERS

1. All the systems in the human body need energy from food. It is important that the body gets energy from all the nutrients it needs to function well. When you eat food such as bread, meat, and vegetables, they are not in a form that the body can immediately use as a source of energy. Food must be changed into smaller molecules of nutrients before they can be absorbed into the blood and carried to the cells throughout the body.
2. Digestion is the process by which food and drinks are broken down into their smallest parts, so that the body can use them to build and nourish cells to provide energy.

INTRODUCTION

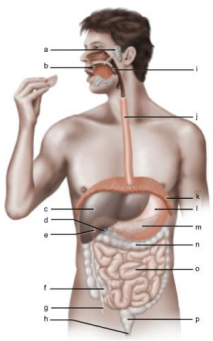
1. Assess students' prior knowledge of the word digestion by posing these questions:
   - What did you take for breakfast today?
   - Why does the body need food?
   - Do my hands need energy to work?
   - How do we get this energy?
2. After taking the responses from the students tell them that the food we eat provides energy for moving our hands, eating, studying and doing different chores. The body needs food to get nutrients for energy, growth and cell repair. Food must be broken down into smaller molecules before they can be absorbed into the blood and carried to cells throughout the body to get energy. This process is called digestion.

DEVELOPMENT

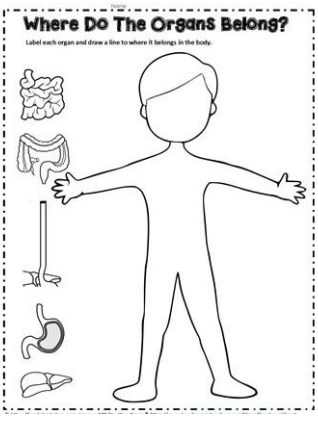
1. Before the discussion, let the students watch a video on the digestive system.
2. Digestive system: 3 mins 20 seconds

https://www.youtube.com/watch?v=bFczvJp0bpU

3. After the student have viewed the video, pose a question to initiate the discussion with:
   - Why do you think the digestive system is important?



4. **Possible responses:** All the systems in the body need energy from food, so it is important for the body to get all the nutrients it needs to function well.
5. **Teacher input:** the body cannot use food in the form in which it enters the body. First, it has to be broken down and changed into liquid form. Then it has to be chemically changed to enter the blood. The organs of the digestive system work together to accomplish the process.
   - Are you all ready to know the organs of the digestive system?



6. Teacher explains through a diagram: the digestive system is a continuous pathway, called the Alimentary canal. The alimentary canal starts from the mouth and ends at the anus. At different regions, the alimentary canal shapes into specific organs which perform specific functions.
7. The names of the organs are oral cavity, esophagus, stomach small intestines and large intestines
8. Activity: Label each organ and draw a line to where it belongs to the body.

Activity 1:

1. Instruct students to bring biscuits / bread for lunch. Provide a slice of bread to students in the class and ask them to swallow it (carefully) without being chewed. Ask them to share the observation with the class. Then ask them to chew the bread and describe why they were able to swallow it? Develop the idea that we are given flat and pointed teeth at the same time? Teeth cut the food, tear the food, grind and crush it so that it can be well chewed and soft so that it can be swallowed easily. The body cannot use food in the form in which it enters the body. The breaking of large food molecules into smaller pieces in the oral cavity is called physical digestion. Mouth leads to oral cavity when food mixes with saliva in the oral cavity enzymes digestive glands produce enzymes and chemical changes occur and it is called chemical digestion.
2. Food can be digested by a combination of two methods –physical digestion and chemical digestion.
3. Pose questions to evaluate their learning:
   - What does the digestive system consist of?
   - What is the alimentary canal?
   - From the mouth food goes into the buccal/oral cavity, what sort of digestion takes place there?

Activity 2:

Role Play

1. In the buccal cavity teeth, cut and chew the food. At the floor of the oral cavity, there is the tongue. The tongue has taste buds to taste food. There are 3 pairs of salivary glands which open into the oral cavity to secrete saliva. Chewing activity mixes saliva in the food to make food soft. The well-chewed food is swallowed into the esophagus through pharynx.
2. Students look at the diagram and locate esophagus and pharynx or refer to page No. 45 of the textbook.
3. Continue the discussion: point to the esophagus and tell what it looks like? Yes, it's a narrow muscular tube through which food passes from oral cavity to the stomach.

Example:

- Using a dropper, place 10 drops of vinegar (or 1 teaspoon if you add more bread) into the balloon. This represents stomach acid. Close the zip tie, then "digest" the food by gently mixing and mashing the contents of the balloon. The balloon models the stomach, rectum and intestines
- **Result:** the piece of bread will be dissolved in the acid and turned into a paste
- The stomach is like a bag shaped structure. Its walls secrete Gastric juice which consists of HCL enzymes and water. The acid helps to kill germs in the food and enzymes break proteins into smaller pieces. Here the food turns into a paste.

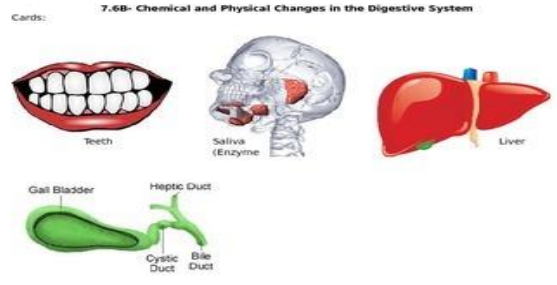
4. Recap the process through quick questions.

Activity 3:

1. From the stomach, food enters the small intestine. The first part of the small intestine gets bile from the gall bladder and pancreatic juice from the pancreas which complete the process of digestion. The second part of the small intestine has millions of finger like projections, called villi. Each villus contains blood vessels. The digested food passes through the walls of these villi and passes into the blood stream. Undigested food passes into the large intestine. Some minerals and salts are also absorbed in the blood through walls of the large intestine.
2. The remaining waste moves into the rectum as faeces which are expelled out through the anus.

CONCLUSION / SUM UP/ WRAP UP:

Instructions are missing here. How to do it? Teacher is explaining or students are doing it as a worksheet? Please add.



Identify where physical and chemical changes occur.

