THIRD EDITION

NEW OXFORD PRIMARY SCIENCE

Teaching Guide

LEVEL 4

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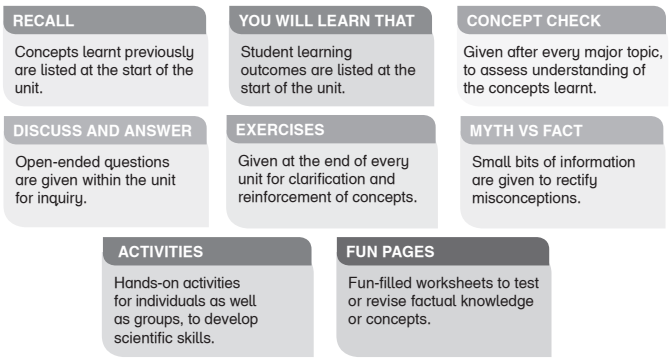
Contents

Introduction

This teaching guide consists of a scheme of work, worksheets, answers to questions in the book, sample assessment paper, and lesson plans. It is designed to support delivery of the National Curriculum effectively. It provides the teachers with teaching strategies to make learning student-centred, with simple and clear instructions for the teachers.

The following key features of the book have been integrated into the lesson plans, making it easier for the teacher to teach the lessons:



The PDF version of this teaching guide (available online at OUP website) allows teachers to adapt and modify lessons to suit the diverse needs of their students. As a result, teachers can focus their efforts on maximising the learning of their students.

A progression map is given to enable department heads and coordinators to plan for the progression of students' learning.

Scheme of work

The division of the syllabus (units) into two terms has been provided. A detailed scheme of work has also been provided according to which the teachers can plan their lessons over the terms. The scheme of work is flexible and adaptable to teachers' needs and school requirements.

Progression chart

This shows how NOPS builds on students' prior knowledge and progresses the topics from basic to more complex across the series.

National Curriculum Alignment

Each teaching guide also includes curriculum maps for that grade. It shows where each SLO of the National Curriculum is covered in the NOPS series.

How to Use this Teaching Guide

Background information

Brief background information has been provided before the lesson plans. It outlines the scientific knowledge necessary to teach a particular unit.

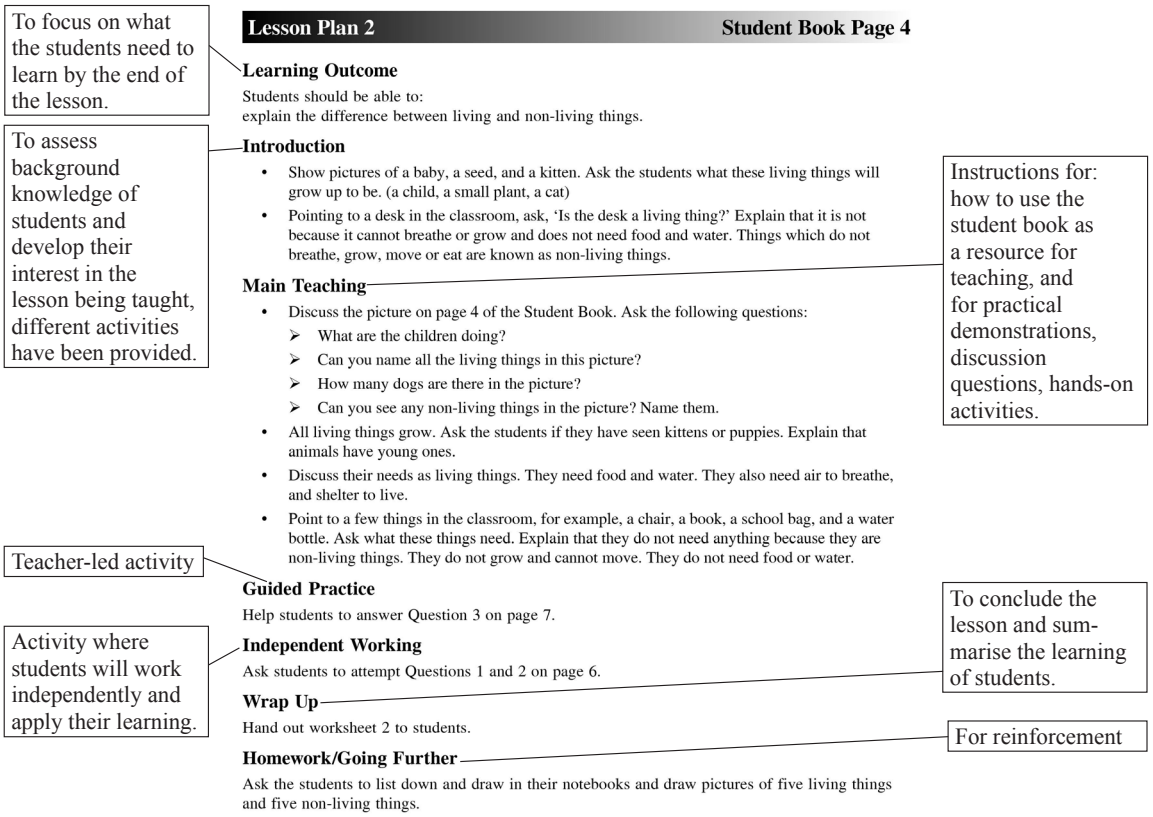
Lesson plan

Teachers can use the provided lesson plans for each unit addressing the relevant learning outcomes as is or customise according to their class requirements. Lesson plans can be modified as per available resources.

i. **Learning outcome:** Each lesson plan is according to the lesson outcomes which are closely related to the student learning objectives from the National Curriculum.

ii. **Introduction:** Introduces the various techniques that are used in this teaching guide:
   - Questions can be asked to check background knowledge or misconceptions about the concept being taught. This teaching guide gives interesting ways to encourage brainstorming and asking questions.
   - For early years, pictures (flashcards) or videos can be shown to initiate introductory discussion.

- If resources are available, experiments or hands-on activities can be arranged. The teacher can ask questions before an experiment to elicit responses from students. After the results have been observed and recorded, ask what was done in the experiment and what happened. Do the results answer the questions posed at the start of the experiment? How do they explain what happened?



iii. **Main teaching:** After introducing the lesson, teachers can utilise the techniques suggested in the 'main teaching' section to lead the students through the lesson in detail. Use different techniques to make learning of the lesson as interesting for the students as possible. Demonstrations, hands-on activities, model-making, drawing diagrams, videos, field trips, reading, etc., can be used to teach the topic in detail.

iv. **Guided practice:** Activities requiring teacher guidance have been provided in this section.

v. **Independent working:** Suggestions on how to encourage students to work independently using the activities mentioned in the lesson plans.

vi. **Wrap up:** Conclude the lesson and summarise the learning of students by using wrap activities given in the lesson plans.

vii. **Worksheet:** Photocopiable worksheets have been provided with lesson plans, which can be used in the class or for homework.

Answers

Answers to all the questions given in exercises, fun pages, 'concept check', and 'discuss and answer' have been provided at the end of the lesson plans.

Assessment:

Sample Assessment Paper has been provided at the end of the teaching guide, based on the standard board format. The format of the sample paper can be used to design assessment papers.

Concept Check boxes given in the student book can be used for assessing learning during the class.

Topic Progression Across NOPS Series

strand	SNC topic/chapter	SNC sub-topic	SNC SLOs	LOCATION IN NOPS IV
life science	CHARACTERISTICS AND LIFE PROCESSES OF ORGANISMS	characteristics of major groups of living things	• Compare and contrast characteristics that distinguish major groups of living things (plant and animals).	Unit 1
			• Classify animals in terms of vertebrates and invertebrates with examples and analyze the differences and similarities in vertebrates and invertebrates.	Unit 1
			• Classify plants in terms of flowering and non-flowering with examples and analyze the differences and similarities in flowering and non-flowering plants.	Unit 1
			• Recognize and appreciate diversity in life (both plants and animals) and identify ways to protect diversity.	Unit 1
		Functions of major structures in living things	• Identify major parts/organs in animals (teeth, bones, lungs, heart, stomach muscles, brain).	Unit 1
			• Relate the parts/organs of body of animals to their functions (e.g., teeth break down food, bones support the body, lungs take in air, the heart circulates blood, the stomach helps to digests food, muscles move the body).	Unit 1
			• Identify parts of a plant (leaves, stem, flowers, seeds, roots).	Unit 1
			• Relate the structures of plants to their functions (i.e., roots absorb water and nutrients and anchor the plant, leaves make food, the stem transports water and food, flowers produce seeds, and seeds produce new plants).	Unit 1
	ECOSYSTEMS	Diversity of the conditions for life on Earth	• Recognize what is an ecosystem (e.g., forests, ponds, rivers, grasslands and deserts).	Unit 2
			• Explain biotic (plants, animals and humans) and abiotic (light, temperature, soil and water) and their linkages.	Unit 2
			• Analyse the way these biotic and abiotic constituents create a balance to sustain any ecosystem.	Unit 2
			• Recognize the interactions between animals and plants and the importance of maintaining balance within an ecosystem.	Unit 2
		Relationships in simple food chains	• Describe a few food chains and analyse their structure to understand its function.	Unit 2
			• Describe the role of living things at each link in a simple food chain (e.g., plants produce their own food; some animals eat plants, while other animals eat the animals that eat plants).	Unit 2
			• Identify and describe common predators and their prey.	Unit 2
		Competition in an ecosystem	• Recognize and explain that some living things in an ecosystem compete with each other for food and space.	Unit 2
			• Recognize the value of a balanced ecosystem.	Unit 2
			• Interpret that human actions such as urbanization, pollution and deforestation affect food chains in an ecosystem.	Unit 2
			• Identify various actions and roles that humans can play in preserving various ecosystems.	Unit 2

strand	SNC topic/chapter	SNC sub-topic	SNC SLOs	LOCATION IN NOPS IV
	HUMAN HEALTH	Symptoms, transmission, and prevention of communicable diseases	• Observe and recognize some common symptoms of illness (e.g., fever, coughing and influenza).	Unit 3
			• Differentiate between contagious diseases (hepatitis, T.B, influenza and polio) and non-contagious (cancer and diabetes)	Unit 3
			• Relate the transmission of common communicable diseases (e.g., touching, sneezing, and coughing) to human contact.	Unit 3
			• Explain some methods of preventing common diseases and their transmission (e.g., vaccination, washing hands, wearing mask).	Unit 3
		Ways of maintaining good health	• Describe the importance of maintaining good health.	Unit 3
			• Recognize everyday behaviours that promote good health (e.g., a balanced diet, drinking clean water, exercising regularly, brushing teeth, getting enough sleep).	Unit 3
			• Define balanced diet and explain its components.	Unit 3
			• Identify common food sources included in a balanced diet (e.g., fruits, vegetables, grains, milk and meat group).	Unit 3
			• Understand the value of clean drinking water and inquire about the factors that generally make it unclean.	Unit 3
			• Explore a few ways that can help make water clean and suitable for drinking (water filtration and boiling).	Unit 3
	MATTER AND ITS CHARACTERISTICS	States of matter and its characteristics	• Describe matter and its states (solid, liquid, gas).	Unit 4
			• Describe characteristics of each state of matter with examples.	Unit 4
		Physical properties as a basis of classifying matter	• Compare and sort objects and materials on the basis of physical properties (e.g., mass, volume, states of matter, ability to conduct heat or electricity, ability to float or sink in water).	Unit 4
			• Explore the properties of metals (i.e. appearance, texture, colour, density).	Unit 4
			• Identify properties of metal (conducting heat and electricity) and relate these properties to use of metals (i.e. a copper electrical wire, an iron cooking pot).	Unit 4
	FORMS OF ENERGY AND ENERGY TRANSFER	Common sources and uses of energy	• Identify sources of energy (e.g., the Sun, flowing water, wind, coal, oil, gas).	Unit 5
			• Recognize that energy is needed to do work, (e.g. for moving objects), heating and lighting.	Unit 5
			• Describe and demonstrate the transformation of energy.	Unit 5
			• Understand the importance of energy conservation.	Unit 5
			• Recognize the role and responsibility of humans to conserve energy resources.	Unit 5
strand	SNC topic/chapter	SNC sub-topic	SNC SLOs	LOCATION IN NOPS IV

		Light and sound in everyday life	• Relate familiar physical phenomena (i.e., shadows, reflections, and rainbows) to the behaviour of light.	Unit 5
			• Relate familiar physical phenomena (i.e., vibrating objects, echoes) to the production and behaviour of sound.	Unit 5
			• Recognize that warmer objects have a higher temperature than cooler objects.	Unit 5
		Heat transfer	• Investigate the changes that occur when a hot object is brought in contact with a cold object.	Unit 5
			• Identify ways to measure temperature and understand its unit.	Unit 5
		Electricity and simple electric circuits	• Describe and demonstrate that electrical energy in a circuit can be transformed into other forms of energy (e.g., heat, light, sound).	Unit 5
			• Explain and provide reasoning that a simple electric circuit requires a complete electrical pathway.	Unit 5
	FORCES AND MOTION	Familiar forces and the motion of objects	• Describe force and motion with examples from daily life	Unit 6
			• Identify gravity as a force that draws objects to Earth.	Unit 6
			• Investigate that friction force works against the direction of motion.	Unit 6
			• Provide reasoning with evidence that friction can be either detrimental or useful under different circumstances.	Unit 6
		Simple machines	• Recognize that simple machines, (e.g., levers, pulleys, gears, ramps) help make motion easier (e.g., make lifting things easier, reduce the amount of force required, change the distance, or change the direction of the force).	Unit 6
	EARTH AND ITS RESOURCES	Physical characteristics of Earth	• Recognize that earth's surface is made up of land and water and is surrounded by air.	Unit 7
			• Recognize that water in rivers and streams flows from mountains to oceans or lakes.	Unit 7
		Earth's resources	• Identify some of Earth's natural resources that are used in everyday life (e.g., water, wind, soil, forests, oil, natural gas, minerals).	Unit 7
			• Recognize that some remains (fossils) of animals and plants that lived on Earth a long time ago are found in rocks, soil and under the sea.	Unit 7
			• Differentiate between renewable and non-renewable resources	Unit 7
			• Investigate the impact of human activities on Earth's natural resources	Unit 7
			• Suggest the ways to conserve the natural resources.	Unit 7
earth and space science	**EARTH'S WEATHER AND CLIMATES**	weather and climate	• Understand the difference between weather and climate.	Unit 8

strand	SNC topic/chapter	SNC sub-topic	SNC SLOs	LOCATION IN NOPS IV
			• Relate that weather (i.e., daily variations in temperature, humidity, precipitation in the form of rain or snow, clouds, and wind) changes with changing geographical location.	Unit 8
			• Recognize that average temperature and precipitation can change seasons and location.	Unit 8
		Objects in the Solar System and their Movements	• Describe and demonstrate the Solar System with the sun at the centre and the planets revolving around the sun.	Unit 9
			• Identify the sun as a source of heat and light for the Solar System	Unit 9
			• Recognize that the earth has a moon that revolves around it, and from earth the moon looks different at different times of the month.	Unit 9
	EARTH IN THE SOLAR SYSTEM	Earth's motion and related patterns observed on Earth	• Investigate and describe how day and night are related to Earth's daily rotation about its axis, and provide evidence of this rotation from the changing appearance of shadows during the day.	Unit 9
			• Describe how seasons in Earth's Northern and Southern hemispheres are related to Earth's annual movement around the Sun.	Unit 9
		Solar and Lunar eclipses	• Illustrate and explain how solar and lunar eclipses occur.	Unit 9
		Basic Craft Making Basic technical model making	Practice techniques of folding, cutting, tearing and pasting papers, cardboard to make objects and patterns Design paper bags, envelopes, cards and face masks	Unit 10
		Technical activities	Design models of sphere, cube, prism, cylinder and cone with clay or playdough	Unit 10
			• Design hammer, wheels, rollers and gears using clay or play dough	Unit 10
			• Operate tablets/mobile phones for use of calculator, alarm clock and calendar	Unit 10
			• Operate mobile phones for taking snap shots	Unit 10
		Elementary first aid	• Recognize the items of first aid box.	Unit 10
			• Use digital and clinical thermometer externally to measure body temperature.	Unit 10
			• Check blood pressure by digital blood pressure monitor	Unit 10

Unit 1: Characteristics and Life Processes of Organisms

Lesson Plan 1 — Student Book Page 2

Learning Objective

- To identify cell as a basic unit of life (plant and animal).

Learning Outcomes

Students should be able to:

- explain that all living things are made of cell
- differentiate between plant and animal cells

Introduction

Show the students a picture of a wall and ask them to identify the building unit of the wall (brick, stone, cement block, etc.). Complete a giant jig-saw puzzle in class and point out that each piece is important in making the whole puzzle.

Main teaching

Explain that cells are the building blocks of all living organisms.