Board activity:

1. Make a flow chart for recap of the digestive system.

ASSESSMENT

1. Write down the answers of Q # 1, 2 given on **page # 50** of PCTB **Grade 6 (Textbook).**
2. QUIZ

FOLLOW UP

1. Assign students a task to make a model of “How does digestion occur?”
2. Helping site: Chemical & Physical Digestion | Is Digesting Food a Chemical Change? - Video & Lesson Transcript | Study.com https://www.google.com.
3. Digestive system
   https://www.google.com/search?q=free+downloadable+video+on+physical+and+chemical+digestion+grade+6&rlz=1C1BNSD_enPK96#fpstate=ive&vld=cid:943999ae,vid:PBgRqiOjG1U

Grade - 7	Lesson Plan 4: Human Respiratory and Circulatory Systems	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Describe the structure and function of Human heart.

MATERIALS

- Board / Marker/chalk.
- Textbook General Science 7
- Worksheet, Evaluation Sheet

INFORMATION FOR TEACHERS

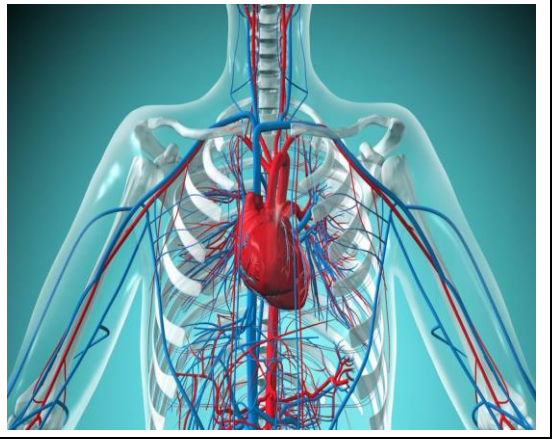
- As a teacher, it is important to have a basic understanding of the heart and its functions in order to effectively teach students about the human structure and function.
- Here are some key points that teachers should know about the heart:
  - **Location:** The heart is located in the chest, between the lungs and behind the sternum (breastbone).
  - **Size:** The heart is approximately the size of a fist.
  - **Shape:** It is conical shaped.
  - **Protection:** It is protected by a double layered transparent membrane called pericardium.
  - **Structure:** The heart is divided into four chambers - the right and the left atria, and the right and left ventricles. The valves regulate the flow of blood between the atria and the ventricles. Blood flows through the heart in a specific pattern, starting with the right atrium and ending with the left ventricle
  - **Function:** The heart's main function is to pump blood throughout the body, delivering oxygen and nutrients to the cells and removing waste products.
- Encourage students to ask questions and clarify any doubts if they may have. This will help to reinforce their understanding of the concept and make the learning process more interactive.
- While teaching a lesson, also consult the textbook and use diagrams, models, or videos to help illustrate these concepts to your student.
- Show the video by using the given link on multimedia. If the facility of multimedia is not available, then encourage the students to note down the link and watch the video where possible.

INTRODUCTION

1. Start a short whole-class discussion about the heart by asking them to put their hands where your heart is located. The response should be to put hands on chest.
2. Ask the students to feel their heartbeat and observe its speed.
3. Now ask the students to stand up and start doing some light exercises, such as jumping in place. After a minute, have them stop and ask them to place their hand on their chest to feel their heartbeat.
4. Ask them questions such as "How fast is it beating?", and "What is causing your heartbeat to increase?
5. After getting responses tell them that the heart is beating faster than normal after the exercise because the body muscles require more oxygen than the normal.
6. Now arises the question that what is the role of heart to provide oxygen to the body. Why is it beating fast?
7. Tell the students that we need to learn the function of the heart to get these answers.
8. Also tell them that it is obvious to know the structure of anything in order to know its function.

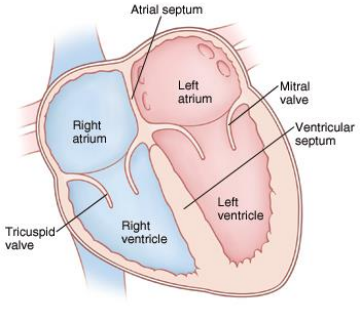
DEVELOPMENT

1. First provide the students with some basic information about the heart, such as its exact location, shape, size and its covering.
2. You can use a visual aid, such as a diagram of the heart to help illustrate these concepts.

Location: Heart is located in front of the chest cavity between the two lungs. It is slightly on the left of the center and protected by ribcage. **Shape:** Heart is conical shaped. **Size:** It is about the size of our fist. **Covering**: It is protected by a double layered transparent membrane, called pericardium.	

Activity 1: **08 minutes**

1. Use diagrams or models of the heart to illustrate different parts of the heart. You can use images from the textbook, a poster, or a digital resource.
2. Describe the four chambers of the heart, i.e. right atrium, right ventricle, left atrium, left ventricle along with valves that prevents the backflow of the blood.
3. Also describe that the blue side of the heart shows that it carries deoxygenated blood while pink/red colour shows that it carries oxygenated blood.



Activity 2:

1.
2. Use diagrams or models of the heart to describe the working of heart.
3. Describe the pathway of blood flow in the heart as follows:
4. Blood is pushed from the atrium into the ventricles on each side of the heart as valves open and shut. This happens during every heartbeat to ensure the blood flows in one direction.
   - The right atrium receives the deoxygenated blood from the body.
   - Right atrium contracts and pushes the blood through the valve to the right ventricle.
   - When right ventricle contracts, it pushes the blood to the lungs through the pulmonary artery for oxygenation.
   - The left atrium receives oxygenated blood from lungs through pulmonary vein.
   - Left atrium contracts and pushes the blood through valve to the left ventricle.
   - The left ventricle contracts and pumps the oxygenated blood to all parts of body through the main artery, called aorta.
   - The cycle starts again as deoxygenated blood returns to the right atrium of the heart from the body.
5. Encourage students to ask questions and clarify any doubts if they may have.
6. Use given link to elaborate the concept of working of the heart.
   https://www.youtube.com/watch?v=ep4cQrYFL0w

CONCLUSION / SUM UP/ WRAP UP:

Conclude that:

1. Human heart has 4 chambers, two smaller atria and two larger ventricles.
2. The valves regulate the flow of blood between the atria and the ventricles.
3. Left side of the heart receives deoxygenated blood from the body.
4. Right side of the heart receives oxygenated blood from the lungs.
5. The flow of blood in the heart is unidirectional.