- Emphasize that all living things are made up of cells and the cell is the basic unit of life.
- On the board, draw diagrams of a plant cell and an animal cell and ask the students to find the differences.
- Discuss the similarities and differences: both plant cells and animal cells have a cell membrane; they both contain cytoplasm and a nucleus; a plant cell has one large vacuole while an animal cell has many small vacuoles.
- Explain that plant cells also have a cell wall and chloroplast but these are not found in animal cells.
- Explain the role of each part of a plant cell and an animal cell.
- Explain that different cells make up the different parts of the body.

Guided Practice

The students should be asked, one by one about the roles of different parts of a cell.

Independent Working

Ask the students to read page 2 and identify the different parts of a plant cell and an animal cell.

Wrap Up

Discuss how plants and animals have different cells and talk about their similarities and differences.

Homework/Going Further

Write up the main points of the earlier (above) discussion in your notebooks.

Lesson Plan 2 — Student Book Pages …3-4

Learning Objective

- To compare and contrast characteristics that distinguish major groups of living things (plants and animal).

Learning Outcomes

Students should be able to:

- explain the difference between the animals and plants
- identify and explain similarities between the animals and plants.

Introduction

- Show the students some flash cards with pictures of animals or plants, emphasizing upon various requirements and characteristics e.g., animal grazing on grass, plant seedling being watered and a child walking.
- Place a chart (reference page 4 on the soft board) showing differences and similarities between animals and plants.

Main Teaching

- Explain the differences and similarities between animals and plants.
- Emphasize the scientific facts i.e. All living things need food, they respire, grow, move, exercise and have sensitivity.
- The chart showing difference and similarities will be used for further discussion

Guided Practice

The students should be asked one by one about differences and similarities between animals and plants.

Independent Working

Ask the students to read page no.3 and note the differences and similarities between animals and plants.

Wrap Up

Discuss how animals and plants are living things and they have difference and similarities.

Homework/Going Further

Write down a list of similarities and differences between animals and plants in your notebooks.

Lesson Plan 3 — Student Book Pages 5–7

Learning Objectives

- To understand the concept of classification.
- To highlight the classification of animals according to the environment they live in.

Learning Outcomes

Students should be able to:

- explain how living things are classified into different groups.
- explain that different living things live in different environment.

Introduction

Ask the students to name some animals that are found around their homes.

Main Teaching

- Explain that living things are classified into two major groups: the animal kingdom and plant kingdom.
- The animal kingdom is divided further into:
  - terrestrial animals e.g. elephant, dog and lion.
  - arboreal animals e.g. squirrel, opossum and lizard.
  - aquatic animals e.g. fish, whole and turtle.
- Explain how living spaces of various animals are different.

Guided Practice

With the students prepare a table listing the different environments and animals that live well there.

Independent Working

Direct the students towards resources about different environments. Ask them to prepare short reports on the animals, which live in different environments. Include information such as the kind of food they eat and how they protect themselves from extreme weather.

Wrap Up

Ask students to classify some animals into different classes.

Homework/Going Further

The students should collect pictures of some animals from each group i.e. terrestrial, aquatic, arboreal and aerial and write a report on how each is different as it is classified into a certain group.

Learning Objectives

- To classify animals as warm blooded or cold blooded.
- To classify animals in terms of vertebrates and invertebrates with examples and analyse the differences and similarities between invertebrates and vertebrates.

Learning Outcomes

Students should be able to:

- Explain how animals deal with temperature variations is different ways.
- Explain that animal kingdom is large group of all animals living on Earth.
- Explain that vertebrates and invertebrates are two major groups in animal kingdom.

Introduction

Teacher will ask students about their pets and if they do, they will be asked to name them.

Main Teaching

- Quiz the students about their living habits in summer and winter. How are they different from each other.
- Ask them if animals change their living habits according to season as well.
- Relate how humans adapt and deal with temperature variations.
- Explain the animal kingdom and how they are further classified into vertebrates and invertebrates based on presence or absence of backbone.
- Emphasize upon five classes of animals with backbones, giving examples from each class.

Guided Practice

The students should be asked to divide into two groups; each will talk about vertebrate or invertebrate with examples.

Independent Working

Ask the student to read page no 7 to 9 and note how animals deal with temperature variations and how they are further classified based on presence of or absence of backbones.

Wrap Up

Discuss how animals deal with temperature variations and how they are further classified based on presence or absence of backbone.

Homework/Going Further

Write with few examples on how animals deal with temperature variations

Note the classification of animals into a kingdom and its further classification into two main groups.

Lesson Plan 5 — Student Book Pages 9–12

Learning Objectives

- To classify plants in terms of flowering and non – flowering plants and analyse the difference and similarities in flowering and non-flowering plants.
- To identify parts of a plant (leaves, stem, flowers, seed, and roots)
- To relate structure of plant to their functions (i.e. roots absorb water and nutrients and anchor the plant, leaves make food, the stem transports water and food, flowers produce seeds and seeds produce new plants).
- Recognise and appreciate diversity in life (both plants and animals) and identify ways to protect diversity.

Learning Outcomes

Students should be able to:

- explain how plants are important for life on Earth
- Identify and explain various parts of flowering plants.
- Explain classification of plants into flowering and non-flowering plants based on their similarities and differences.
- Understand the diversity of life and their role in the environment.
- Illustrate/explain the life cycle of a flowering plant.

Introduction

Show the students some

- Flowering and non-flowering plants in pots e.g., roses and ferns. Show how they are similar and different in some ways.
- Complete a Jigsaw (Picture given on page 12 NOPS Book 4).
- Place the table (Page 11 NOPS Book 4) on the soft board and use in main teaching.

Main Teaching

- Explain the Plant Kingdom and its major groups i.e. flowering and non-flowering plants: and lifecycle of a flowering plant.
- Talk about the table given on page 11 NOPS book 4.
- Complete jigsaw puzzle with students while discussing the diversity of life.

Guided Practice

Students will be asked about plants and their groups.

How can we support diversity of life on Earth.

Independent Working

Ask students to read page no.11 and note the similarities and differences between tomato plants and pine trees.

Wrap Up

Discuss how plants have similarities and differences, based on their classification.

Homework/Going Further

Ask students to grow some seeds like chickpeas or lentils at their homes and record observations in a report.

Lesson Plan 6 — Student Book Pages 16–17

Learning Objectives

- To identify major parts/organs in animals (teeth, bones, lungs, stomach, muscles, and brains).
- To give clear concept of cell, tissue and organ.

Learning Outcomes

Students should be able to:

- explain that all living things are made up of cells.
- explain the tissues are special groups of cells which perform similar job.
- explain that groups of tissues that work together are called organs and each organ has a special function.

Introduction

First show the students parts of a toy car (or any toy which needs assembling) and then assemble it to show various how parts work together .Then talk about how the organs in our body work together in groups called systems and these organs are made up of cells.

Main Teaching

- Ask the students to look at pictures of cells and explain that cells are the building blocks of life. Explain how types of cells work together and perform different functions in our body.
- Ask students to look at the diagram on page 17 and explain that same types of cells join together and form tissues.
- Write the names of some tissues on the board show their location in human body and ask the students their functions.
- Look at the pictures of the internal organs (heart, lungs, kidneys, muscles, brain and stomach) on page17. Ask different students to name the parts and say one thing that each organ does for us.

Guided Practice

Show different cells under the microscope and ask the students to observe them closely or show them a video about different cell under the microscope.

Independent Working

Ask the students to write the names of different tissues and organs and their functions.

Wrap Up

Ask the students to read the text on page 17 and discuss it in the class.

Homework/Going Further

Draw an outline of the human body on an A4 paper and label the areas where different cells are located and write their function.

Lesson Plan 7 — Student Book Pages 17–18

Learning Objectives

- Relate the parts/organs in animals to their functions (bones support the body, lungs takes in air, the heart circulates blood, the stomach helps to digest food and muscles move the body)

Learning Outcomes

Students should be able to:

- explain that groups of organs work together in organs systems.
- explain that our muscles and bones work together as the musculoskeletal system.

Introduction

Invite a student to volunteer to perform exercises. Point out how different muscles and bones make it possible for us to do exercises.

Main Teaching

- Recall what is a cell, tissue and organ. Explain the level of organization (cell→tissue →organ→organ system→organism)
- Using an example of a named organ system for example, the urinary system. Explain how different organs present work together.
- Show the students an X-ray of a broken bone. Ask them to suggest how they can protect their bones.
- Explain that bones cannot move on their own, they need muscles to move them. Show a picture of the muscular system.
- Talk about various muscles used to perform different movements.
- Explain that joints are points where two or more rigid bones are joined together by muscles. Joints enable humans to bend, swivel, curl, pivot and turn.
- Ask the students to move a hinge joint (elbow or knee) and explain how a hinge joint (like hinge on the door) and a ball and socket work. Students should discuss the range of movement of each joint. Ask the students to move some major bones in their bodies, such as the shinbone, the thighbone, humerus (upper arm bone) and the jaw bone.
- Ask students which joint is used to move certain bones. Ask them to describe the movement of the joint

  (up and done: around in a circle,etc.) and identify the kind of joint being used. Read about the skeletal/muscular system on page 5-6.

Guided Practice

Show the students a model skeleton to see how bones are connected.

Independent Working

To help students help students understand how muscles move our bones, invite them to follow the steps below to create a model of a human arm.

1. Fold and then unfold an 8 into1inch strip of cardboard to create a cardboard arm.
2. Cut a rubber band in half to represent two muscles.
3. Tape a rubber band muscle in a straight line to each side of the cardboard arm.

4. Gently pull one rubber band to make the sections of the arm bend towards each other and contract. This is the actions of the biceps.
5. Then pull the muscles on the reverse side (the triceps) to make the biceps lengthen and relax. The arm will straighten once more.

Wrap Up

Instruct students to answer Question 1 on page no 13

Homework/Going Further

The students should attempt activity on page 1 and 15.

Lesson Plan 8 — Student Book Pages 18–19

Learning Objectives

- To relate the parts of the body to its function (i.e. teeth breakdown food)
- To recognize different types of teeth.

Learning Outcome

Students should be able to:

- Identify different types of teeth and their function.

Introduction

Ask the students to use their tongue to count the number of teeth they have, and complete the "Discuss and Answer" on page 18

Main teaching

- Ask the students how many teeth they had when they were born
- Explain the differences between the milk teeth and the permanent teeth.
- Show a model of a jaw. Point to the different types of teeth, and explain the role of each type of tooth:
- Incisors-for cutting and biting food.
- Canines – for tearing food
- Molars and premolars-for grinding and chewing food
- Ask the students to read the text and study the diagram on page 19 and then discuss works of a dentist and tooth care.

Guided Practice

Show video demonstration of brushing teeth

https://www.youtube.com/watch?v=CmZp1wdJAw4

https://www.youtube.com/watch?v=Bi3R0cTie7c

https://www.youtube.com/watch?v=Qq5oamypTCY

(or invite a dentist to demonstrate the brushing of teeth)

Independent Working

The students should complete the concept check on page 19

Wrap Up

Invite a student to demonstrate the correct way to brush teeth

Homework/Going Further

The students should do activity no. 3 given on page no. 24

Lesson Plan 9 — Student Book Pages 20–22

Learning Objectives

- To elaborate upon musculoskeletal system.
- To highlight importance of bone in our bodies and how to avoid injuries, etc.
- To realize importance of "First Aid Kit"

Learning Outcomes

Students should be able to;

- Recognise that there are different types of muscles: smooth, cardiac and skeletal.
- Explain that we must look after our bones so they do not break
- Explain precautionary measures at home in case of injury (First Aid Kit)

Introduction

Do activity 1 on page 24

Main teaching

- Ask the students to read the text on page 20 and discuss the different types of muscles.
- Write the names of some muscles on the board and explain how they work and their locations within the body.
- Discuss some diseases of bones and muscles and explain that although the bones are strong they can break.
- Explain that bones fracture because of injury. Bones weaken as people grow older hence, having a high probability of fractures.
- Emphasize on eating Calcium-rich foods like milk, cheese and yoghurt, helps to build strong bones
- Discuss importance of 'First Aid Kit' at homes to take case of injury first hand

Guided Practice

Encourage students to attempt "discuss and answer" on page 21.

Independent Working

Give the students cards to match the types of muscles and bones with their functions.

Wrap Up

Answer Question 1 on page 23 in their books.

Homework/Going Further

Ask the students to attempt Activity 4 on page 24

Worksheet 1-1

1. Fill in the blanks

a. All living things are made up of _____.

b. The _____ is the outer covering of the cell and controls what enters and leaves.

c. The jelly-like substance inside the cell is called _____.

d. The _____ controls all the activities of the cell.

e. A plant cell has _____ vacuole, while an animal cell has _____ vacuoles.

f. The _____ supports and protects the plant cell.

g. _____ contains chlorophyll and helps the plant make food.

h. All living things need to perform _____ life processes.

i. Plants make their own food through _____.

j. Removal of waste from the body is called _____.

2. Match each life process with its description.

Life Process	Description
Respiration	Making new life
Reproduction	Breaking down food to get energy
Sensitivity	Increasing in size and going through a life cycle
Excretion	Reacting to changes in the environment
Growth	Removing waste from the body

3. Choose the correct answer

i. What helps plants make their own food?

a. Nucleus

b. Chloroplast

c. Vacuole

ii. Which part of the cell stores food and waste?

a. Cytoplasm

b. Cell wall

c. Vacuole

iii. Which life process helps animals escape danger?

a. Growth

b. Sensitivity

c. Respiration

4. Draw and label a plant cell and an animal cell.

Worksheet 1-2

1. Fill in the blanks

a. Scientists sort living things into groups. This is called _____.

b. Animals with a backbone are called _____.

c. Animals without a backbone are called _____.

d. All plants belong to the _____ kingdom.

e. Flowering plants produce _____ and _____.

f. Non-flowering plants reproduce by _____ or _____.

2. Match each group with its feature.

Group	Feature
Vertebrates	Do not have backbone
Invertebrates	Have a backbone
Flowering plants	Reproduce with spores or seeds
Non-flowering plants	Produce flowers and fruit
Aquatic animals	Live in trees
Arboreal animals	Live in water
Aerial animals	Fly in the air

3. Which of the following statements are True and False

a. Most animals in the animal kingdom are vertebrates. _____

b. Mosses and ferns are non-flowering plants. _____

c. Pine trees produce flowers. _____

d. Insects are invertebrates. _____

e. Cutting down forests helps protect biodiversity. _____

4. Think and Answer

i. How are flowering and non-flowering plants different?

a. _____

b. _____

c. _____

ii. What makes a mango tree and a pine tree similar and different?

a. _____

b. _____

c. _____

iii. Why is it important to protect endangered species?

a. _____

b. _____

c. _____

5. Create a classification chart showing:

- Vertebrates and invertebrates (with examples)
- Flowering and non-flowering plants (with examples)

Vertebrates/ Invertebrates	Flowering/Non-flowering

Worksheet 1-1

1. Fill in the blanks

a. _____ are the smallest building units of living things.

b. A group of similar cells working together is called a _____ .

c. A group of tissues working together is called an _____ .

d. The _____ pumps blood to all parts of the body.

e. The _____ receives and processes information and controls body actions.

f. The _____ helps digest food.

g. The _____ move oxygen into the blood and carbon dioxide out.

h. The _____ remove waste and extra fluid from the body.

2. Match each organ with its function.

Organ	Function
Brain	Circulates blood
Heart	Controls actions and responses
Stomach	Exchange gases
Lungs	Digests food
Kidneys	Remove waste and balance minerals

3. Choose the correct answer

i. What is a group of organs working together called?

a. Tissue

b. Organ system

c. Skeleton

ii. Which organ system includes the stomach and intestines?

a. Muscular system

b. Digestive system

c. Nervous system

iii. Which organ is made up of muscle tissue and works constantly?

a. Brain

b. Heart

c. Lung

4. Think and Answer

a. What is the difference between a cell, a tissue, and an organ?

_____

_____

_____

b. Why is the heart considered a powerful organ?

_____

_____

_____

c. How do organs work together in a system?

_____

_____

_____

5. Draw a diagram showing the levels of organization in the human body: cell → tissue → organ → organ system. Label each part.

Worksheet 1-2

1. Fill in the blanks

a. All the bones together make up the _____.

b. The _____ protects the brain, and the _____ protects the lungs and heart.

c. _____ helps break down food.

d. A child has baby teeth, also called _____ teeth.

e. An adult has _____ permanent teeth.

f. The four types of permanent teeth are _____, _____, _____, and _____.

g. _____ muscles are voluntary and help move the body.

h. _____ muscles make up the heart.

i. _____ muscles are involuntary and found in hollow organs.

2. Match each type of muscle with its description.

Muscle Type	Description
Skeletal	Found in organs, involuntary
Cardiac	Voluntary, attached to bones
Smooth	Found in the heart, involuntary

3. Which of the following statements are True and False

a. Bones protect soft internal organs. _____

b. Milk teeth are permanent. _____

c. Cardiac muscles need your instructions to work. _____

d. Calcium-rich foods help build strong bones. _____

4. Think and Answer

a. What would happen if your body had no bones?

_____

_____

_____

b. How do muscles and bones work together to help you move?

_____

_____

_____

c. Why is it important to take care of your teeth?