∃ ASSESSMENT

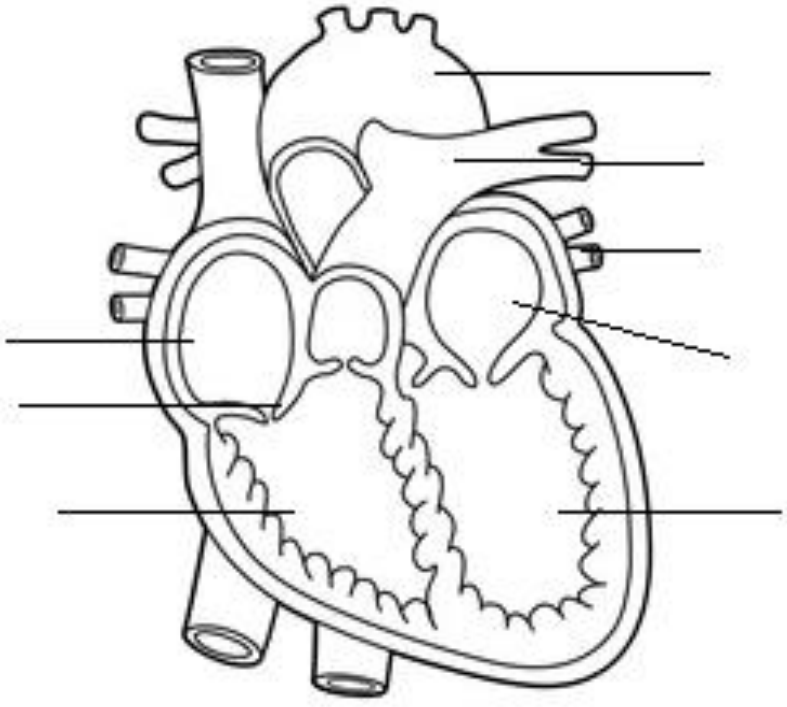
1. Use evaluation sheet / board to assess the students.

% FOLLOW UP

1. Provide worksheet # 1 for home task and guide the students how to fill it up.

Worksheet No. 1

1. **Solve it in two steps:**
   - **Step 1:** Label the given diagram of heart and colour the chambers accordingly.
   - **Step 2:** Mark arrows to show the direction of flow of blood. Also put numbers to show the pathway of blood.

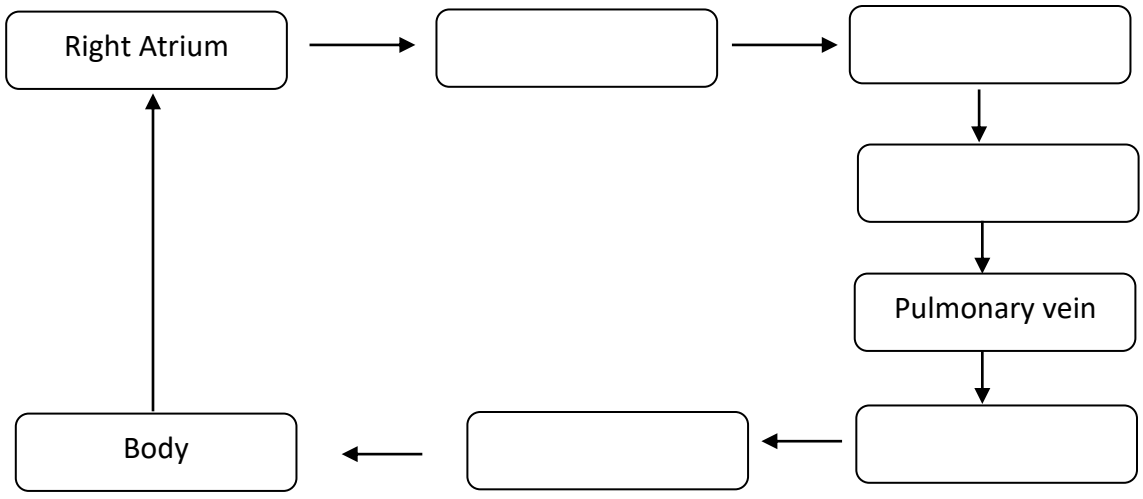


2. **Complete the following:**

The _____ pumps the _____ all-around the body. The human heart has _____ chambers. Heart has _____ that keeps the flow of blood in one direction. The _____ atrium of the heart receives _____ blood from the body while the left atrium receives the _____blood from _____.

Evaluation Sheet

1. **Complete the flow chart to show the path of blood in the heart.**



Grade - 7	Lesson Plan 5: Human Respiratory and Circulatory Systems	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Describe the composition of blood and the functions of red cells, white cell, platelets and plasma.

MATERIALS

- Board / Marker/chalk.
- Textbook General Science 7
- Worksheet
- Yellow liquid hand soap / glycerine / water & yellow colour
- A medium sized bag red beans
- A handful of white beans
- About a cup of brown lentils
- A Jar and Lid / beaker

INFORMATION FOR TEACHERS

- As a teacher, it's important to have a basic understanding of the blood and its components in order to effectively teach students about blood.
- Here are some key points that teachers should know about the blood:
  - Composition: Blood is composed of various components, including red blood cells, white blood cells, platelets, and plasma. Each component plays a unique role in the body's functions.
  - Function: Blood has multiple functions in the body, including the transportation of oxygen, nutrients, and hormones to the body's tissues, the removal of waste products, and the regulation of body temperature.
- Encourage students to ask questions and clarify any doubts they may have. This will help to reinforce their understanding of the concept and make the learning process more interactive.
- While teaching a lesson, also consult the textbook and use diagrams, models, or videos to help illustrate these concepts to your students.
- Show the video by using given link on multimedia. If the facility of multimedia is not available, then encourage students to note down the link and watch the video where possible.
- For lab activity:
  - Plan out the materials and resources you will need and ensure that you have enough supplies for all students.
  - Provide clear instructions and demonstrate any safety precautions that need to be

taken.
- Divide students into small groups to work on the activity. Assign specific roles or tasks to each group member to promote teamwork and collaboration.
- Circulate around the classroom during the activity, monitoring progress and answering questions as needed

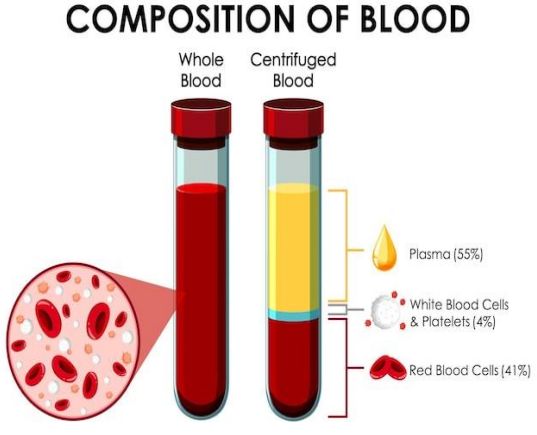
- If Science lab is not available, demonstrate the activity in front of class

INTRODUCTION

1. Start a short whole-class discussion about the blood by asking them if they have had cut on any part of body, did it bleed. What did the blood look like?
2. Encourage students to ask questions and share their own experiences with blood.
3. Provide a brief definition of blood and its importance in the body.
4. Explain that blood is a fluid that circulates throughout the body, carrying oxygen, nutrients, and waste products to and from the body's tissues.