_____

_____

_____

5. a. Draw and label the types of teeth in your mouth.

b. Write what each type does.

Unit 2: Ecosystem

Lesson Plan 1 — Student Book Page 25–31

Learning Objectives

- To recognize what is an ecosystem (e.g., forest, ponds, rivers, grasslands and deserts).
- To explain biotic (plants, animals and humans) and abiotic factors (light, temperature, soil and water) and their linkages.
- To analyse the way these biotic and abiotic constituents create a balance to sustain any ecosystem.
- Recognize the interactions between animals and plants and the importance of maintaining balance within an ecosystem.

Learning Outcomes

Student should be able to:

- Identify the non- living parts of the environment as water, air, mineral, light and warmth.
- To explain the interaction between the biotic and abiotic factors.
- To share how our actions are affecting the ecosystem and what is our responsibility towards saving our ecosystem.

Introduction

Ask the students

- Where do we live?
- Where do the animals live?
- From where do we get our food?

Main Teaching

- Explain the various ecosystems on Earth.
- Every living thing has its own ecosystem.
- Explain that biotic and abiotic factors play their vital parts in the ecosystem, name and discuss abiotic factors i.e., water, air, minerals, light, warmth.
- Discuss imbalance and competition.
- State how actions are affecting the environment badly.
- Ask the students what their responsibility is towards saving the ecosystem.

Guided Practice

Do concept check on page 30.

Independent Working

Ask the students to "Discuss and Answer" on page 27

Wrap Up

List and discuss the abiotic factors i.e., water, air, minerals, light and warmth

Homework/Going Further

The students should be given activity 1 on page no.37 as homework.

Lesson Plan 2 — Student Book Pages 31–35

Learning Objectives

- To describe a few food chains. Analyse the structure of a food chain to understand its functions.
- To describe the role of living things and their link in a simple food chain (e.g. plants produce their own food, some animals eat plants, while some animals eat the animals that eat plants)
- Identify and describe common predators and prey.
- To recognize and explain some living things in an ecosystem compete with each other for food and space
- Recognize the value of a balance ecosystem.
- To interpret that human actions such as urbanization such as urbanization, pollution and deforestation affect the food chains in an ecosystem.
- Identify various actions and that humans can play in preserving various ecosystem

Learning Outcomes

- Draw a food chain to show how all living things depend on each other.
- Identify animals as herbivores, carnivores and omnivores.

Introduction

- Ask the students to look at the food chains on page 34, discuss it.

Main teaching

- Quiz the students about their living habitat in summer and winter. How are they different from each other?
- Ask them if animals change their living habits according to season as well.
- Draw some examples of simple food chains on the board.

  Sketch a food chain (e.g. Sun- Grass- Cow- A student) on the board to demonstrate to the students that what they eat is a part of a food chain.
- Discuss how livings things protect themselves.
- Discuss as to how plants are producers.
- Introduce the concept of animals as consumers, i.e. organisms that eat producers or other consumers.
- Explain the role of decomposers in all food chains.

Guided Practice

- Using the earlier sketched food chain, ask the students to help you identify the primary producers, primary consumers, and the secondary consumers.

Independent Working

- Write the following terms on the board: plants, rabbit, fox, lion
- Ask the students to make a food chain by sequencing them. The students should also identify the producer and consumers

Wrap Up

- Complete the concept check on page 34, and discuss and answer on page 35.

Homework/Going Further

The students should list the name of some producers, consumers, and decomposers.

Worksheet 2-1

1. Fill in the blanks

a. An ecosystem is a community of _____ things and their interactions with _____ things.

b. Living things in an ecosystem are called _____ factors.

c. Non-living things in an ecosystem are called _____ factors.

d. Plants use _____, _____, and to make their own food.

e. _____ are living things that break down dead plants and animals.

2. Match each food chain part with its role.

Part	Role
Sun	Make their own food
Producers	Provides energy for plants
Consumers	Break down dead matter
Decomposers	Eat plants or other animals
Herbivores	Eat other animals
Carnivores	Eat only plants
Omnivores	Live on or inside other animals
Parasites	Eat both plants and animals

3. Choose the correct answer

i. What is a scavenger?

a. An animal that eats only plants

b. An animal that hunts live prey

c. An animal that eats dead animals

ii. Which of the following is a decomposer?

a. Snake

b. Fungus

c. Eagle

iii. What happens if one part of a food chain is removed?

a. Nothing changes

b. It affects other plants and animals

c. The chain becomes stronger

4. Think and Answer

a. What would happen if all the snakes in a food chain were removed?

b. How do decomposers help keep ecosystems clean?

c. Why is the Sun important in every food chain?

5. Activity

i. Put these in correct order to form a food chain:

a. owl, plants, insects, mouse

b. hawk, hare, grass

c. grasshopper, bird, grass, hawk

ii. Explain what happens if one predator is removed from each chain.

Worksheet 2-2

1. Fill in the blanks.

a. We should save ecosystems to protect and ensure a healthy _____.

b. Cutting down trees and polluting water can disturb the _____ of an ecosystem.

c. Plastic does not and can harm _____.

d. _____ spaces in cities help reduce pollution and provide shade.

e. Animals protect themselves by running, hiding, or using _____.

f. Plants protect themselves with _____, leaves, or poisonous berries.

2. Match each action or adaptation with its purpose.

Item	Purpose
Planting trees	Harms ecosystems and blocks sunlight
Using plastic	Helps reduce pollution and cool the environment
Arctic fox	Protects itself with spikes
Cactus	Camouflages in snow
Recycling	Hides using body patterns
Zebra	Reduces waste and saves resources

3. Mark whether the statements are True or False.

a. Plastic decomposes quickly like leaves. _____

b. Trees help absorb water and release oxygen. _____

c. All animals eat the same kind of food. _____

d. Parasites live inside or on other animals. _____

e. A balanced ecosystem has equal numbers of predators and prey. _____

4. Think and Answer

a. What are some ways humans can help protect ecosystems?

_____

_____

_____

_____

b. How do animals and plants protect themselves from danger?

c. Why is it important to reduce single-use plastic?

Unit 3: Human Health

Lesson Plan 1 — Student Book Page 38-39

Learning Objectives

- To describe the importance of maintaining good health.
- To recognise everyday behaviors that promote good health (e.g. a balanced diet)

Learning Outcomes

Students should be able to explain :

- What is meant by the term balanced diet.
- We all need a balanced diet to keep healthy.

Introduction

Ask the students what they ate for breakfast. Have a class discussion about the food categories represented in their breakfasts..

Main teaching

- Ask the students to look at picture of a balanced meal on page 39, on the students book and discuss what it shows.
- Introduce the definition of a balanced diet, that is, eating meals that have enough but not too much food, from each of the six food groups. Explain that a balanced diet gives you the correct daily amount of carbohydrates, minerals, fats, proteins and vitamins.
- Discuss that we get different amount of nutrition from different foods.
- Allow students to explore and discuss how food choices can affect people's health.
- Emphasize that washing your hands before you eat is essential for keeping healthy.

Guided Practice

Ask the students to comment on the 'Discuss and Answer' on page 39.

Independent Working

Instruct the students to play the Balanced Diet game. Divide the students into pairs and give each pair a paper plate. Put pictures of food in a basket and ask the students to collect and put on the plate pictures of food that make a balanced lunch. Other pairs should comment on whether it is balanced or not.

Wrap Up

Ask students of regarding what they have learned today and how will they use it to improve their own health.

Homework/Going Further

Ask students to complete the table in question 3on page 47.

Lesson Plan 2 — Student Book Pages 31–35

Learning Objectives

- To define balanced diet and explain its components.

Learning Outcomes

Students should be able to :

- Name foods that contain proteins, carbohydrates, fats, vitamins, and minerals.
- Explain how vitamins and minerals are needed by the body.

Introduction

Ask the students about their food and take a poll who does and who does not like to eat vegetables like bitter gourd, Lady's pumpkins and turnips.

Main teaching

- Write the names of six food groups on the board in a table and write examples under each heading. Discuss the table in detail.
- Ask the students to look at the picture of food from the six food groups and ask them to name each food item.
- Identify the range of healthy food and discuss the effects that these foods have on our bodies.
- Emphasize that a healthy meal needs to include starchy foods. Encourage students to try wholegrain varieties, e.g. wholegrain cereal, whole wheat pasta and brown rice.
- Explain that we should eat at least, two portions of fish a week to get proteins and essential fats.
- Ask the students to name some fruits and vegetables and encourage them to eat at least 6 portions of fruits and vegetables everyday because they contain fiber.
- Discuss what daily amounts are, what nutrient each food group provides, and why everyone should eat something from each food group at every meal.

Guided Practice

Help the students to discuss and complete the concept check on page 40.

Independent Working

Ask the students to complete the table in activity 1 on page 49.

Wrap Up

Discuss foods that contain minerals.

Homework/Going Further

- Ask the students to plan a menu for the entire day. They should choose a variety of foods and include the recommended number of nerving from each food groups for breakfast, lunch, and dinner. For each meal, they should draw the foods (and / or use magazine pictures) and indicate the food groups represented.

Lesson Plan 3 — Student Book Pages 41–43

Learning Objectives

- To recognize everyday behavior that results in good health by following food pyramid
- To identify common food sources included in a balanced diet like fruits, vegetables, grains, milk and meat groups.

Learning Outcomes

Students should be able to :

- Explain how a food pyramid shows the relative importance of the various food groups.
- Describe various ways of cooking and preserving food.

Introduction

- Do activity 3 on page49.

Main teaching

- Ask the students to compare the proportions of the different food groups shown in the picture on page 42 of the Student Book.
- Discuss the six food components of the food components of the food pyramid and their proportions by explaining the significance of the pyramid formation, the food group we should at eat least are at the top that includes fatty foods, sugar and salts; the foods we should eat most of like carbohydrates and proteins are at the bottom.
- Share information about the food pyramid, offer recipe ideas for healthy food choices, and discussing the effects that unhealthy food can have on people's health.
- Ask the students explain as to why some people are concerned regarding the amount of fatty and sugary foods and drinks that some students eat.
- Inform them that eating too many fatty and salty foods can lead to heart diseases in later life, eating too many sugary foods such as cakes, biscuits, sweets, chocolates,and soft drinks can lead to dental cavities.

Guided Practice

Draw a table and ask the students to record their weight and height during a lesson. Invite a dietician to visit the school to answer some questions that the students might have about nutrition.

Independent Working

Answer question 6 on page 47.

Wrap Up

Emphasize upon keeping good health by selecting food sensibly.

Homework/Going Further

Ask the students to write in their notebooks and talk about question 7 on page 48 in next class

Lesson Plan 4 — Student Book Pages 42–43

Learning Objectives

- To understand the value of clear drinking water and inquire about the factors that generally make it unclear.
- To explore a few ways that can help make water clean and suitable for drinking (water filtration and boiling).

Learning Outcomes

Students should be able to:

- Explain importance of water and exercise along with balanced diet.
- Explain what actions make water unclear discuss various ways to purify water.

Introduction

- Keep a glass filled with tap water and ask students to guess if it is safe for drinking.

Main teaching

- Ask students what facility is available for them in school, which provides clean and purified water.
- Explain why water is so important for human health along with exercise and balanced diet.
- Discuss various factors that make water unclear thus not safe for human usage like drinking.
- Ask students what measures are taken in their homes for purification of water.
- Explain that physical activities like brisk walk, bicycling, swimming are good exercise and improve our health.

Guided Practice

- Ask students to observe and write a report on how water can be made save to drink (page 43).

Independent Working

- Ask the students to prepare a table listing various precautionary measures with pictures.

Wrap Up

- Importance of drinking clear water will be discussed. Share how much water children should drink on daily basis for good health.

Homework/Going Further

- Ask the students to read the lesson and discuss with anyone of the family members or with a friend.

Lesson Plan 5 — Student Book Pages 44–45

Learning Objectives

- To observe and recognise some common symptoms of illness (e.g. fever, coughing and influenza)
- To differentiate between contagious diseases (Hepatitis, T.B, Influenza) and non-contagious (Cancer).
- To relate the transmission of common communicable diseases through human contact.
- To explain some methods of preventing, common diseases and their transmission (e.g. vaccination, washing hands, and wearing mask).

Learning Outcomes

Students should be able to:

- To explain what diseases and their symptoms are.
- To explain two types of diseases based on the mode of transmission.
- To discuss how contagious diseases can be prevented.

Introduction

- Ask students randomly about any health issues they have faced lately like fever, cough or sneezing and what was the result.

Main teaching

- Define what is a disease and name some common diseases.
- Discuss symptoms of some diseases like fever, and body aches.
- Explain the transmission of diseases as they are classified on the basis of being contagious or non-contagious. Name and talk about some non-contagious diseases.
- Explain non-contagious diseases and their prevention including vaccination.
- Importance of protecting ourselves from COVID -19, emphasizing upon wearing masks and other protective measures. Ask students if they wear masks and maintain social distance, especially in public places.

Guided Practice

Ask students to prepare a list of precautionary measures that will protect them from contagious diseases and write in their notebooks.

Independent Working

- Student to do activity 3 on page 49 and prepare a chart for class soft board.

Wrap Up

- Students will do Question number 7 and 8 page 48 in class.

Homework/Going Further

- Do activity no. 2 page 49 and report.

Worksheet 3-1

1. Fill in the blanks

a. A balanced diet includes the right _____ of different types of food.

b. Carbohydrates give us _____ to work and play.

c. Proteins help the body to _____ and _____ tissues.

d. Cooking food kills _____

2. Match each food group or concept with its function.

Item	Function
Fats	Help eyesight and healing
Vitamins	Keep the body warm
Minerals	Helps digestion
Dietary fibre	Strengthen bones and teeth
Freezing	Preserves food

3. Choose the correct answer

i. Which of the following is junk food?

a) Apple

b) Rice

c) Fizzy drink

ii. Which vitamin is made by the skin in sunlight?

a) Vitamin A

b) Vitamin C

c) Vitamin D

iii. What happens if food is overcooked?

a) It becomes healthier

b) It loses nutrients

c) It tastes better

4. Think and Answer

a. Why is it important to eat a variety of foods?

_____

_____

_____

b. What makes a meal unbalanced?

c. How can you reduce junk food in your diet?

d. What are some safe ways to preserve food at home?

5. **Draw a food pyramid and label each section with examples of foods. Show which foods should be eaten more and which should be eaten less.**

Worksheet 3-2

1. Fill in the blanks

a. We should drink at least _____ glasses of water daily.

b. Water that stands still for a long time becomes _____.

c. Boiling water kills _____ that may cause illness.

d. A disease is a disruption to the _____ of living things.

e. Contagious diseases can spread through _____, _____, or _____.

f. A vaccine helps the body to _____ a disease.

2. Match each method or concept with its purpose.

Item	Purpose
Filtering	Strengthens bones and muscles
Exercise	Removes particles from water
Polio	Spreads through air
TB	Causes paralysis
Dengue	Spread by mosquitoes

3. Mark whether the statements are True or False

a. Stagnant water is safe to drink. _____

b. Water from deep wells is usually clean. _____

c. Exercise helps improve blood circulation. _____

d. Fizzy drinks are a good source of vitamins. _____

e. Polio can be treated with medicine. _____

f. Vaccines help prevent contagious diseases. _____

4. Think and Answer

a. What are some ways to purify water at home?

_____

_____

_____

_____

b. Why is clean drinking water important for health?

c. How does exercise help your body?

d. What are some symptoms of dengue?

e. How can we prevent the spread of contagious diseases?

Unit 4: Topic: Matter and its Characteristics

Lesson Plan 1 Student Book Page 54-55

Learning Objectives

- Describe matter and its states

Learning Outcomes

Students should be able to explain :

- explain that matter is made up of particles.

Introduction

Make groups of 4 students each. Give some bucky balls to each group. Ask the students to use them to make different shapes. Use the activity to explain that, just as their different shapes are made of the balls, every different form of matter is made up of particles.

Main Teaching

- Explain that matter is anything that has mass and takes up space.
- Give each student some books and explain that the mass of each book is different. Explain that the mass is the quantity of matter in a body.
- Show different sized beakers to demonstrate that different beakers have different volumes. Explain that volume is a measurement of how much space something takes up.
- Compare the weight of an inflated balloon to the weight of an empty balloon to demonstrate that air has weight.
- Refer to the bucky balls again and introduce the concept of particles. Explain that the particles are always moving about.
- Discuss how particles in solids only vibrate but in gases, they move a lot.

Guided Practice

Activity:

Explain that solids are made up of particles that are so tightly packed together that they cannot move about freely, like people in a very crowded room. Because the particles are stuck in one place, the shape of a solid usually stays the same.

- Ask the students to stand up as if in crowded room, where nobody can move.
- Ask the students to imagine that there are fewer people in the room and people can walk around comfortably. In the same way, in liquids the particles are less tightly packed together, so they can move around and so the liquids can take the shape of a container they are in. Ask students to role-play moving around, in the room.
- Finally ask the students to imagine that they are out in the playground and they can move around freely because they have plenty of space. This how the particles in gases move around and because of this, they do not have a fixed shape or size, they will spread through the space available. Ask a few students to move around like the gas particles.

Independent Learning

Ask the students to work in pairs. Distribute one pack of sorting cards to each group of students. Ask them to sort the cards based on how much mass they think each object has.

Wrap Up

Discuss and answer the 'Concept Check' on page 55.

Homework/ Going Further

The students should draw shapes in their notebook to represent, a solid, a liquid and a gas. Show the arrangement of particles in each of them.

Lesson Plan 2 — Student Book Page 54-55

Learning Objectives

State the three states of matter also share some examples.

Learning Outcome

Students should be able to:

- describe characteristics of each state of matter with examples.

Introduction

Give students, an ice cube, and ask them to rub it in their hands. Explain that the ice is melting i.e. changing state from solid to liquid because heat is released by the rubbing.

Main Teaching

- Write down the names of three states of matter on the board and explain how changes in state occur. Discuss the effect of heating and cooling in bringing about changes of state.
- Refer to the melting ice and explain that melting occurs when the temperature is increased and a solid turns into a liquid.
- Explain that when a liquid cools it becomes a solid as the particles move closer to each to each other. In water, this process is called freezing.
- Put some water in a beaker and heat it. Explain that bubbles are a gas and water is boiling. Explain that the water has changed into a gas. This process is called evaporation.
- Display a glass of cold water with drops of water on the outside. Explain that when the drop of water vapour (a gas) touches a solid surface, it is cooled and changes into water. This process is known as condensation.

Guided Practice

Ask students to do Question 2, from page 61, in their notebooks.

Independent Working

Students will search the various states water is found on Earth from Internet and submit a report.

Wrap up

Talk about the different states of various forms of matter with examples.

Homework/Going Further

Ask students to observe a puddle and record the way it changes in their notebooks.

Lesson Plan 3 — Student Book Page 56-58

Learning Objectives

- Compare and sort objects and materials on the basis of physical properties (e.g. mass, volume, states of matter, ability to conduct heat or electricity, ability to float or sink in water.

Learning Outcome

Students should be able to:

- explain the physical properties of matter with examples.
- explain changes in states of water due to various changes in the environment.

Introduction

Show students the different states of water using ice cubes and water at room temperature. Use terms such as melting and condensation to explain the change in states and ask them about their observations.

Main Teaching

- Explain that matter changes its states when heated. It can melt, boil, condense and freeze with change in temperature.
- Draw and explain the diagram on page 56 showing changes in states of matter.
- Explain that the distance between the particles changes with physical changes.
- Introduce the term ‘mass and volume’ and discuss properties of matter.

Guided Practice

Ask students to do ‘Concept Check’ on page 58 and facilitate as and when required.

Independent Working

Ask students to do activity 1 on page 62 with an elder’s support.

Wrap up

Explain the change observed in daily life, which do not change the matter but their state changes.

Homework/ Going Further

Ask students to note any 5 physical changes around them and report.

Lesson Plan 4 — Student Book Page 59-60

Learning Objectives

- Explore the properties of metals (i.e. appearance, texture, colour, density).
- Identify properties of metal (conducting heat and electricity) and relate these properties to use of metals (i.e. a copper electric wire, an iron cooking pot).

Learning Outcomes

Students should be able to:

- Identify metals from other materials.
- Recognise metals through their appearance, etc. (physical properties).
- Explain usage of various metals.

Introduction

Show some metal objects like wire, bangles, cane of juice and ask students to touch these and feel the texture, notice the colour and weight.

Main Teaching

- Explain that metals are found in Earth called as ores. They are solid rocks.
- Explain that metals are lustrous (i.e. materials, which shine).
- Discuss texture of metals and talk about colours of metals. Take example from students.(For example gold is of yellowish red colour).
- Explain metals as conductors of heat and electricity.
- Define density and talk about sinking and floating of metal objects. For example, a needle sinks and a ship floats.

Guided Practice

Ask students to do "Discuss and Answer" on page 60.

Independent Working

Ask students to do Question 3 on page 61 in their notebooks.

Wrap Up

Explain metals and the relevant concepts especially mass, volume and density.

Homework/ Going Further

Ask students to name three metals along with their usage.

Worksheet 4-1

1. Fill in the blanks

a. Everything that has _____ and occupies _____ is called matter.

b. Matter is made up of tiny _____ that are always _____.

c. Matter exists in three states: _____, _____, and _____.

d. A substance is made up of the same kind of _____.

2. Match each state of matter with its characteristics.

State	Characteristics
Solid	No fixed shape or volume
Liquid	Definite volume but no fixed shape
Gas	Definite shape and volume

3. Choose the correct answer

i. What causes a solid to become a liquid?

a. Cooling

b. Heating

c. Freezing

ii. Which state of matter has particles that move freely and bounce off each other?

a. Solid

b. Liquid

c. Gas

iii. What happens when a gas cylinder is opened?

a. Particles stay inside

b. Particles escape and mix with air

c. Particles freeze

4. **Draw a diagram showing the changes of state: melting, freezing, evaporation, and condensation. Label each part clearly.**

Worksheet 4-2

1. Fill in the blanks

a. Mass is the amount of _____ in an object.

b. Volume is the _____ occupied by an object or fluid.

c. _____ materials soak up water, while _____ materials do not.

d. _____ materials bend easily, while _____ materials do not.

e. _____ conduct heat and electricity, while _____ stop it.

2. Match each material with its property.

Material	Property
Rubber	Strong
Steel	Flexible
Paper	Light
Cotton	Weak
Lead	Heavy

3. State whether the following statements are true or false.

a. All materials float on water. _____

b. Metals are shiny and can be shaped. _____

c. Mercury is a metal in liquid form. _____

d. Oil dissolves in water. _____

4. Think and Answer

a. Why should we avoid pouring oil down the drain?

_____

_____

_____

b. What makes metals useful for making wires and cooking pots?

_____

_____

_____

c. Which materials would you use to make a raincoat and why?

_____

_____

_____

_____

5. Collect ten objects made of different materials. Record their properties such as mass, volume, state of matter, and whether they conduct heat or electricity, float or sink.

Object	Mass	Volume	State of matter	Conduct heat / electricity	Float	Sink

Unit 5: Forces, Energy and Machines

Lesson Plan 1 — Student Book Page 63-64

Learning Objectives

- Identify sources of energy (e.g. the Sun, flowing water, wind, coal, and gas.)
- Recognise that energy is needed to do work (e.g. for moving objects), heating and lighting.
- Describe and demonstrate the transformation of energy.
- Understand the importance of energy conservation
- Recognise the role and responsibility of humans to conserve energy resources.

Learning Outcomes

Students should be able to:

- explain sources of energy and their requirement for work
- explain how energy is transformed (Sunlight into heat and light).
- talk about conservation of energy and their role conservation of energy resources.

Introduction

Ask questions:

1. Why do we need food?
2. Why do we need sunlight?
3. How do machine help us?
4. What makes machines work?

Main Teaching

- Define energy.
- Explain energy sources and its work.
- Discuss transformation of energy with example. Take input from students on various examples they have observed, randomly.
- Explain in detail why conservation of energy is important for human survival on Earth.
- Discuss the role and responsibility of humans for conservation of energy resources.

Guided Practice

Ask students to do 'Discuss and Answer' activity on page 64 as peer activity (two students discuss the topic)

Independent Working

Ask students to read "Do You Know" on page 63 and facilitate.

Wrap Up

Share some important points of the lesson.

Homework/Going Further

Ask students to make a list of actions they can take for the conservation of energy. Display the lists on soft board.

Lesson Plan 2 — Student Book Page 65

Learning Objectives

- Recognise that warmer objects have a higher temperature than cooler objects.
- Investigate the changes that occur when a hot object is brought in contact with a cold object.

Learning Outcomes

Students should be able to:

- explain that matter is made of particles called atoms.
- explain that when an object is heated its particles move faster.
- explain that when an object is cooled its particles move slowly.

Introduction

Ask some student volunteers to touch a hot cup of tea (take precaution, make sure they touch it slightly from the outside) or an ice cube. Observe their reaction ask them to share the reason for it.

Main Teaching

- Explain the terms ‘heat and temperature’
- Recall that everything that has ’weight’ and occupies ‘space’ is called ‘matter’.
- Explain matter is made up of tiny, invisible particles called atoms.
- Put a glass of water in the freezer and explain that when we cool an object its particles move more slowly because they release energy.
- Put a glass of water in direct sunlight and explain that when we heat an object its particles start moving faster because they get energy.
- Take the ice cube out of the freezer .The glass will show condensed water vapour.
- Introduce the term absolute zero -273 0 Celsius is the coldest temperature that can be measured. Nothing can be colder than absolute zero.

Guided Practice

Demonstrate activity 1 on page 71.

Independent Working

Ask students to read the text on page 65.

Wrap Up

Talk about the lesson concisely and answer students’ queries.

Homework/Going Further

- Explain the diagram on page 65.
- Describe how it feels if you touch an ice cube wrapped up in a towel.

Lesson Plan 3 — Student Book Page 65-68

Learning Objectives

- Investigate the changes that occur when hot objects is brought in contact with a cold object.
- Investigate ways to measure temperature and understand its units.

Learning Outcomes

Students should be able to:

- explain that temperature is a measure of how hot or cold something is.
- explain that heat of an object is the total amount of thermal energy it contains.

Introduction

Show the students a thermometer and use to explain its usage for temperature measurement.

Main Teaching

- Introduce the term heat and temperature and differentiate between them. Temperature is the measure of average energy of the particles in an object; the heat of an object is the total amount of thermal energy an object contains.
- Show a Celsius and Fahrenheit thermometer and use it to explain the different temperature scales.

Guided Practice

Ask students to write down the precautions taken while using a thermometer in their notebooks (reference page 68)

Independent Working

Ask the students to do "Discuss and Answer" on page 66.

Wrap Up

Ask students to do Concept check on page 67 of the student book.

Homework/Going Further

The students should answer Question 4 on page 70.

Lesson Plan 4 — Student Book Page 73-74

Learning Objectives

Relate familiar physical phenomena (i.e. vibrating objects, echoes) to the production and behaviour of sound.

Learning Outcomes

Students should be able to:

- explain that sound waves travel outwards in circle.

Introduction

Do activity 1 on page 85.

Main Teaching

- Explain that sound is a form of energy. It is produced by vibrations and travels in waves.
- Explain that every sound that we hear is caused by something shaking.
- Demonstrate when a stone hits the surface of water; the waves travel outwards in circles. Explain that sound waves also travel outwards in circles, but we cannot see them.
- Things that produce sound shake back and forth very quickly. These shaking movements are called vibrations. Vibrations cause air in front of them to vibrate, when the vibrations reach our ears, they cause the eardrums to vibrate, and we hear the sound.
- Beat a drum and explain that the sound moves through the air by pushing the air particles, around its source. When this happens, the particles are pressed together and then they spread apart, or they expand.
- Each particle passes its energy to next particle and in this way vibrations are passed on from molecule to molecule. This movement is called a sound wave.
- Draw a sound wave on the board and explain it.

Guided Practice

- Show students ripples made in water by throwing a stone, in a tub of water and talk about creation of sound.

Independent Working

Ask students to draw sound waves in their notebooks.

Wrap Up

Ask a student volunteer to explain how sound travels from its source to the ear.

Homework/Going Further

Ask the students to write the names of 5 different sources of sound.

Lesson Plan 5 — Student Book Page 74-76

Learning Objectives

Sound can be measured and it needs a medium

Learning Outcomes

Students should be able to:

- explain that sound can be measured.
- distinguish between loud and soft sounds.
- explain that sound needs a medium to travel through. It cannot travel through a vacuum.

Introduction

Ask the students reaching our ear at the same time.

to look at the table on page 75 and discuss how the hearing capacities of different animals are different.

Main Teaching

- Explain that the sound that is pleasing to the ear is musical. Sounds that we find unpleasant are called noise. A number of different vibrations produce musical sounds and noise.
- Explain that sound can travel through water.
- Explain that sound travels at different speeds through different materials.
- Explain that sound travels best through solids.
- Sound cannot travel in a vacuum therefore the noise of the explosions on the Sun cannot be heard on Earth.

Guided Practice

Ask the students to do ‘Concept Check’ on page 75.

Independent Working

Identify some sounds around you and differentiate between loud and soft sounds.

Wrap Up

Ask students to read the text on page 74-76 and answer their queries if any.

Homework/Going Further

Ask students to search the internet to find places where can be produced and share in the class.

Lesson Plan 6 — Student Book Page 77

Learning Objectives

Recognise that unpleasant sounds are called noise.

Learning Outcomes

Students should be able to:

- noise (irregular and repetitive waves) and music (regular, repetitive sound waves).

Introduction

Ask the students to look at the picture on page 77 and discuss different type of sounds.

Main Teaching

- Discuss the difference between noise and music. Irregular, repetitive sound waves create noise; while regular repetitive waves produce musical notes.
- Ask the students to do "Discuss and Answer' on page 78.
- Explain that a loud sound is produced by a larger vibration and a softer sound is produced by a smaller vibrations.
- Discuss the sounds produced by different objects.

Guided Practice

Make groups of four students. Demonstrate to them the making of jaltarang using 7 identical bowls containing different volumes of water. Ask students try composing music.

Independent Working

Each group should present its musical composition.

Wrap Up

Ask students to draw sound waves with high frequency inn their notebooks.

Homework/Going Further

Students should make a string phone using two paper cups and string. They should also write a note on their findings in their notebooks.

Lesson Plan 7 — Student Book Page 77-78

Learning Objectives

Comprehend that echoes are sounds made in a large empty room and even in open areas like hills.

Learning Outcomes

Students should be able to :

- explain that echoes are produced when sound waves bounce off hard surfaces.

Introduction

Throw a ball against the wall and catch it. Do these two or three times. Explain that when sound bounces back off a wall it produces an echo.

Main Teaching

- Introduce the term echo and explain that sound is reflected when it strikes a hard surface. This bouncing back of sound is called an echo.
- This means that when sound waves hit a physical barrier such as a cliff or a wall, they bounce back, and we hear the sound again. The reflected sound is called an echo. We have louder echoes in a valley or a hall.
- Explain that scientists have invented some instruments, which can be used by fishermen to detect shoals of fish in the sea. Explain how an echo sound works.
- Explain that bats have eyes, but they cannot see. They use echoes to detect and catch flying showing ways of
- Show a video https://www.youtube.com/watch?v=kp5jyZtoTIg or https://www.youtube.com/watch?v=laeE4icRYp4 about echolocation in bats. Answer any questions.

Guided Practice

Ask students to do ‘Concept Check’ on page 78.

Independent Working

Ask students to share their experiences when they were able to listen to echoes.

Wrap Up

Ask students to produce an echo in the classroom.

Homework/Going Further

Draw a poster showing ways of presenting noise pollution.

Lesson Plan 8 — Student Book Page 78-79

Learning Objectives

- Define light.
- Describe objects as transparent, translucent or opaque based on behavior of light.
- Introduce speed of light and shadow formation.
- Give clear concepts of luminous and non-luminous objects.

Learning Outcomes

Students should be able to:

- light and its behavior towards objects it falls upon.
- explain speed of light with an example (how long it takes sunlight to reach Earth)
- describe luminous and non-luminous objects.

Introduction

Bring a torch in class and turn it on. Ensure that curtains are down so that students can see light.

Main Teaching

- Write definition of light on the board. Also, draw waves to explain waves to explain rays and beam of light.
- Define transparent, translucent, and opaque objects.
- Talk about speed of light and give examples from the text (thunderstorm and lightning) page 78.
- Introduce shadow formation. Give examples from daily life. If possible, take students out to assembly area to show shadow formation.
- Explain luminous and non-luminous objects.

Guided Practice

Ask student to do "Discuss and Answer' activity on page 80.

Independent Working

Ask students to make a list of 5 luminous and 5 non-luminous objects in their notebooks.

Wrap Up

Talk about light as a form of energy and its transformation. Briefly talk about the remaining lesson.

Homework/Going Further

Ask students to observe various natural and man-made objects and categories them as luminous and non-luminous objects.

Lesson Plan 9 — Student Book Page 80-81

Learning Objectives

- Recognise formation of rainbows and the various colours it shows.
- Relate to reflection of light (as to how we see things).
- Comprehend reflection of light due to reflective surfaces

Learning Outcomes

Students should be able to:

- Talk about information with reference to rainbow formation.
- explain the phenomenon of reflection of light.
- describe reflective surfaces and their usefulness.

Introduction

With a poster showing a rainbow, ask the students to recognise the formation.

Main Teaching

- Explain what rainbow is and how it is formed in a sequence (VIBGYOR i.e. violet, indigo, blue, green, yellow, orange, and red).
- Explain reflection of light.
- Talk about surfaces being reflective and non-reflective with examples (e.g. clear, standing water, mirror, metal surfaces).

Guided Practice

Ask students to do question 7 on page 84 in their notebooks. Take rounds and facilitate during the class.

Independent Working

Ask students to do ‘Concept Check’ on page 81.

Wrap Up

Talk about the lesson and answer students’ queries if any.