DEVELOPMENT

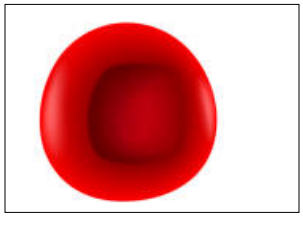
Activity 1:

1. Discuss the composition of blood. 2. Introduce the 4 components of blood, i.e. plasma, RBC's, WBC's and platelets. 3. Describe the composition of blood on board as given in picture. 4. Explain that plasma is yellow liquid with 92% water. Plasma without fibrinogen and blood cells is called serum. 5. Write the composition of components of blood on board and also show them in form of pie-chart.	

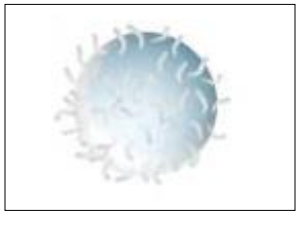
Activity 2:

1. Describe each blood cell in detail.
2. Begin by explaining that blood is made up of different types of cells that have different functions. The three main types of blood cells are:

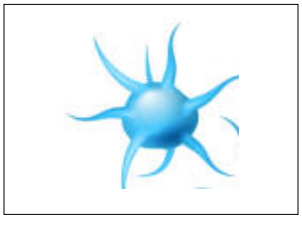
Red blood cells



White blood cells



Platelets



3. Describe red blood cells:
    - Red blood cells are the most abundant type of blood cell, and their main function is to carry oxygen from the lungs to the rest of the body.
    - They contain hemoglobin that carry oxygen from lungs to rest of the body and also carry carbon dioxide from body to lungs for removal.
    - They are shaped like a biconcave disc, which gives them a large surface area for absorbing and releasing oxygen.
4. Describe white blood cells:
    - White blood cells are part of the body's immune system and are responsible for fighting infections and foreign invaders.
    - They come in different types and can recognize and attack specific types of invaders.
    - Use examples such as viruses, bacteria, or parasites to explain the role of white blood cells.
5. Explain platelets:
    - Platelets are small cell fragments that help the blood clot to prevent bleeding.
    - They form clumps and stick to damaged blood vessels to stop bleeding.
    - Use examples such as a cut or a scrape to explain how platelets work.
6. Use visuals or models to show the shape of red blood cells, white blood cells and platelets.
7. Reinforce the importance of blood cells:
8. Explain to the students that each type of blood cell plays a vital role in keeping our body healthy and functioning properly. Without them, we would not be able to transport oxygen, fight infections, or prevent bleeding
9. Use analogies:
10. Using analogies can help make the concepts easier to understand. For example, you could compare red blood cells to buses carrying oxygen, white blood cells to soldiers fighting invaders, and platelets to construction workers repairing a damaged road.
11. Use given link to show the components of blood and their importance.
    https://www.youtube.com/watch?v=VSVYgivfs9c

Activity 3:

1. Take students to Science Lab for making a Blood Model/ demonstrate it in class.
2. Divide students in groups.
3. Provide materials to each group and instruct them clearly.
4. Materials needed for blood model are:
    - Yellow liquid hand soap/ glycerin for the Plasma
    - A medium sized bag of Red beans for the Red Blood Cells
    - A handful of white beans for White Blood Cells
    - About a cup of brown lentils for the Platelets
    - A Jar and lid / beaker
5. Steps to make a blood model are:
    - Pour Yellow liquid hand soap/ glycerin into the jar which represents the plasma in the bloodstream.

- Add the red beans to the jar to represent the red blood cells. Stir them into the yellow liquid hand soap/ glycerin. Red blood cells make up about 40% of blood so make sure you add plenty of red beans.
- Add in the white blood cells and stir. These are represented by white beans.There is about one white blood cell for every 700 red blood cells, so don't add many of these.
- Add little brown lentils to represent platelets.

6. Blood Model is ready.
7. Ask each group to write the function of each blood cell on a piece of paper and present it along with their models.

CONCLUSION / SUM UP/ WRAP UP:

Conclude that:

1. Blood is composed of 55% plasma and 45% blood cells.
2. Plasma is yellow liquid with92% water.
3. RBC's, WBC's and platelets are three types of blood cells.
4. RBC's contains hemoglobin which carry oxygen from lungs to body cells.
5. WBC's are responsible for fighting infections and foreign invaders.
6. Platelets help the blood clot to prevent bleeding.

∃ ASSESSMENT

1. Ask following questions to assess the learning of students.
   - What is composition of blood?
   - Name three blood cells.
   - What is basic function of each blood cell?
2. Take random responses and appreciate the students for correct answers.

% FOLLOW UP

1. Ask the students to solve the worksheet # 1 in home task.

Worksheet No. 1

1. **What does blood do?**

   _____

2. **What are the components of the blood?**

   _____

3. **Which is the most common blood cell of the body?**

   _____

4. **What is plasma?**

   _____

5. **What is main component of RBC's?**

   _____

6. **What is function of haemoglobin?**

   _____

7. **Why are white blood cells important?**

   _____

8. **What is shape of RBC's?**

   _____

9. **What is lifespan of RBC's?**

   _____

10. **What is function of platelets?**

    _____

Grade – 6	Lesson Plan 6: Solar System	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Differentiate between the characteristics of different planets.

MATERIALS

- Writing board, marker/chalk
- Poster of solar system (Sun and the Eight Planets)
- Textbook General Science Grade 6 PCTB
- Worksheet

INFORMATION FOR TEACHERS

- Student have already learnt about space and satellites in their previous class.
- Now they will learn more about the solar system and uses of satellites.
- Use videos to explain the position of the Sun and other planets.
- Poster of solar system and planets may also be used during teaching.
- Tell the students to explore more about the solar system. They can watch scientific videos on solar system and planets.
- Use Textbook General Science 6 PCTB for teaching and learning support material.