Homework/Going Further

Ask students to do question 6 and 8 on page 84 in their notebooks.

Lesson Plan 10 — Student Book Page 86-87

Learning Objectives

- Explain electricity.
- Explain complete and incomplete circuits

Learning Outcomes

Students should be able to:

- explain that the electricity that flows through a conductor is called a current.
- explain that electricity needs a closed or complete circuit to flow.
- explain that electricity will not flow through an open and incomplete circuit.

Introduction

Ask the students to pretend to be electricians and ask them to think about and decide what type of circuit allows for flow of electricity. Ask students if they can identify the differences between a complete and incomplete circuit. Once identified ask for suggestions about how to fix the incomplete circuit.

Main Teaching

- Explain the term circuit and show the difference between complete and incomplete circuits. Demonstrate that electricity needs a complete circuit to flow; that is a closed circuit.
- Demonstrate that if there is a gap or break in the circuit the electricity will not flow. This is called an open or incomplete circuit. Construct a simple circuit and point out the different component and discuss what each does. Talk about how we turn on a light at night or when it is dark but turn it off during the day. To do this a switch is used. Show the students a switch board and ask them to point out the switches of different fans and lights in the classroom. Discuss and demonstrate how switch controls the flow of electric current. When the switch is turned on, the circuit becomes complete, so the appliance starts working. However, when the switch is turned off, the circuit becomes incomplete, and the appliance stops working.

Guided Practice

Divide the students into groups. Provide each group with a battery cell, a torch, a bulb with holder, a switch and three pieces of connecting wires. Draw a labeled circuit diagram on the board and ask students to follow the diagram to construct an electric circuit. Direct them to keep the switch open and observe what happens.

Independent Working

Ask the students to draw labeled diagrams of complete and incomplete circuits in their notebooks.

Wrap Up

Discuss ‘Do You Remember’ on page 86.

Homework/Going Further

Ask the students to’ Discuss and Answer’ activity. Write a report on discussion as homework.

Lesson Plan 11 — Student Book Page 87-88

Learning Objectives

Explain and provide reasoning that a simple electric circuit requires a complete electric pathway.

Learning Outcomes

Students should be able to:

- identify simple, series and parallel circuits
- explain the terms 'conductors' and 'insulators'.

Introduction

Show the students a series circuit and a parallel circuit and begin by displaying the circuit A and B diagram on the board https://betterlesson.com/lesson/resource/3061023/circuit-a-and-b-diagram-jpg.

Main Teaching

- Explain series and parallel circuits and ask students to make predictions about the brightness of the light bulbs in each circuit.
- Discuss the characteristics of a series circuit: the current has only one path to flow along so if one bulb is removed, the circuit is broken and all the other bulbs stop working. Also because they share the energy, each bulb in the circuit glows less brightly.
- Discuss the characteristics of a parallel circuit. There is more than one path for the current to flow along. If one bulb is removed, the circuit is not broken and the other bulbs continue to shine. Also, the bulbs do not share energy with one another, each bulb glows brightly.
- Explain the terms 'conductors and insulators' and demonstrate by using different materials to try to complete a circuit.

Guided Practice

Help students to construct a series and a parallel circuit and ask them to discuss series and parallel circuits with their peers. Ask the students to record their ideas and provide time for each group to share their thinking with the class.

Independent Working

Ask the students to construct a simple circuit with a battery, light bulb and a switch. They should draw the circuits in their notebooks. They should then construct two simple series circuits, each with number of light bulbs identified. Remind them that in a series circuit there is only one path for electricity to flow along. Tell them to keep the battery source the same and ask them to rank the relative brightness of the bulbs in each circuit.

Invite them to construct two parallel circuits, one with the two light bulbs and the other with three light bulbs. Remind them that in a parallel circuit there are multiple pathways for electricity to flow along. Again they should keep the battery source the same. They should draw the diagrams in their table and rank the relative brightness of the bulbs.

Wrap Up

Give students time to share their observations of each circuit with their peers. Ask them to review the differences between parallel and series circuits and to explain how each might be used to meet the human need.

Homework/ Going Further

Ask the students to choose one complete circuit to use to create their own model of lighthouse.
Ask them to construct a lighthouse with a complete circuit and a switch. Ask them to identify the conductors and insulators used in the model.

Part 1

Worksheet 5-1

1. Fill in the blanks

a. Energy is the ability to do _____.

b. Humans get energy from their _____ .

c. Wind energy is transformed into _____ on a sailing boat.

d. The energy stored in batteries is transformed into _____ in a torch.

e. Conserving energy means not _____ it.

2. Match each energy source with its type.

Energy Source	Type
Sun	Non-renewable
Coal	Renewable
Wind	Non-renewable
Oil	Renewable
Flowing water	Renewable

3. Choose the correct answer

i. What is one way to conserve electricity?

a. Leave lights on all day

b. Use energy-saving bulbs

c. Use more fans

ii. Which of the following is a renewable energy source?

a. Natural gas

b. Oil

c. Sunlight

iii. What happens when we waste energy?

a. It gets recycled

b. It creates problems and reduces supply

c. It becomes stronger

4. Think and Answer

a. Why is it important to conserve energy?

b. What are some ways you can save energy at home or school?

c. How does conserving energy help the environment?

Worksheet 5-2

1. Fill in the blanks

a. Temperature is the measure of the average _____ of particles.

b. Heat is the total amount of _____ energy in a substance.

c. Heat flows from a _____ object to a _____ object.

d. Heat is measured in _____.

2. Match each item with its correct description.

Item	Description
Thermometer	Unit of heat energy
Joules	Measures temperature
Mercury	Tiny particles in matter
Celsius	Liquid used in thermometers
Atoms	Temperature scale

3. State whether the following statements are true or false.

a. Heat and temperature mean the same thing. _____

b. Temperature depends on the size of the object. _____

c. Heat flows from cold to hot objects. _____

d. A thermometer should be handled carefully. _____

4. Think and Answer

a. What happens when you add cold milk to hot tea?

_____

_____

_____

b. Why does an ice cube melt when taken out of the freezer?

_____

_____

_____

c. What is the difference between heat and temperature?

_____

_____

_____

Part 2

Worksheet 5-1

1. Fill in the blanks

a. Sound is a form of _____ produced by _____.

b. The number of vibrations per second is called _____ and is measured in _____.

c. Objects vibrating strongly produce _____ sounds, while slow vibrations produce _____ sounds.

d. Sound cannot travel through outer space because it is a _____.

2. Match each item with its correct description.

Item	Description
Hertz	Material through which sound travels
Medium	Unit of sound measurement
Echo	Unpleasant or harmful sound
Noise pollution	Sound bouncing off surfaces

3. Choose the correct answer

i. What causes sound waves to form?

a. Light rays

b. Vibrations

c. Heat

ii. Which animal can hear the highest frequency?

a. Dog

b. Bat

c. Dolphin

iii. Where does the sound travel fastest?

a. In gases

b. In liquids

c. In solids

4. Think and Answer

a. What are some loud sounds you hear in your area?

_____

_____

_____

b. How can we reduce noise pollution in our homes or schools?

_____

_____

_____

c. Why can't we hear explosions on the Sun from Earth?

_____

_____

_____

5. Draw a diagram showing how sound waves travel from a vibrating object to your ear. Label the medium and direction of wave movement.

Worksheet 5-2

1. Fill in the blanks

a. Light is a form of _____ that travels in straight lines called _____.

b. Transparent objects allow _____ light to pass through.

c. Translucent objects allow _____ light to pass through.

d. Opaque objects allow _____ light to pass through.

e. A shadow is formed when light is _____ by an object.

2. Match each object with its type.

Object	Type
Clear glass	Translucent
Waxed paper	Transparent
Wooden door	Luminous
Firefly	Opaque
Moon	Non-luminous

3. State whether the following statements are true or false.

a. Light travels faster than sound. _____

b. The Moon produces its own light. _____

c. Smooth surfaces reflect light well. _____

d. A rainbow is formed when sunlight passes through raindrops. _____

4. Think and Answer

a. Why do we see lightning before we hear thunder?

_____

_____

_____

_____

b. What are some examples of luminous and non-luminous objects?

_____

_____

_____

_____

c. How does light reflect off a mirror?

_____

_____

_____

_____

5. Draw and label a rainbow. Write the names of its seven colours in order.

Part 3

Worksheet 5-1

1. Fill in the blanks

a. Electricity is a form of _____.

b. The path along which electricity flows is called a _____.

c. A complete circuit is also called a _____ circuit.

d. If there is a gap in the circuit, electricity will not _____.

e. A switch is used to _____ the flow of electric current.

2. Match each item with its correct function.

Item	Function
Battery	Powers appliances
Bulb	Turns electricity into light and heat
Switch	Controls the flow of electricity
Wire	Controls the flow of electricity

3. Choose the correct answer

i. What happens in an incomplete circuit?

a. Electricity flows normally

b. Electricity does not flow

c. The bulb glows brighter

ii. What powers a remote control or torch?

a. Mains electricity

b. Battery

c. Solar panel

iii. What happens when a switch is turned off?

a. The circuit becomes complete

b. The appliance starts working

c. The circuit becomes incomplete

4. Think and Answer

a. Why does electricity not flow in an incomplete circuit?

_____

_____

_____

b. What are some appliances in your home that use electricity?

_____

_____

_____

c. What happens to a bulb when it has been on for a while?

_____

_____

_____

5. Draw and label a complete electric circuit using a battery, wire, switch, and bulb.

Worksheet 5-2

1. Fill in the blanks

a. In a series circuit, the current has _____ path to flow.

b. If one bulb is removed in a series circuit, all bulbs will _____.

c. In a parallel circuit, the current divides into _____ paths.

d. Bulbs in a parallel circuit glow _____ than in a series circuit.

2. Match each object with its type.

Material	Type
Copper	Insulator
Plastic	Conductor
Iron	Insulator
Rubber	Conductor

3. State whether the following statements are true or false.

a. A parallel circuit has only one path for current. _____

b. Conductors allow electricity to pass through. _____

c. Insulators are used for safety. _____

d. Removing one bulb in a parallel circuit stops all bulbs from working. _____

4. Think and Answer

a. What is the difference between a series and a parallel circuit?

_____

_____

b. Why do bulbs glow more brightly in a parallel circuit?

_____

_____

c. What materials are safe to touch in an electric circuit?

_____

_____

5. Make a list of five conductors and five insulators found in your home or classroom.

Unit 6: Forces and Motion

Lesson Plan 1 — Student Book Page 92

Learning Objectives

Describe force and motion with example from daily life.

Learning Outcomes

Students should be able to:

- explain that forces can change the speed, direction or shape of an object.
- explain that different amounts of forces have different effects.

Introduction

Put a toy car on the floor. Ask the students to answer the following questions:

- Can you move this car?
- How can you move this car?
- What makes this car move?

Main Teaching

- Explain that we need to exert a force to perform a job. If we do not push the car, it will not move.
- Explain that some jobs need more force and some need less. When a car is pushed gently, it covers less distance because less force is applied, but when it is pushed hard, it covers more distance because more force is applied.
- Ask a student volunteer to lift a spring balance to which a bundle of books have been tied vertically upwards, and observe the stretching in the spring balance.
- Inflate a balloon halfway and inflate a balloon fully. Demonstrate that if we let the air out from both the balloons, that the one that contains more air will travel farther. The more in the balloons, the farther it will travel.
- Explain that forces are pushes or pulls which can change the speed, direction or shape of an object.
- Explain that force can stop a moving object.
- Ask students to lift a bundle of 4 textbooks and then lift a chair. Ask them which one required greater force.
- Make sure that students understand the concept that the greater the force the greater the change in distance covered by an object.
- Introduce the term speed and define it as how fast something moves. Things move at different speeds.

Guided Practice

Ask students to look at pictures on page 92 and give one word answer i.e. push or pull is the way force is being applied to move an object, or change the shape of an object or do a job.

Independent Working

- Ask students to come up with two examples for each from daily life.
- Pull- when an object is pulled.
- Push when an object is pushed.

Wrap Up

Ask them to define 'force' and 'motion' in their own words.

Homework/ Going Further

Ask students to write in their notebooks, five examples of the use of force. Use their observations.

Lesson Plan 2 — Student Book Page 93-94

Learning Objectives

- Identify gravity as a force that draws objects to Earth.
- Investigate that friction is a force which works against the direction of motion.
- Provide reasoning with evidence that friction can either be detrimental or useful under different circumstances.

Learning Outcomes

Students should be able to :

- define force.

  to recognise through daily observations that friction is a force which works against the direction of motion and usefulness and disadvantages of friction with reasoning.

Introduction

Ask students following questions:

1. What happens when an object is dropped? For example an apple or a ball.
2. (to think and share) Why everything drops to the ground?
3. Why Earth and other planets orbit the solar system? What is the effect of size of the sun on these planets?

Main Teaching

- Explain that gravity and friction are two forces.
- Discuss gravity and examples on page 93 and share how walking on the moon is different from the same on Earth.
- Define friction and how explain how it works.
- Discuss the table on page 94, elaborate with given examples.

Guided Practice

Ask student volunteer to read 'Do You Know' on page 93, loudly and discuss later.

Independent Working

Ask students to do 'Discuss and Answer' on page 95 and write it down in their notebooks.

Wrap Up

Discuss consciously the concepts taught and answer queries if any. For example how bicycle pads work and friction affects on it.

Homework/Going Further

Ask students to do question 4.b on page 100.

Lesson Plan 3 — Student Book Page 95-98

Learning Objectives

Recognise that simple machines (e.g. levers, pulleys, gears, ramps) help make motion easier, reduce the amount of force required, change the distance, or change of direction of the force).

Learning Outcomes

- Identify the six types of simple machines.
- Distinguish between simple and compound machines.
- Explain how machine can be used to make work easier and faster.

Introduction

Show the students some machines such as a hair dryer, a juicer, a bicycle, etc. and explain that these are compound machines and they make our work easier.

Main Teaching

- Explain that there are two main kinds of machines: simple machines and compound machines.
- Put an apple on the table and cut it with a knife.
- Explain that machines are tools that make our work easier.
- Explain that simple machines have few or no moving parts and are used to apply force to work.
- Introduce the six types of simple machines and discuss them one by one.
- To introduce the lever, show a rod that rests and moves on a support called fulcrum or pivot. The force which is applied to do the work is called effort. The object that is moved or lifted is called the load. A sea-saw is an example of a lever.
- Make a ramp using a piece of a card board and move atoy car up it to demonstrate the inclined plane, makes it easier to roll objects from lower to higher, or higher to lower surfaces.
- Give the students screws that they are used to fasten or hold things together. Use a screwdriver to demonstrate that by rotating, the screw can be driven into objects to hold them together.
- Show a wheel and axle on roller skates. Point out that an axle is a rod that goes through a wheel and allows the wheel to move with it. Give examples of axles of cars and bicycles.
- To explain a pulley, show model of a flagpole, and demonstrate how it works.

- Demonstrate how a wedge can be used to break a log into two sections. Point out that wedge consists of two inclined plains. Explain that a wedge consists of two inclined plains joined back to back.
- Show a bicycle to identify different types of simple machines in it. Explain that a compound machine is the combination of two or more simple machines.

Guided Practice

Ask students to attempt 'Concept Check' on page 96.

Independent Working

Ask students to attempt question 3 on page 100 in their notebooks.

Wrap Up

Ask students to read the text on page 96 and then attempt question 4 and assist where necessary.

Homework/ Going Further

Ask students to attempt '

Concept Check' on page 98 and write down in their notebooks.

Worksheet 6-1

1. Fill in the blanks

a. A force is a _____ or a _____.

b. Motion is _____.

c. Gravity pulls everything towards the _____ of the Earth.

d. Friction is the force between two _____ that move across each other.

2. Match each force or concept with its correct description.

Concept	Description
Gravity	Slows things down when surfaces rub together
Friction	Pulls objects toward the Earth
Motion	A change in position
Push	A force that moves an object away
Pull	A force that brings an object closer

3. Choose the correct answer

i. What happens when you push a swing harder?

a. It moves less

b. It moves more

c. It stops

ii. What causes an object thrown in the air to fall back down?

a. Friction

b. Gravity

c. Motion

iii. What reduces friction between two surfaces?

a. Making them rough

b. Adding water or making them smooth

c. Increasing pressure

4. Think and Answer

a. When is friction useful?

_____

b. When can friction be a problem?

_____

c. What do you notice when you push a block across a smooth surface and a rough surface?

_____

Worksheet 6-2

1. Fill in the blanks

a. Machines help us do work by increasing or changing the _____ of a force.

b. A simple machine has _____ or no moving parts.

c. A lever consists of a bar that moves on a support called a _____.

d. An inclined plane has a _____ surface that helps move objects up or down.

e. A pulley uses a _____ and a wheel to move objects.

2. Match each simple machine with its example

Machine	Example
Lever	Flagpole
Inclined Plane	Ramp
Pulley	Drill
Screw	Bottle opener
Wedge	Knife

3. State whether the following statements are true or false.

a. A wheelbarrow is a compound machine. _____

b. A wedge is made of two inclined planes joined together. _____

c. A gear is a type of pulley. _____

d. A can opener is a simple machine. _____

4. Think and Answer

a. Why do we use machines?

_____

_____

b. What are the six types of simple machines?

_____

_____

c. Can you name a compound machine you use at home?

_____

_____

Unit 7: Earth and its Resources

Lesson Plan 1 Student Book Page 106

Learning Objectives

- Recognise that Earth's surface is made up of land and water and is surrounded by air.
- Recognise that water in rivers and streams flows from mountains to oceans.

Learning Outcomes

Students should be able to;

- Explain composition of Earth's surface.
- Explain flow of water from the resource to the oceans.

Introduction

Ask students if they ever visited mountainous areas during vacations and share if they have seen streams and small rivers flowing.

Main Teaching

- explain that Earth's top surface is made of soil with water and air in it. The atmosphere majorly Discuss distribution of water on Earth's surface and how it moves from higher elevation to lower elevation to the lower land.
- Talk about 'Earth' and the natural changes that consistently occur due to changes like flooding. Also talk about 'dams' and why do we need them.

Guided Practice

Ask students to do 'Fill in the blanks', from 'Concept Check' on page 106.

Independent Working

Ask students to attempt question 2 on page 102 from 'Concept Check'.

Wrap Up

Talk about various concepts on introduced with the help of pictures on page 105 and 106.

Homework/ Going Further

Ask students to do activity 2 on page112.

Lesson Plan 2 — Student Book Page 107-109

Learning Objectives

- Identify some of Earth's natural resources that are used in everyday life (e.g. water, wind, soil, forests, oil, natural gas, minerals).
- Recognise that some remains (fossils) of animals and plants that lived on Earth, a long time ago are found in rocks, soil and under the sea.

Learning Outcomes

Students should be able to:

- name some of the Earth's natural resources.
- explain how are the fossils formed and where are they found ?

Introduction

Place the poster of the Earth given on page 107 on the board (Cover the labeling by paper tape).Ask students to identify labeled parts and remove the cover when correct answer is given.

Main Teaching

- Define and explain what is a natural resource.
- Name and explain various natural resources and their uses i.e. air, wind, plants, animals, water, forests, land, natural gas, oil, minerals and soil.
- Discuss each resource in detail as given in the text book.

Guided Practice

Ask students to do 'Discuss and answer' on page 108.

Independent Working

Give print outs of different natural resources to students and ask them to prepare flash cards. Use in the next activity.

Wrap Up

Distribute the flash cards randomly. Ask the students with the cards to identify the natural resource and then brief them about it.

Homework/ Going Further

Ask students to write about various natural resources in their notebooks.

Lesson Plan 3 — Student Book Page 109-110

Learning Objectives

- Differentiate between renewable and non-renewable resources.
- Investigate the impact of human activities on Earth's natural resources.
- Suggest the ways to conserve the natural resources.

Learning Outcomes

Students should be able to:

- Define and differentiate between renewable and non-renewable resources
- Recognise how human activities are having adverse effects on the natural resources and environment in general.
- state our responsibilities towards conservation of natural resources.

Introduction

Distribute 10 flash cards showing natural resources, amongst the students. Ask them to show and tell whether it's a renewable resource or not.

Main Teaching

- Define and explain natural resources as renewable or non-renewable resources. Give examples of sun, wind and water as renewable resource and fossil fuels like coal is a good example of non-renewable resource.
- Discuss various human activities, which are great hazard to natural resources and environment. Talk about deforestation and how paper money has gained more importance.
- Pollution, global warming are results of human activities. The impact is frequent heat waves, less rainfall. Explain with reference to areas you live in.
- Ask students what measures should be taken for conservation of natural resources and write their responses on the board. Add to complete the list of measures, if required.

Guided Practice

Ask students to answer question 3 i-v.

Independent Working

Ask students to do question 4 on page 112 in their notebooks.

Wrap Up

Ask students to do question 6, 1 and 2 on page 112.

Homework/ Going Further

Ask students to do activity 3 on page 112 and submit a report.

Worksheet 7-1

1. Fill in the blanks

a. Scientists believe the Earth was formed from _____ and _____.

b. As the Earth cooled, _____ and _____ were formed.

c. Rain fell for thousands of years and formed _____ and _____.

d. Most of the Earth's surface is covered in _____.

2. Match each item with its correct description.

Item	Description
Volcano	Hot molten material from Earth's center
Fossils	Preserved remains of ancient life
Lava	Surrounds the Earth
Air	Eruption of ash and smoke from Earth's crust

3. Choose the correct answer

i. Rivers are formed when:

a. Wind blows across the land

b. Water flows from high to low ground

c. Earth rotates

ii. What percentage of Earth's surface is covered by water?

a. 29%

b. 50%

c. 71%

iii. What causes rocks to break into smaller pieces over time?

a. Earthquakes

b. Water and wind

c. Volcanoes

4. Think and Answer

a. How do floods change the surface of the Earth?

_____

_____

_____

b. What are some ways water impact on the Earth's surface?

c. Why is the Earth's center still hot?

Worksheet 7-2

1. Fill in the blanks

a. Natural resources are materials found in _____.

b. _____ and _____ are examples of renewable resources.

c. _____, _____, and _____ are examples of non-renewable resources.

d. _____ is formed from rotting plants and animals and is part of soil.

2. Match each resource with its use.

Resource	Use
Wind	Used for drinking and irrigation
Water	Makes electric power
Plants	Provide wool and leather
Animals	Provide food and oxygen

3. State whether the following statements are true or false.

a. Fossil fuels are renewable resources. _____

b. Soil is made by erosion and contains humus. _____

c. Wind and water can be used to generate electricity. _____

d. All fossils are complete animals or plants. _____

4. Think and Answer

a. What are some ways humans have harmed natural resources?

_____

_____

_____

b. Why is deforestation a serious issue?

_____

_____

_____

c. What can individuals do to conserve natural resources?

_____

_____

_____

5. Make a list of five natural resources and write how each one is used in daily life.

Unit 8: Earth's Weather and Climate

Lesson Plan 1 — Student Book Page 113-114

Learning Objectives

- Understand the difference between weather and climate.
- Explain different weather systems and air currents.

Learning Outcomes

Students should be able to:

- define weather and climate.
- explain different weather systems.
- explain how air currents are formed.

Introduction

Tell students about weather of the day without using the term 'weather'. For example

→ How hot is it today?

→ Is it cloudy today?

→ There is no air current at the moment? right or wrong ?

Then ask students what word can be used to describe how hot it is? Is it going to rain today?

The key word is 'weather'.

Main Teaching

- Define weather and explain with the help of diagrams the different types of weather .e.g., cloudy, windy, sunny and rainy weather.
- Define climate and explain the difference between weather and climate.
- Explain different kinds of weather. Also talk about various factors that affect the weather like Sun. With the help of picture on page 113, explain how sunlight changes the seasons. Humidity and air is also affected. Give examples from the text .e.g. Northern areas of Pakistan, Australia. Ask students to share the names of cities or countries they have travelled to with reference to the weather they experienced there.

Guided Practice

Ask students to do question 4, 1, 2 and 3 on page 119.

Independent Working

Ask students to question 5 on page119 and write a brief report on their findings

Wrap Up

Talk about weather and climate of Pakistan in general (it has different weather conditions).

Homework/ Going Further

Ask students to do activity 2 on page 119 and note down in their notebooks.

Lesson Plan 2 — Student Book Page 114-115

Learning Objectives

Relate weather changes to changing geographical location.

Learning Outcomes

Students should be able to :

- explain weather changes due to change in geographical location.

Introduction

Prepare flash cards showing the three climate zones i.e. Tropical, temperate and polar zones. Show the cards and if they can identify the climates of the area. Share the names of the three zones.

Main Teaching

- Explain weather changes with changing geographical location. Write names of three zones on Earth, formed on the bases of climate; on the boards. One by one write the temperature there and then explains. Ask students to share their experiences of any other climate zones, besides the one they are living in.

Guided Practice

Ask students to do "Discuss and Answer' activity on page 115. Collect the weather charts and display on boards after a week.

Independent Working

Divide the class into four groups. Ask each group to prepare a chart of A4 size chart paper and show any one of the following through drawings:

- Hot weather
- Cold Weather
- Cloudy weather
- Rainy weather

Display in the school corridor.

Homework/ Going Further

Ask students to attempt question 4-3 on page 119 and write down in the notebook. 5

Lesson Plan 3 — Student Book Page 115-117

Learning Objectives

- To learn about water cycle.
- Recognise that average temperature and precipitation can change seasons.

Learning Outcomes

Students should be able to :

- explain water cycle and its various stages.
- have clear concept that changes in temperature and rain, etc., can result in change in the seasons.

Introduction

Display a poster of water cycle (Reference: page 115) on board and ask students about it.

For example:

→ What is happening on the mountain tops? (Raining and snowing).

→ What is happening near the land, indicated by arrows? (evaporation)

Main Teaching

- Define and explain water cycle with the help of poster placed earlier on the board. Start from one point (e.g. snowing) and describe various stages and at the end again talk about the stage started from. This will mark completion of a cycle.
- Ask a volunteer student to read from page 115 to 116 of textbook.
- Talk about clouds, rain, snowfall in the mountainous areas and evaporation of clouds in the hot weather.
- Discuss other types of wet weather (i.e. Fog, Mist, Dew and Forests).
- Explain humidity and give a clear concept. Use examples from daily life.
- Talk about water that covers the land.
- Explain salt water and share the reasons for high salt contents in oceans.

Guided Practice

Ask students to do 'Discuss and Answer' on page 117.

Independent Working

Divide students into peer groups and ask them to read 'Environment Watch' on page 117 and note its important concepts, on A4 sheet. Collect, mark positively and display each report where appropriate.

Wrap Up

Talk about the lesson and answer students' queries if any.

Homework/ Going Further

Ask students to do 'Concept Check' on page 117 in their notebooks.

Worksheet 8-1

1. Fill in the blanks

a. Air temperature is the intensity of _____.

b. The temperature varies from day to day and from _____ to _____.

c. Sunlight is most direct at the _____.

d. Places near the equator are _____ than places farther north or south.

2. Match each zone with its climate description.

Zone	Description
Tropical Zone	Very hot, vertical rays
Temperate Zone	Mild climate, slanted rays
Polar Zone	Coldest climate, very slanted rays

3. Choose the correct answer

i. Why does warm air rise?

a. It is heavier than cold air

b. It is lighter than cold air

c. It is pushed by clouds

ii. What causes breezes near the sea?

a. Movement of clouds

b. Difference in heat absorption between land and water

c. Rotation of the Earth

iii. Which zone is closest to the equator?

a. Polar Zone

b. Temperate Zone

c. Tropical Zone

4. Think and Answer

a. Why is it cold high up in the mountains even though you are closer to the Sun?

_____

_____

_____

b. What is the weather like where you are today?

c. What is the climate of your local region?

d. Find out about the weather and climate in a different part of the world and talk about it.

Worksheet 8-2

1. Fill in the blanks

a. Sunshine heats up water and turns it into _____.

b. Water vapour rises and cools to form _____.

c. When droplets join together and become heavy, they fall as _____.

d. Rainwater flows into _____ and _____.

e. The water cycle begins again when water reaches the _____

2. Match each type of weather with its description.

Type	Description
Fog	Lighter than fog
Mist	Water vapour freezes below 0°C
Dew	Cloud close to the ground
Frost	Tiny droplets on grass after a cold night

3. State whether the following statements are True or False.

a. All clouds make rain. _____

b. Clouds can evaporate in warm air. _____

c. Ice crystals falling from clouds form snow or hail. _____

d. Dew forms because hot air holds less water vapour. _____

4. Think and Answer

a. What happens to clouds when they move into warmer air?

_____

_____

_____

b. Why does your skin feel sticky in humid places?

_____

_____

_____

c. What is humidity and how does it affect how we feel?

_____

_____

_____

5. Draw and label the water cycle. Include evaporation, condensation, cloud formation, precipitation, and collection.

Unit 9: Topic: the Earth In The Solar System

Lesson Plan 1 — Student Book Page 120

Learning Objectives

- Discuss and demonstrate the solar system the solar system with planets revolving around the sun.
- Identify sun as a source of source of heat and light for the Solar system.

Learning Outcomes

Students should be able to:

Describe the sun as a star in the solar system and the planets that orbit around it.

Introduction

Ask students few questions about the solar system:

→ What is the huge, shiny, ball on the sky that gives us light?

→ What is a star?

→ Is the sun a star?

Main Teaching

- Explain the term star, and sun as star in our solar system
- Describe Earth as a planet orbiting the sun and introduce 8 other planets namely:
- Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
- Share that they all orbit the sun and are all spheres like Earth.
- Summarise that sun and 8 other planets including Earth make up the solar system.
- Discuss that besides Earth, some other, some other planets in the solar system also have moons.
- Introduce the shape of the Earth as a sphere with examples of a ball and name the two types of movements.

Guided Practice

Ask the students to draw a fully labeled diagram of the solar system (Ref. Page 120).

Independent Working

Ask students to make a list of planets in the solar system as they have studied earlier.

Wrap Up

Talk about sun as a source of light and energy. Answer students' queries if any.

Homework/ Going Further

Encourage students to learn names of planets in our solar system.

Lesson Plan 2 — Student Book Page 120-122

Learning Objectives

Investigate and explain how day and night are related to Earth's daily rotation about its axis and provide evidence of its rotation from the changing appearance of the shadows during the day.

Learning Outcomes

Students should be able to:

- explain that the Earth spins on its axis(called rotation).
- explain that the Earth orbits the sun(called revolution).

Introduction

Do activity 3 on page 127.

Shine a torch on a globe from one side. Explain that the part of the globe that is facing the sun has daytime. Rotate the globe on its axis. Ask the students which part has day and which part has night.

Main Teaching

- Explain that the sun does not move. The sun appears to move across the sky but actually, it is the Earth that is moving not the sun.
- Ask students to read the text on page 121 to find out characteristics of the Earth.
- Describe the characteristics of the Earth and explain that shape of the Earth is almost a sphere.
- Discuss the imaginary line on which the Earth rotates, which is known as the axis.
- Explain that the Earth has two types of movements. The spinning of the Earth, makes the sun appear to move from East to West in anticlockwise direction. This movement is called rotation. The rotation of the Earth on its axis causes day and night.
- Explain that as the Earth spins the part that faces the sun has day and the part that is away from the sun has night.
- Show the students a globe. Explain that the rotation of the Earth means it spins on its axis. At the same time, it also moves around the sun. This movement is called revolution. Revolution is a movement in which one-object moves around another object.
- Discuss how the Earth revolves around the sun and moon revolves around the Earth, in fixed paths called orbits.

Guided Practice

Help students to do 'Discuss and Answer' on page 122.

Independent Working

Ask the students to list the characteristics of the Earth.

Wrap Up

Ask the students to read movements of the Earth and note down the differences between rotation and revolution from page 121 and 122

Homework/ Going Further

- Ask the students to read 'Do you Remember' on page 121 to recall previous learning.
- Study' Do You Know?', on page 121, for further information.

Lesson Plan 3 — Student Book Page 122-123

Learning Objectives

Discuss how seasons in Earth's Northern and Southern hemisphere are related to Earth's movement around the sun.

Learning Outcomes

Students should be able to:

- explain that the equator divides the Earth into two hemispheres.
- explain how seasons are caused by the Earth's tilted axis.

Introduction

Do activity 1 on page 127.

Main Teaching

- Explain how the seasons are caused by the Earth's tilted axis and its revolution around the Sun.
- Explain that the Earth has 365.25 days to orbit the Sun. This period is called a solar year.
- When both halves of the Earth receive equal amount of light, it is either spring or autumn.
- Use a globe and a torch to demonstrate that when the North Pole is tilted towards the sun, the southern hemisphere is tilted away from the sun. As a result, the southern hemisphere is colder at the time and has winter.
- Explain that when it is winter in northern hemisphere it is summer in southern hemisphere.

Guided Practice

Help the students do question 6 on page 126, in groups of four.

Independent Working

The students should do 'Concept Check' on page 123.

Wrap Up

Ask students to attempt question 4 on page 126 and facilitate.

Homework/ Going Further

Ask students to do question 5 in their notebooks.

Lesson Plan 4 — Student Book Page 123-124

Learning Objectives

- Recognise that the Earth has a moon that revolves around it, and from the Earth the moon looks different at different times of the month.
- Illustrate and explain how solar and lunar eclipses occur.

Learning Outcomes

Students should be able to explain:

- explain various features related to moon(e.g. it reflects sunlight; orbits around the Earth).
- explain how solar and lunar eclipses occur with the help of a diagram.

Introduction

Place images of phases of moon from page 123 on the board and ask students to name the object and identify what pictures show. When the students reply with words like moon, crescent and full moon write them under the appropriate phase of the moon.