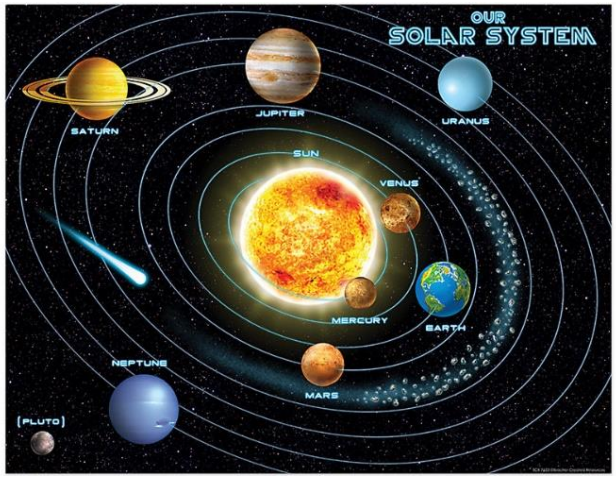
INTRODUCTION

1. Ask the students to tell the name of objects which they see in the sky during day and night.
2. Encourage the students to share their answers and write their responses on the board. (sun, moon, starts)
3. We see several stars shining in the sky at night. Have you ever thought that what these stars are?
4. After taking responses, tell the students that these are huge spheres of burning gases which emit heat and light.
5. A huge object, which emits its own heat and light, is called a star.
6. Some objects that revolve around the Sun are called planets.
7. Tell the students that the solar system is consists of the Sun and the other objects that are revolving around the Sun.

∀ DEVELOPMENT

Activity 1:

1. Ask the students that what the natural source of light and heat is.
2. After getting their response, draw a picture of the Sun on the board.
3. Tell the students that the Sun has central position in the solar system; the planets and many other object are revolving around the Sun.
4. Show a video about the solar system to the students / display the poster of solar system in front of the class / draw a solar system model on the board and label the Sun and the planets accordingly.
5. After watching video or with the help of poster, introduce the names of other planets.
6. Tell the participants that the solar system is made up of the Sun and everything that orbits around it. This includes planets, moons, asteroids, comets, and other objects.
7. The eight planets that orbit the Sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. These planets are very different from one another in terms of their size, composition, and distance from the Sun.
8. The Earth is also a planet.
9. Ask the participants whether the Sun is moving around the Earth or the Earth is moving around the Sun.



Activity 2:

1. Ask the students to open page #135 and 136 of their textbook General Science Grade 6.
2. Tell them that they will read about the Sun and the planets in pairs.
3. Give them 3-4 minutes for reading.
4. Now divide the participants in eight groups and assign one planet to each group.
5. Instruct them to find the characteristics of that planet and note down on a paper.
6. Give them 4-5 minutes for this task.
7. Move around in the class, observe their work, and guide them where necessary.
8. Instruct each group to display the chart in front of the class.
9. Invite all groups one by one to present their chart and tell the characteristics of planets.

CONCLUSION / SUM UP/ WRAP UP:

Conclude that:

1. The Sun and the planets are the main components of solar system.
2. The Sun has the central position in the solar system and the other objects are revolving around the Sun.
3. The objects that revolve around the Sun are called planets.
4. Planets are not stars because they do not shine with their own light.

ASSESSMENT

1. Distribute worksheet #1 to the students and instruct them to solve individually.
2. Move around in the class and observe their work.
3. At the end, tell the correct answers of the questions and check how many students have correct answers.

FOLLOW UP

1. Visit YouTube and search videos of the solar system. Observe the characteristics of planets while watching video.

Grade – 8	Lesson Plan 7: Biotechnology	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Discuss the application of biotechnology

MATERIALS

- Writing board, marker/chalk
- Textbook General Science Grade 6 PCTB

INFORMATION FOR TEACHERS

- As a teacher, it's important to have a basic understanding of biotechnology and its applications.
- Here are some key terms related to biotechnology that teachers should know:
  - **Biotechnology** is the application of living organisms or their components to create useful products and processes for various industries.
  - **Genetic engineering** is a process of manipulating an organism's DNA (genetic material) to introduce new traits or characteristics or to modify existing ones. The goal of genetic engineering is to produce organisms with desirable traits that are not found in nature, or to enhance or modify traits that are already present.
  - **A transgenic organism** is an organism that has been genetically modified by introducing foreign DNA into its genome. It is also known as genetically modified organisms or GMOs.
- Make sure the students also have a solid understanding of these key terms before moving to an applications of biotechnology.
- Use real-world examples to illustrate the applications of biotechnology. For example, you can explain how biotechnology is used to produce medicines, develop crops with enhanced nutritional value, or create biodegradable materials.
- While teaching a lesson, also consult the textbook and use diagrams, models, or videos to help illustrate these concepts to your students.

INTRODUCTION

1. Write the given four areas on the board:
   - Agriculture
   - Food production and preservation
   - Healthcare, and
   - Environmental management
2. Tell the students that biotechnology has various applications and has made a significant impact in these sectors.

3. Ask the students, can they name some biotechnological products under each heading.
4. After taking response, write a biotechnological product for each heading as follow:
   - Agriculture – Genetically modified wheat crop
   - Food production and preservation – Genetically modified cheese with better taste
   - Healthcare - Insulin
   - Environmental management - bioplastic
5. Write more products according to responses given by the students.

DEVELOPMENT

Activity 1:

1. Ask the students to open and read the content on page # 41 of General Science textbook 8 under the heading “Agriculture”.
2. Encourage students to ask questions and clarify any doubts they may have while reading content.
3. After reading activity, sum up the application of biotechnology in agriculture as follow:
4. Agriculture: Biotechnology has played a crucial role in improving the agricultural yield of Pakistan. The use of genetically modified crops has allowed farmers to produce crops that are more resistant to pests, diseases, and drought. Biotechnology has also been used to improve the quality and yield of cotton, which is a significant cash crop in Pakistan.

Activity 2:

1. Introducing the role of biotechnology in food production.
2. Ask the students to share their understanding of biotechnology in the food industry.
3. Make a list of genetically modified food on the board as follows:
   - Apple
   - Orange
   - Papaya
   - Soybean
   - Potato
   - Eggplant
   - Milk
   - Cheese
   - Bread
4. Discuss the way they are modified genetically as follows.
   - Apples – have more iron and prevent browning
   - Oranges – have more Vitamin C
   - Papaya- resist diseases
   - Soybean – have healthier oil than harmful trans fats
   - Potato – have more Vitamins A & E
   - Eggplant – are insect-resistant
   - Milk – have more fat contents
   - Cheese – has more flavour
   - Bread – has more shelf life
5. Sum up the application of biotechnology in food production as follows:

Food industry: Biotechnology has also been applied in the food industry of Pakistan. It has been used to produce foods with higher nutritional values and improved taste and quality. For example, the use of biotechnology in cheese production has allowed the development of cheese with better texture, flavor, and aroma.

Activity 3:

1. Explain the role of biotechnology in health as follows;

   Healthcare: Biotechnology has revolutionized healthcare. It has played a critical role in the development of vaccines, diagnostic tools, and medicines. For instance, there is significant progress in the production of insulin through biotechnology, which has made life-saving medicine more affordable and accessible to patients.
2. Ask the students to read the content given on Page # 42 of General Science 7 under the heading "Health".
3. Explain the given biotechnological products.
4. Encourage the students to ask questions and clarify any doubts they may have while reading content.

Activity 4:

1. Begin by asking the students what challenges we are facing today regarding environment.
2. Write down the relative responses on the whiteboard such as pollution, degradation of land, sewage water, etc.
3. Ask the students to think about the role of biotechnology to solve these challenges we are facing today.
4. Give them 3 minutes to think in pairs and note down their findings.
5. Take random responses from pairs.
6. Sum up the activity by describing the role of biotechnology in environment as follows:

   Environmental management: Biotechnology has also contributed to environmental management in Pakistan. It has been used to develop innovative wastewater treatment systems and to reduce industrial pollution. Biotechnology has also been used to improve the quality of soil and water, which is crucial for agriculture and the overall health of the environment

CONCLUSION / SUM UP/ WRAP UP:

Conclude that:

1. Biotechnology has various applications and has made a significant impact on various sectors, including agriculture, healthcare, and environmental management.
2. Biotechnology is playing a vital role in increasing the yield of crops by producing disease resistant, pest resistant crops and having crops with high nutritional value.
3. Biotechnology has had a significant impact on the production of food products such as bread, yogurt, and cheese.
4. Biotechnology also have an effect on the production of vaccine for immunization, insulin production, dyes, etc.
5. Biotechnology is also used for solving environmental problem such as pollution, degradation of lands and sewage water.

ASSESSMENT

1. Ask the following question to assess the learning of students.
2. What is the application of biotechnology in:
   - Agriculture
   - Health
   - Food Production
3. Take random responses and appreciate the students for correct answers.

FOLLOW UP

1. Encourage students to write down the answer of Q2 part iii in home task.
2. Ask the students to select any food item/ crop and then compare and contrast its genetically modified form with its traditional form. They should look for differences in appearance, taste, nutritional value, and other factors. They should also discuss the benefits and drawbacks of each.

Grade – 8	Lesson Plan 8: Cellular Organization	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Recognize cells as basic unit of life that are organized into tissues, organs, organ systems and organisms.

MATERIALS

- Multimedia/laptop/poster
- Board
- Maker/chalk.
- General science 6 PCTB Book
- Legos (blocks)
- Worksheets

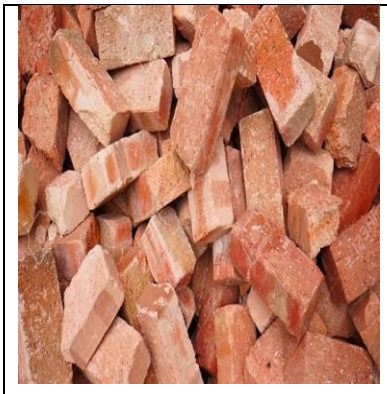
INFORMATION FOR TEACHERS

- Cell is the basic structural and functional unit of life.
- This lesson deals with the role of a cell as a unit of structure.
- Role of a brick in a building is same as the role of a cell in an organism.
- Many similar cells combine together to make a tissue.
- Related tissues group get together to make an organ.
- Many organs work in coordination to complete a task.
- Association of different systems results in an organism.

  Note: Taking students outside in the field enhances their interest and involve in the lesson. That's why it is asked to take them out to show if any construction activity going on nearby .If it is not possible then select from other given options.
- Second preference can be the use of multimedia/laptops or even mobiles, to show them pictures or related material as students are attracted more towards these gadgets than books.
- Lesson is planned, considering all different options so that you can select the best possible option for you.

INTRODUCTION

Start lesson by showing class a construction site (if possible to show nearby). Or show them these pictures on multimedia or your laptop or mobile, or ask them to open Text book general science page#3 and see pictures of inquiry 1.1.



1. Ask them to see the picture and tell about it.
2. Ask these questions;
   - What are bricks?
   - How is that wall made?
   - Do the bricks eat food, breath in air, grow or reproduce? (No)
   - Is it a living thing? (NO)
   - Then how it grows?
   - How one brick changes into a house?
   - What are the different stages in building a house from a brick?
3. Take their responses, write stages of a building /a house from a brick on the board and then explain that:
   - Brick is not a living thing.
   - It is a structural unit of a building.
   - Many bricks are organized in building of our houses.

All floors combined	House/Building
⬆	
Combination of rooms	Floor
⬆	
Collection of walls	Room
⬆	
Many bricks join	Wall
⬆	
Basic structural unit	Brick

4. Now ask them that;
   - Why are we discussing about a building?
   - What is its relation with the living things?
5. Pause a little and then tell that:

Stages of construction of a building from a brick are very similar to the stages of making of an organism from a cell.

6. Now announce the SLO that today we will;

"Recognize cells as a basic unit of life that are organized into tissues, organs, organ systems and organisms."

DEVELOPMENT

1. Develop the lesson by recalling their previous knowledge about the cell by asking question;
   - What is a cell?
   - Are all cells of the same kind?
   - Tell the name of different kinds of cells?
   - Can we see a cell?
2. Let them respond freely, involve the whole class into discussion, after 1-2 minutes, conclude it by summarizing their answers.

   - Cell is a basic structural and functional unit of living organisms.
   - There are many different kinds of cells (muscle cells, bone cells, blood cells etc.).
   - We can see cells with the help of a microscope.