Main Teaching

- Explain that moon is Earth's natural satellite which reflects sunlight. It goes through several changes on the sky in 29 days, which are called as 'phases of the moon'.
- Describe four key phases of the moon.
- Explain eclipses. Share that solar relates to sun and lunar relates to moon. Also describe with the help of diagrams how these eclipses occur.
- Recall terms like opaque, shadow so that the students are able to learn well.
- Give clear concept regarding safety measures during solar eclipse. State that looking directly at sun is extremely harmful to eyes. Scientists use state of the art equipment for their observations of eclipses.

Guided Practice

Do an activity with the students. Call 6 student volunteers near the board and make 2 groups of 3 each. One group will demonstrate solar eclipse and the other will demonstrate lunar eclipse. They will act as Earth, Moon and the Sun. Help in the activity as required.

Independent Working

Ask students to do 'Concept Check' on 124.

Wrap Up

Summarise the lesson briefly. Answer students' queries, if any.

Homework/ Going Further

Ask students to visit related websites on internet and watch videos on eclipses.

Worksheet 9-1

1. Fill in the blanks

a. The Earth spins on its _____ in an anticlockwise direction.

b. The movement of the Earth on its axis causes _____ and _____.

c. The Earth takes _____ hours to complete one rotation.

d. The Earth revolves around the in a fixed path called an _____.

e. The Earth takes about _____ days to complete one revolution.

2. Match each term with the correct description.

Term	Description
Rotation	Causes day and night
Revolution	Movement around the Sun
Axis	Imaginary line through North and South Poles
Equator	Divides Earth into two halves

3. Choose the correct answer

i. What causes seasons on Earth?

a. The Moon's movement

b. The tilt of Earth's axis

c. The Sun's rotation

ii. Which planet do we live on?

a. Mars

b. Earth

c. Venus

iii. How many planets are in our solar system?

a. 7

b. 8

c. 9

4. Think and Answer

a. Why does it look like the Sun moves across the sky?

b. What is the difference between rotation and revolution?

Worksheet 9-2

1. Fill in the blanks

a. The Moon reflects _____ from the Sun.

b. A full Moon occurs every _____ days.

c. The Moon revolves around the Earth in about _____ days.

d. The changing shapes of the Moon are called _____ of the Moon.

e. A lunar eclipse happens when the _____ blocks sunlight from reaching the Moon.

2. Match the phases of the Moon.

Phase	Description
New Moon	Moon is between Sun and Earth
Full Moon	Thin crescent shape
Crescent Moon	Half-circle shape
Half Moon	Complete circle

3. State whether the following statements are True or False.

a. The Moon produces its own light. _____

b. A solar eclipse happens when the Moon blocks the Sun. _____

c. The Earth has only one Moon. _____

d. The Moon's phases change every week. _____

4. Think and Answer

a. Why should we never look directly at the Sun?

_____

_____

_____

b. What causes a solar eclipse?

_____

_____

_____

5. Draw and label the four main phases of the Moon.

Unit 10: Technology In Everyday Life

Lesson Plan 1 — Student Book Page 131-134

Learning Objectives

- Practice techniques of folding, cutting and pasting papers, cardboards to make objects and patterns.
- Design paper bags, envelopes, cards and face mask.

Learning Outcomes

Students should be able to:

- learn folding, cutting, pasting papers, cardboards and to make various things.
- through hands -on activities make paper bags, envelopes, card, and face mask.

Introduction

Write the word 'technology' on the board and ask students what comes to their mind when they hear it. Write correct responses on the board. For example , it helps us to do various jobs in an easier way.

Main Teaching

- Explain that in order to reuse and recycle materials we have to come up with new ideas. Use of these ideas through technology helps in daily life.
- Read out the lesson first and ask students to carefully, follow it.
- Talk about importance of precautionary measures, for good health. It also helps us to stay protected from contagious disease. Use of mask is important as a precautionary measure.
- Design and conduct activities as on page 132, 133, and 134 one by one, as this lesson is activity based, ensure that materials are available.(ideally for reuse in order to be recycle). Handle scissors, etc., carefully with students.

Following activities will be conducted:

  - Making a paper bag.
  - Making an envelope and a card.
  - Making a face mask.

For each activity divide students into groups of four and assign duties to promote teamwork and the spirit of sharing and caring.

- Facilitate the students throughout the lesson actively. Arrange support from school staff to ensure safety of the students.
- Display students' work in school corridor during PTM (Parent /Teacher Meeting).

Guided Practice

Ask students to do 'Concept Check' on page 133 in their notebooks.

Independent Working

Ask students to do Activity 3 on page 139.

Wrap Up

Ask students to do 'Discuss and Answer ' on page 131. Facilitate accordingly.

Homework/ Going Further

- Students will show objects they made to their family and friends and talk about the reason for this exercise.(i.e. reuse and recycle).
- Ask students to do Question 3 part 1, in their notebooks.

Lesson Plan 2 — Student Book Page 135-136

Learning Objectives

- Recognise the items of 'First Aid Box' in their daily life.
- Use digital and clinical thermometer externally to measure body temperature.
- Check blood pressure by digital blood pressure monitor.

Learning Outcomes

Students should be able to:

- recognise the importance of 'First Aid Box' in home and school.
- have knowledge of various items to have in a 'First Aid Box'.

Introduction

Write the name 'First Aid Box' and make a drawing of it too, on the board. Make a crescent on the box. Ask students to name the object. Make a list of all items required to make a 'First Aid Box' and place on the soft board.

Main Teaching

- Explain what is' First Aid Box' and talk about its importance.
- Discuss each item mandatory for the first aid and its purpose. Ask students if they have seen these items, and share how they are used. Ask a student randomly to read the text on page 135.
- Show a digital thermometer in class (if possible) and explain how it works. Tell the normal human body temperature and body temperature when sick.
- Explain blood pressure and demonstrate how it is measured with the device.
- Emphasize importance of the topic. Discuss how important each life is.

Guided Practice

Take students to medical room in groups for a demonstration by medical staff on 'First Aid'

Independent Working

Ask students to attempt 'Concept Check' on page 136.

Wrap Up

Elicit the important points of the lesson from students.

Homework/ Going Further

Give Question 3, part 2 as homework. Ask students to do in their notebooks.

Lesson Plan 3 — Student Book Page 136

Learning Objectives

- Design models spheres, cubes, prism, cylinder and cone with clay or play dough.
- Design hammer, wheels, rollers and gears using clay or play dough.
- Operate mobile phones to take snapshots.

Learning Outcomes

Students should be able to:

- use play dough or clay to make various models, e.g. prism.
- use clay or play dough to make hammer, wheels, etc.
- learn how to operate a mobile phone and take snapshots.

Introduction

Do activity 1 part 3 to prepare play dough for the use in various activities that will follow.

Main Teaching

- Explain why technology is still an important part of human life.
- Talk about use of clay in making of clay pottery.
- Do activities on page 136 and 137, with students:
  - to make different models of cone, cylinder, sphere, prism and cube by clay or play dough
  - to make models of things around us. For example, hammers, wheels, rollers and gears.
- Discuss the shapes prepared earlier like cone and cylinder are useful in making of models in next activity(i.e. hammer, wheel).
- Show students how snapshots, can be taken by mobile phones. Also try to record a video while discussion is taking place. Show later.
- Write the name ‘mobile phone’ on the board and explain how it is used. Discuss in detail various functions it performs (Ref. page 138 part1 and 2) and report.

Guided Practice

Ask students to do ‘Discuss and Answer’ on page 137.

Independent Working

Ask students to read about various functions of mobile phone.

Wrap Up

Highlight the importance of hands -on activities introduced through the lesson.

Homework/ Going Further

Ask students to make a list of functions they have learnt, through the use of mobile phone.

Worksheet 10-1

a. List some items found in the first aid box.

b. What are some uses of mobile phones?

Unit 1: Characteristics and Life Processes of Organisms

P3 Concept check

Fill in the blanks with the parts of the cells:

Plant cells and animal cells both have a cell membrane. They both contain cytoplasm and a nucleus. A plant cell has one large vacuole and an animal cell has many small vacuoles. Plant cells also have a cell wall and contain chloroplast.

P 5 Discuss and answer

A range of responses are possible here. An experiment that is designed to observe and compare a living thing and a non-living thing, over a period of time, using measurements taken at appropriate intervals, would be appropriate. The experiment does not have to be conducted so it can be hypothetical. Here's an example: an experiment could involve comparing a baby elephant or a sapling tree and a large rock and measuring their size once a month for a year!

P 7 Concept check

1. Scientists classify living things into two different groups. Animals and plants are two different groups. They can be classified according to where they live.
2. Any appropriate correct examples can be provided. Examples in italics. In the text the following examples have been given and may be used as answers: i. cactus palm, aloe vera ii. lotus reeds iii. monkeys, apes, lizard, opossum, squirrel

P9 Concept check

Scientists usually divide animals into two large groups: those with a backbone and those without a backbone. Animals with a backbone include fish, amphibians, birds, reptiles, and mammals.

Discuss and answer

Students should be able to use the points from the table on page 11 to respond. If you can show them images or examples of the two trees, that will greatly help them to notice and describe the differences.

Exercises:

1. i. b. leaves
   ii. d. cat
   iii. a. slug
   iv. d. ferns
   v. b. through the roots
2. i. oxygen carbon dioxide ii. food iii. respire sensitivity move iv. depend v. oxygen
3. i. X ii. / iii. / iv. X v. X vi. X vii. / viii. X
4. i Any three of the characteristics of living things: they need food, they respire, they can move by themselves, they have sensitivity, they reproduce, they grow, they excrete.
   ii. Yes, plants respire.
   iii. photosynthesis. Sunlight, water, and carbon dioxide.

iv. food

v. Classification is grouping things. It is done in order to make studying things easier.

vi. plant trees, stop destroying wild spaces, stop cutting down trees, stop hunting for animals. They may suggest other ways too – e.g.: stop using chemicals that harm wildlife etc.

vii. Answers should use some or all of the information from the table on page 11.

viii. They are animals and part of the animal kingdom. They live in a range of habitats. They are found all over the world in different environments.

5. See diagram on p10

6. Discuss and collect responses. An experiment can be done to cover a leaf and observe it or keep a plant without light and observe it. If plants do not get sunlight, they cannot produce chlorophyl and they will lose their green colour and, eventually, die.

7. Use info from 1st and 3rd columns of table on p 9

P18 Discuss and answer

They will need to count their own teeth. This is sometimes not as easy as it might seem but they can have fun trying and comparing the numbers, the gaps they have, the kinds of teeth they have (baby/adult, incisor, canine, premolar…) etc.

P 19 Concept check

A baby is born with no teeth. A three-year-old child will usually have a set of twenty baby teeth. An adult who has looked after their teeth will usually have thirty-two permanent teeth. There are four different types of permanent teeth: incisors, canines, premolars, and molars.

P19 discuss and answer

The human hand consists of 27 bones, 27 joints, and 34 muscles! It is not likely that they will be able to feel them all. Most people come up with a count of 16+.

P21 Concept check

Cells are the smallest building units of living things. The muscles which make up the heart are the cardiac muscles. Skeletal muscles are voluntary muscles. All the bones of the body together make up the skeleton.

P21 Discuss and answer

Some bones are healed by wearing a cast. Some are healed with surgery (often using screws, rods, pins, or plates to hold the bond in place). Most broken bones heal in 6 to 8 weeks.

Exercises

1. i. a. stomach ii. b. heart iii. c. involuntary muscles iv. b. circulate blood in the body
   v. d. ear

2. i. connective tissue ii. cardiac iii. ligaments iv. smooth/involuntary
   v. skeletal vi. smooth

3. i. b. ii. d iii. a iv. e v. c

4. i. It gives strength and support to the body. It is the framework that shapes to the body. It protects internal organs. It helps to move the body.

   ii. They help us break down food.

   iii. incisors, canines, premolars, molars.

   iv. The kidneys remove wastes and extra fluid from the body. They help maintain a healthy balance of minerals and salts in the body.

v. Three – smooth (involuntary; stomach, intestines, bladder), cardiac (involuntary, pump blood out of the heart and relax to let it back in; heart), skeletal (voluntary, we can control them, they make movement possible; any muscle in the hands, arms, legs, etc.)

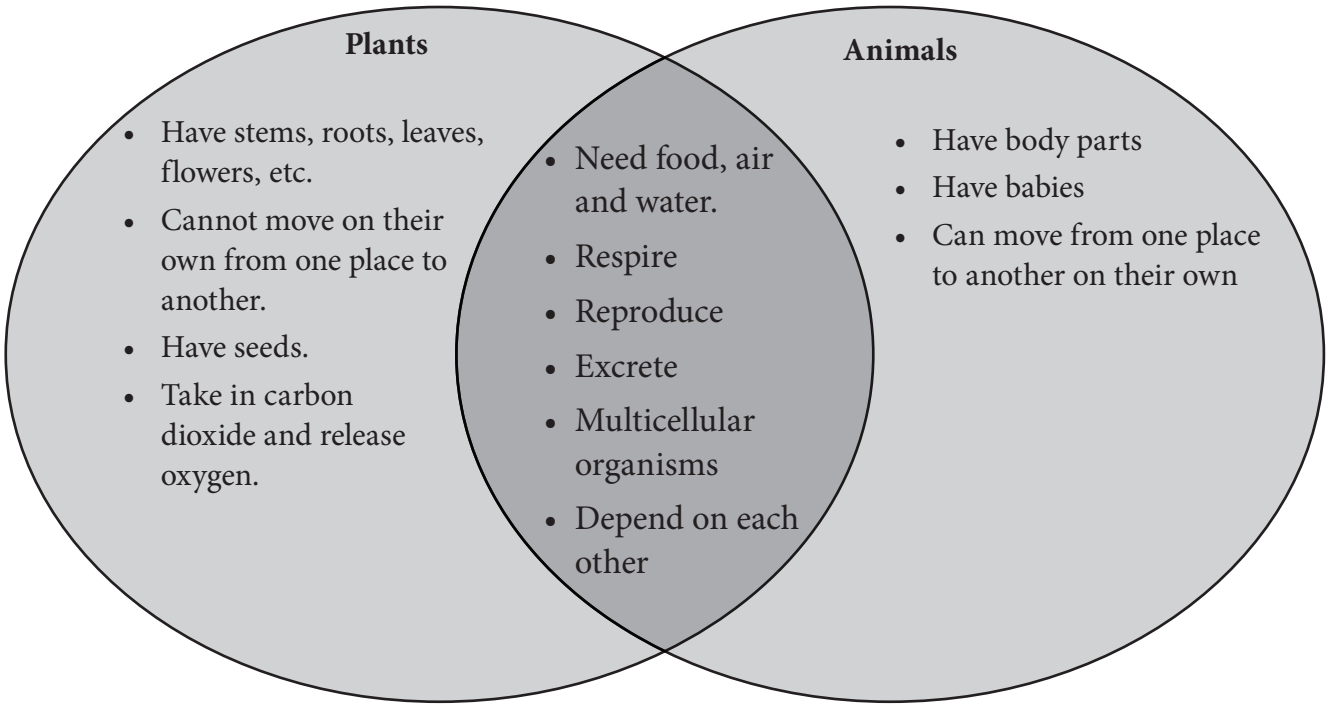
vi. To take air in and out of the body. To move oxygen into the blood and carbon dioxide out of it.)

Independent Learning

Ask the students to work in pairs. Distribute one pack of sorting cards to each group of students. Ask them to sort the cards based on how much mass they think each object has.

Unit 2: Ecosystems

P27 Discuss and answer



Differences and similarities between animals and plants

P30 Discuss and answer

Discuss what can be seen in the images. What has gone wrong? Invite a range of ideas. Broadly, the solutions are plant more trees, minimise use of plastics.

Concept check

ENERGY NUTRIENTS ECOSYSTEM

P34 Discuss and answer

1. When part of a food chain is taken out it can cause the predators to go hungry and decline in population. It can cause the prey to have a population spike (which affects the living things further down in the food chain.
2. Any valid examples should be accepted.

Concept Check

1. Plants insects mouse owl
2. Grass hare hawk
3. Grass grasshopper bird hawk

P35 Discuss and Answer

Any valid examples should be accepted.

Exercises

1. i. d. ii. b. iii. a. iv. a. v. c.
2. The cabbage is a plant and a producer. The caterpillar, sparrow, and eagle are consumers. They cannot make their own food.
3. i. Herbivore: horse, elephant, rabbit, deer, sheep, cow

   Carnivore: tiger, vulture, cat

   Omnivores: jackal, bear, crow, cockroach, human, dog

   ii. Any valid examples should be accepted.

   Herbivore: goat, gorilla, kangaroo, hippo

   Carnivore: eagle, lion, lizard, snake, crocodile, wolf, penguin

   Omnivores: hedgehog, chimpanzee, squirrel, mouse, sloth, fox
4. i. Some humans are vegetarian or vegan.

   ii. Any valid examples should be accepted.

   iii. a. personal view with reason required

   b. They would die. A person can survive about 3 days, some animals can survive longer (e.g. the kangaroo rat, tardigrades), some plants can survive up to 7 days. It is worth looking up a few examples online.
5. i. a. an ecosystem is a community of living things (biotic parts) in a particular place (their physical environment), and their interactions with each other and the non-living parts of their environment (sunlight, climate, temperature, soil and water – the abiotic parts).

   b. The way in which living things are linked together by their food is called a food chain.