Activity 1:

1. Divide the class into different groups.
2. Give them blocks (Legos).
3. Ask them to make different types of houses by joining these legoes. e.g. a room, a hut, a tower, a garden
4. Ask them to complete their structure and put it on the table.
5. Now settle them and start questions:
   - What thing is common in all these structures? (blocks)
   - What thing is common in all the real buildings? (bricks)
   - What is common in all living organisms? (Cell)

Activity 2:

1. Ask learners to look at their hands and tell different parts of their hands (fingers, nails, palm).
2. Now ask them that what are our fingers made up of?(bones, skin, muscles, blood)
3. What are these bones, skin, muscles and blood made up of?
4. Give them 1-2 minutes to think, take their responses and then explain:

   There are many different kinds of cells. These cells join to make different parts of our body to perform different functions.

5. Now get back to your board where you wrote different stages to make a building from a brick.
6. Make another column adjacent to it.
7. Relate, explain and write different stages in the organization of an organism from a cell.

Levels of Building of a house		Levels of cellular organization		
All floors combined	House/Building	Organism	Association of different organ systems	Human
Combination of rooms	Floor	Organ system	Coordination of different organs to complete a task	Nervous System
Collection of walls	Room	Organs	Grouping of related tissues	Brain
Many bricks join	Wall	Tissues	Organization of similar cells	Nerve Tissue
Basic structural unit	Brick	Cell	Basic unit of life	Nerve cell

- Cell is the basic unit of life
- There are many different kinds of cells (blood, muscle, nerve cells).
- Same kind of cells join together to make a tissue (muscle, bone and nerve tissues).
- Related tissues group get together to make an organ (a hand, heart, brain).
- Different organs coordinate to complete a task and result into a system (digestive system, circulatory system etc.).
- All systems are organized into an organism.

8. Ask examples for every level.
9. Write examples with all level.
10. Explain them all the levels.

Activity 3:

1. Divide whole class into pairs.
2. Ask the whole class to make a table of level of organization in their notebooks and complete it with the example of circulatory system.
3. Now ask them to check and correct the work of their partner.
   (blood cells, blood tissues, heart, circulatory system)

CONCLUSION / SUM UP/ WRAP UP:

1. Repeat all the points with the help of the table.
   - Cell is the basic structural and functional unit of living organisms.
   - Cells of same kind join to make a tissue.
   - Different tissues combine to make an organ.

- Many organs coordinate as a system to complete a task.
- Organization of different systems makes an organism.

ASSESSMENT

1. Provide them this worksheet or write on board and ask them to copy and complete in their notebooks.

Worksheet No. 1	
Match the column A to the right description in column B	
A	**B**
Cell	Basic unit of a building
Organ	Organization of similar cells
A brick	Grouping of related tissues
Organisms	Coordination of different organs to complete a task
Tissues	Basic unit of life
Organ system	Association of different organ systems

FOLLOW UP

1. Ask them to make a poster to show different levels of cellular organization.

Grade – 6	Lesson Plan 9: Balanced Diet	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Recognize that a healthy diet contains a balance of food stuffs

MATERIALS

- Marker
- Charts of various food groups
- Computer connected to the internet
- Pictures with food(Visual Images)
- Flip cards

INFORMATION FOR TEACHERS

- Teacher must know about the components of balanced diet and nutritional requirement.
  - Balanced diet is necessary for growth, repair and to accomplish any task.
  - It prevents us from dreadful diseases.
- Use hands-on learning strategies to engage students in the learning process.
- Spread healthy eating lessons throughout.

INTRODUCTION

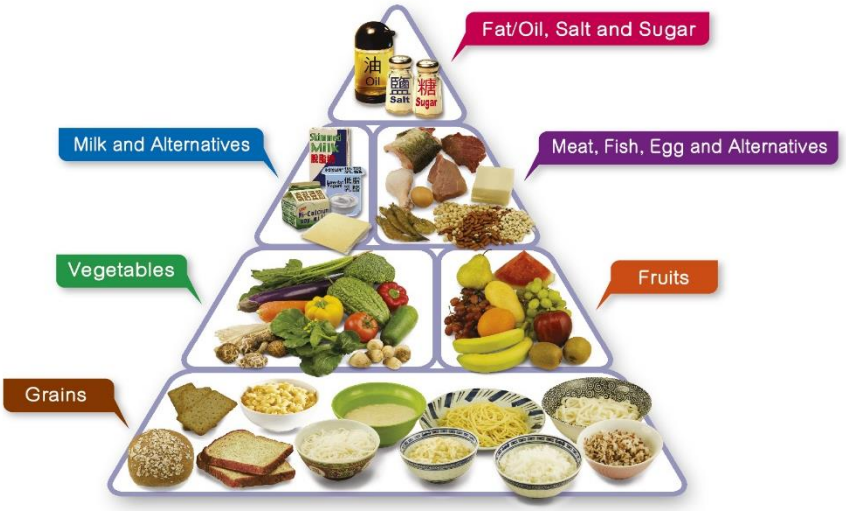
1. To assess the prior knowledge of the students, pose the following questions:
2. What does `Food groups` mean?
3. What do you have for your breakfast?
4. What are the main sources of carbohydrates?
5. What are the main sources of proteins?
6. Which food group provides material for repair, growth etc.?
7. Teacher facilitates by removing misconceptions, makes appreciations, checks the appropriate answers, praises the students who get actively involved in the activity encourages all students to participate with opinions.

DEVELOPMENT

1. Teacher will draw a flow chart on the board to elaborate how balanced diet prevents diseases by explaining the importance of each food group.

Activity 1:

1. Show the Food pyramid and ask them what do they think about it? Tell them it shows food items arranged in different shelves. This chart helps to choose different food items for daily diet.



2. Initiate discussion with the following questions
   - What does this diagram represent? (food pyramid)
   - Assist participants to read the diagram / food pyramid?
   - What food items are placed at the base of the pyramid? (grains)
   - Why does it gradually narrow? (when it narrows it means less amount of this food should be consumed)
   - What food is placed at the top and why?(this type of food should be minimum in diet)
3. Interactive session
   - Food pyramid is a visual representation of the proportions of different foods you should eat every day in order to maintain a balanced diet.
   - Eat Most – Grains.
   - The base of the pyramid shows that a large portion in your food should be grains. Name the food items in the grains which include a major portion of your diet
   - Eat More - Vegetables and fruits. The second shelf shows fruits and vegetables which means eat more but less than the food in the base shelf
   - Eat Moderately - Meat, fish, egg and alternatives (including dry beans) and milk and alternatives. Means eat less than vegetables and fruits.
   - Eat Less - Fat/ oil, salt and sugar. Means include very little food from this shelf.
   - Drink adequate amount of fluid (including water, tea, clear soup, etc.) every day
   - If each meal is planned in proportion with the healthy eating pyramid then you are much more likely to achieve your daily requirements for vitamins, minerals, carbohydrates, proteins and essential fats.
   - After taking responses explain food pyramid on page 38 of the book.

     Activity: Draw a plate on the board and write the names of food items in it you had for lunch yesterday. From the food pyramid identify if it was a healthy meal or not.
   - Use the food pyramid to help you get the balance right. It shows how much of what you eat should come from each food group.

Activity 2:

Short food quiz:

1. Can you think of any foods that are good (healthy) for you but don't taste very nice?
2. Can you think of any foods that are bad (unhealthy) for you and taste really nice?
3. Name some foods that are good for you and taste really nice. Do you know why they are good for you?

Activity:

Foods can be put into groups such as

a. meat, poultry, fish
b. fruit and vegetables
c. dairy
d. sugary and fatty foods
e. grain-based foods (cereals), pasta, potato.

4. Make a list of five foods that you like. These should be individual foods not meals e.g. pasta not spaghetti. State whether they are:
   a. meat, poultry, fish
   b. fruit and vegetables
   c. dairy
   d. sugary and fatty foods
   e. grain-based foods (cereals), pasta, potato.
5. State whether they are healthy or unhealthy. e.g. apple- fruit/vegetable (healthy) milk- dairy (healthy) chocolate- *dairy and sugary/fatty (unhealthy) *Chocolate is a mixture of food groups. It is dairy and is also sugary/fatty!
6. Do a survey of "favourite foods" for the class or in groups.
   a. Do a tally for healthy and unhealthy foods. Make a table.
   b. Do a tally of the types of foods chosen. Compare it with food pyramid
   c. Discussion points- Did your class choose healthy or unhealthy foods?
   d. Which food group is the most popular in your class and why?
   e. Which is the least popular and why?
   f. Is the most popular food group a healthy choice or an unhealthy one?

Activity 3:

1. Record what you eat for breakfast, lunch and dinner.

S #	Day	Breakfast	Lunch	Dinner
1	Monday			
2	Tuesday			
3	Wednesday			
4	Thursday			
5	Friday			
6	Saturday			
7	Sunday			

2. Note: Examine the record and conclude whether your diet is balanced or not. Compare it with the health pyramid

CONCLUSION / SUM UP/ WRAP UP:

Wrap up will be done by:

1. Asking about difference between a healthy and an unhealthy diet
2. Show images of different food groups and students will be guessing the right group of food
3. The students will tell about six main nutrients.
4. The students will be able to use the food pyramid.

∃ ASSESSMENT

1. Class participation
2. Quiz
3. Related questions from the exercise questions

% FOLLOW UP

1. Make a diet plan for your younger sibling using the food pyramid.

Grade – 6	Lesson Plan 9: Application of Technology	Time: 40 Minutes

STUDENT LEARNING OUTCOMES

By the end of the lesson students will be able to:

1. Make bioplastic from milk and vinegar as an application of biotechnology.

MATERIALS

- writing board, marker / chalk
- empty bag of biodegradable plastic
- milk and vinegar
- strainer, 1 spoon and 2 bowls
- burner, stand , beaker / microwave oven
- Textbook General Science Grade 6 PCTB

INFORMATION FOR TEACHERS

- Application of technology is a practical work.
- Create a suitable environment for a practical work, so that the students can do hands on activities.
- As a model, demonstrate the practical activity in front of the students.
- Encourage the students to do this practical work at their homes also.
- Use textbook General Science 8 PCTB for teaching and learning support material.

INTRODUCTION

1. Show the following picture and ask the students;
   - What they know about the land pollution?
   - What are its causes?
   - Why the waste material is causing land pollution?
2. After taking responses, tell them that plastic waste has become a big issue of land pollution.
3. Use of plastic is causing land pollution, because plastic is non-biodegradable substance.
4. Ask the students;
   - What is biodegradable material?
   - What is non-biodegradable material?
5. After getting their responses, tell them by giving examples that;
6. The difference between biodegradable and non-biodegradable materials is their ability to be broken down or decomposed naturally.
7. Biodegradable materials are those that can be decomposed into natural substances by

bacteria, fungi, and other living organisms. Non-biodegradable materials cannot be decomposed naturally.

8. As a result, biodegradable materials are often be considered more environmental friendly because they can be decomposed naturally and do not cause land pollution.

∀ DEVELOPMENT

Activity 1:

1. Now ask the participants that is there any substitute of plastic.
2. After getting their responses, tell them that bioplastic is a substitute of plastic.
3. Bioplastic is a biodegradable material.
4. Ask the participants;
   - Have you ever used bioplastic?
5. After getting responses tell them that;
   - Bioplastic is a biodegradable material.
   - It is environmental friendly and do not cause land pollution.
   - Use of bioplastic is increasing day by day.

6. Bring a bag made by biodegradable plastic in the class and allow the students to see and ask, is there any difference from the ordinary plastic bag.
7. Ask the students that can they make bioplastic at home.
8. After getting their responses, tell them that they can make bioplastic at home.

Activity 2:

1. Show the following video to the students.
   https://www.youtube.com/watch?v=f-PT-PxA_Sk&ab_channel=DIYIdeas-Tutorials-DIYInspiration
2. After watching video ask, 2-3 volunteers to tell the step-by-step procedure of making bioplastic at home in front of the class.
3. Now put milk, vinegar, strainer, bowls and a spoon on a table in front of the class.
4. Invite a group of 3-4 volunteers to come out and perform the practical activity of making bioplastic with the milk and vinegar.
5. Involve other students to tell the procedure step by step when they will be asked.
6. At the end of activity, appreciate the students for their active participation.
7. Instruct the students to do this activity at their home also as assignment and bring bioplastic material prepared by them in the next day class.

CONCLUSION / SUM UP/ WRAP UP:

Conclude the Lesson that:

1. Bioplastic is a substitute of plastic and it is a biodegradable material.
2. Bioplastic is an environmental friendly material and do not cause land pollution.
3. Technology has a tremendous rule of making our daily life easier. We can make bioplastic at home.

ASSESSMENT

1. Write the following question on the board;
   - How bioplastic is environmental friendly?
   - What is biodegradable material?
   - What is not-biodegradable material?
2. Involve different students to answer these questions.

FOLLOW UP

1. Assignment: Assign the students to make bioplastic material at their home.