Any valid examples of food chains and ecosystems should be accepted.

ii. Herbivores eat plants.

iii They compete for food and space in order to survive.

iv. plant more trees, don't pollute, avoid using plastic, protect and care for animals and plants, reduce, reuse, recycle.

v. energy and nutrients

vi. Any valid examples should be accepted. The image and notes on page 28 can be used and referred to for examples in addition to their own examples.

Unit 3: Human Health

P39 Discuss and Answer

The meal at the top contains foods that are fresh, not highly processed, and healthy. The portions are not overly large or too small. It contains a variety of healthy foods. The meal below contains 'junk' foods – ice-cream, cake, sweets, a sugary drink, fried foods, etc. There is a lot of sugar and fat here. The foods are highly processed. It is worth revisiting this task after reading the whole unit to see if students can develop their responses.

P40 Concept Check

We need to eat the right amount of carbohydrates, proteins, fats, and dietary fibre.

1. Fats
2. Protein
3. Dietary fibre
4. 4. Fats and carbohydrates

Exercises

1. i. a. cancer ii. a. bread iii. d. vitamin D iv. b. mosquitos v. a. boiling
2. i. The odd one out is jam because it is not a dairy product.
   ii. The odd one out is carrot because it grows underground/it is a root vegetable.
   iii. The odd one out is sugarcane because it is a stalk/not a fruit.
   iv. The odd one out is onion because it is a vegetable/not a nut.
   v. The odd one out is thalassemia because it is a genetic disease/not a communicable disease.
3. Any valid examples should be accepted in addition to the following.

Protein	Carbohydrate	Fat	Vitamin
eggs	potato	butter	sunshine
nuts	cereals	chocolate	lemon

4. Any valid examples should be accepted in addition to the following.

Contagious	Non-contagious
Measles, mumps, influenza, cold, cough, TB, polio, covid 19, dengue	Thalassemia, cancer,

5. i. Maintaining good health is important because good health allows us to live well, grow (when we are young), fight illness, and enjoy life.
   ii. Exercise is important because it keeps our bodies and minds functioning properly, by helping to circulate the blood and keeping our bones and muscles strong. Exercise helps us to sleep well, makes us feel good, and helps us maintain a healthy weight.
   iii. Contagious disease can be transmitted from one person (or animal) to another, non-contagious diseases cannot.
   iv. Water can be purified by using a filter, using chemical processes, or by boiling it.
   v. Contagious diseases can be spread by people who have the disease by touch, or through dirty water or air (coughing, sneezing).

vi. A balanced diet means eating the right variety of foods in the right amount. Any answer which elaborates on this with details about the kinds of foods to eat and to avoid should also be accepted.

vii. Some or all of the list on page 45 should be accepted.

6. I and ii. It is important for them to reflect on what they eat and how much exercise they do, in a positive way, in order to consider the idea of balance as the key to a healthy lifestyle. Too much or too little is not good for us.

7. Any valid examples should be accepted. Encourage all students to respond to at least one of the questions.

8.

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

Unit 4: Matter and its characteristics

P54 Discuss and answer

Any one of each of the following:

Solid – any parts made of rubber, metal, glass

Liquid – oil, petrol, coolant (water)

Gas – air in the tyres

P55 Concept check:

1. Everything in the world that has mass and occupies space is matter. Particles are always moving. Matter is found in three states of forms.
2. Water particles

P58 Concept check

Answers will vary according to materials collected. The exercise is designed to check understanding of a testing process.

P60 Discuss and answer

Compare appearance and use of metals. Discuss why some materials would not be used to make pans (due to cost, texture, etc). Some questions are given in the task but ask further questions. Examples: which metal is poisonous? Which metals do we use to make jewellery? What can you tell me about copper? Etc.

Exercises

1. i. b. three ii. b iii. a. iv. a. v. d.
2. i. particles ii. solid iii. particles iv. spaces v. matter
3. i. not easy to bend d. rigid
   ii. see-through a. transparent
   iii. does not absorb water b. waterproof
   iv. attracts iron c. magnetic
4. i. / ii. X iii. X iv. / v. X
5. i. Matter is everything in the world that has mass and occupies space.
   ii. The particles in a liquid are less closely packed together than the particles in a solid.
   iii. No, they can flow.
   iv. No, liquids take the shape of the container they are in (because the particles flow).
   v. Aerosol sprays contain chemicals that can harm the environment.
   vi. Oil does not dissolve in water. It can block drains. It can form a film on the surface of water and harm wildlife and plants.
   vii. Aluminium is soft and easily shaped. It is non-magnetic. It is shiny.

Unit 5: Forms of Energy and Energy Transfer

P64 Discuss and answer

Possible items are electric lights (electrical energy into light); fans (electrical energy into motion); computer (electrical energy into light, motion, processing) etc.

P66 Discuss and answer

Students to offer their views and explanations. Revisit after the next section. Conduct the experiment if you can.

P67 Concept check

1. Temperature is the measure of the average energy of particles in a substance.
2. Heat is the total amount of thermal energy of particles in a substance.

Exercises

1. i. d. ii. a. iii. a iv. d. v. a.
2. i. temperature ii. heat iii. heat iv. thermometer v. 37
   vi. 32F and 0C vii. 212F and 100C viii. (minus)
3. i. a. Temperature is the measure of the average energy of particles in a substance.
   b. Heat is the total amount of thermal energy of particles in a substance.
   ii. Celsius and Fahrenheit iii. a thermometer iv. a. it expands and moves upwards
   b. it contracts and moves downwards
   v. We need to conserve energy so that we do not have a shortage or reduced supply. Conservation saves money.
   vi. turn off lights, fans, switches for appliances etc. when not in use; use energy saving light bulbs; avoid using air conditioners; use solar panels; turn off taps; walk or ride a bike rather than using motorised/fuel driven vehicles; use public transport rather than private transport. Reward other suitable answers – e.g. reuse, recycle, reduce…
4. Drawing with temperature marked on it.

SOUND

P 74 Discuss and answer

Music is regular, repetitive sound waves. Noise is irregular, repetitive sound waves. Students' personal opinions on their preferred kinds of music could lead to discussion about the aspects of the kinds of music that they find enjoyable (or dislike). For example, the kinds of instruments, the style of vocals, etc. One person's enjoyment of the fast-paced drums in dance music, the string section of an orchestra, or the rapid rhythms of rap might not be enjoyed by another. If possible play short sections of different kinds of music and discuss the different aspects of the sound.

P75 Concept check

High frequency sounds have more vibrations per second. The sound wave on the right shows a higher frequency than the one on the left.

P78 Discuss and answer

Students will give a range of personal examples. Discuss the ways to reduce noise pollution in turn. Planting more trees reduces noise pollution because sound is absorbed by them. Wearing earplugs

can protect the eardrums and aid concentration. Turning off machines (not sounding horns) reduces background noise which can be tiring and distracting. Loud noise can damage peoples' hearing so speaking softly is better than loud chatter.

Concept check

Sound travels in a circle. Sound can travel through solids, liquids, and gases. Sound cannot travel through outer space because it is a vacuum.

LIGHT

Discuss and answer

In a classroom, most objects will be non-luminous. Some luminous objects that might be in the classroom: the lights; active computer or mobile screens; a projector's light. There may be sunlight coming through windows too! Some objects might reflect light. If you can, shine a torch on a mirror/ smooth surface and discuss what is happening.

Concept check

Create a class list from the individual responses given. If you can, shine a torch on different surfaces and discuss what is happening.

Exercises

1. i. b. ii. a. iii. a. iv. b. v. b.
2. i. repeated motion of an object c. vibration
   ii. the unit of measuring frequency d. hertz
   iii. the bouncing back of a sound wave from one surface to another a. echo
   iv. vibration passing from particle to particle b. sound wave
3. i. an object that produces its own light D. luminous
   ii. an object that allows all of the light to pass through it C. transparent
   iii. an object that blocks the light A. opaque
   iv. an object that allows some of the light to pass though it B. translucent
4. i. vacuum ii. hertz iii. wave iv. solid v. echo vi. ray
   vii. luminous viii. transparent ix. translucent x. opaque xi. of the sun
   xii. Reflects
5. i. a. Sound is a form of energy produced by vibrations travelling in waves.
      b. A vibration is a repeated movement (or disturbance) that transfers energy through matter.
      c. Echo is produced in large and empty rooms.
      d. Frequency is the number of vibrations per second (measured in hertz).
   ii. Answers should include the key vocabulary, such as: vibrations, waves (radiating out in a circle), energy transfer, matter/air particles
   iii. An echo is the bouncing back of a sound wave from one surface to another.
   iv. Music is regular, repetitive sound waves. Noise is irregular, repetitive sound waves.
   v. Sound cannot travel in a vacuum because sound needs a medium (particles in a solid, liquid, or gas) to travel through.
   vi. Light is a form of energy.
   vii. Light travels in straight lines, called rays (collectively - a beam).

viii. Windscreens are made of glass because glass is transparent. The driver needs to be able to see through a windscreen. Wood and metal are opaque (light cannot pass through them and we cannot see through them).

ix. Light travels faster than sound.

6. Accept any appropriate answers. Some suggestions:

i. the sun, lights, a lit candle or match, a fire

ii. the moon, mirrors, reflective surfaces, a potato, anything that is not luminous!

iii. clear glass, air, water, clear plastic

iv. frosted glass, tinted/coloured glass, sunglasses, thin paper, some plastics, sheer fabrics

v. wooden items, whole fruits and vegetables, bricks, cement, metals…

7.

Transparent	Translucent	Opaque
clean air, plastic wrap, the lens of your eye	Sunglasses, butter paper, eyelids, frosted glass, thin tissue paper	cloud, aluminium foil, brick, cardboard
Light can pass through these. They are see-through.	Some light can pass through these. It is not possible to clearly see through these things.	Light cannot pass through these things and we cannot see through them.

8. Ask them to list at least four surfaces of each kind.

ELECTRICITY AND SIMPLE ELECTRIC CIRCUITS

P86 Discuss and answer

Students can use the explanation on the page and look at the diagrams. They should then close their books before attempting to draw the circuit.

P88 Discuss and answer

In the series circuit the bulbs are connected to each other, one after the other. The current flows along the one and only path. If one bulb is removed, the circuit breaks so none of the bulbs will work. In the parallel circuit the current divides into two or more paths. The current flows along each separate path. If you remove one bulb the others will stay lit up because each path is a complete circuit. The bulbs in a parallel circuit will be brighter than the bulbs in the series circuit which are all sharing the energy from the battery.

Concept check

Students should be able to assemble the simple circuit and check they have done so correctly by using the pictures of circuits in the chapter.

Exercises

1. i. b. ii. a. iii. a. iv. b. v. b. vi. c.

2. i. current ii. circuit iii. incomplete iv. complete v. switch vi. series vii. parallel viii. conductor ix. insulator

3. wire/flex, bulb, wire/flex, battery

4. i. a. A conductor is a substance that electricity can pass through.

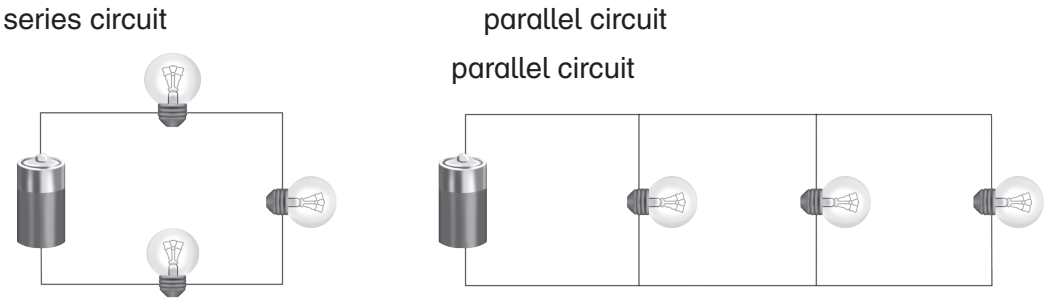
b. An insulator is a substance that electricity cannot pass through.

c. A circuit is a complete path for electricity to flow along.

ii. A switch is a device used to turn electrical appliances on and off.

iii. In the series circuit the bulbs are connected to each other, one after the other. The current flows along the one and only path. If one bulb is removed, the circuit breaks so none of the bulbs will work. In the parallel circuit the current divides into two or more paths. The current flows along each separate path. If you remove one bulb the others will stay lit up because each path is a complete circuit. The bulbs in a parallel circuit will be brighter than the bulbs in the series circuit which are all sharing the energy from the battery.

iv.



v. Students should make a list of appliances first, then classify them.

Activity 4. Torch – battery to light; lamp – mains electricity to light; clock – battery to movement; wristwatch – battery to movement (some watches have a light too, and sound (alarms)); fan – mains to movement; hairdryer – mains to movement and heat (the heated coil also glows – light); doorbell – battery to sound.

Unit 6: Forces and Motion

P96 Discuss and answer

Students should discuss the questions using their own examples, if possible, as well as the pictures. The pictures could invite discussion of a range of useful and problematic aspects of friction. For example, the brakes on a motorbike are useful for slowing/stopping but friction causes the tyres to wear down; a wet road can cause the bike to slip.

Concept Check

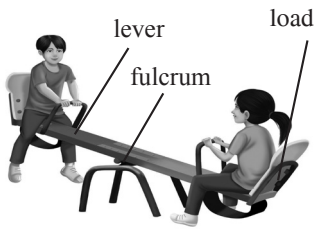
Students will need a wooden ruler and something to act as a fulcrum. They should try moving the position of the fulcrum and discuss the impact that has on how easy it is to lift the load.

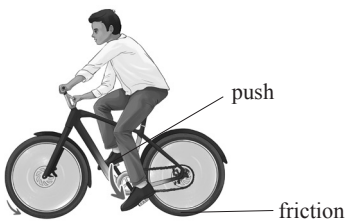
P98 Concept Check

1. wheel and axle
2. lever and inclined plane
3. compound machine

Exercises

1. i. a. ii. b iii. a. iv. b. v. c. vi. c
2. i. machine ii. simple iii. compound iv. lever v. wedge
   vi. screw vii. n inclined plane viii. pulley ix. Axel
3. i. d. ii. e. iii. b. iv. a. v. c.
4. a. Label the load, effort, and fulcrum b. Label the forces (friction, push)





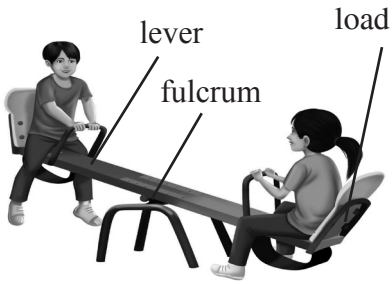
5. Students will experiment with making simple machines.
6.

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

7. i. effort ii. fulcrum

iii. A simple machine has few or no moving parts. A compound machine is made of two or more simple machines combined together.

iv.



v. Accept any suitable answers. Some possible answers: flagpole, window blinds, lifts, construction equipment, wells, exercise equipment…etc.

vi. They move heavy loads or multiply the distance travelled.

vii An inclined plane can be called a simple machine because it reduces the force needed to raise a load. They make it easier to raise a load from lower to higher or vice versa. Examples: ramp, sloping road, the bed of a wheelbarrow….

viii. Any advantages or disadvantages should be supported by real life examples and an explanation. Advantages: can slow things down, produces heat, allows us to hold things and stops us slipping over, stops other things from sliding or slipping. Disadvantages: slows things down so that more force is needed to move them, produces dangerous amounts of heat, can wear things out, produces noise.

ix. Accept any plausible explanations with reference to simple machines.

Situation 1: A pulley could be used to pull the water up to a window.

Situation 2: A ramp could be used to reduce the force needed to raise the load. A wheelbarrow or similar and a ramp would work well.

Situation 3: A lever would be best here. A rod could be mounted on a fulcrum and effort applied to one end while the other end was placed under the load (the rock) to lift it. The process could be repeated until the rock had been rolled off the road.

Unit 7: Earth and its Resources

P106

1. i. Lava ii. rocks iii. Earthquakes
2. Students should use the information immediately above this exercise.

P108 Discuss and answer

Discuss using the information above the exercise.

P109

Discuss using the images and any prior personal experience. Try to look at some images online too.

Exercises

1. i. b. ii. d. iii. a. iv. a. v. a.
2. i. erosion ii. fossils iii. molten lava
   iv. sediment v. millions vi. non-renewable
3. i. Natural resources are materials found in nature, such as the air, wind, plants, animals, water, land, natural gas, oil, minerals, and sunlight.
   ii. Students can list any five from the many examples in the book.
   iii. Fossils are the preserved remains of plants and remains.
   iv. Human activities have a big impact on natural resources. Using them without thought causes problems such as environmental damage. We run the risk of using up non-renewable resources. Deforestation is an issue when we do not plant trees to replace the ones we cut down. Pollution and overuse also have a negative impact on natural resources. Students should provide specific examples to illustrate their points.
   v. Students should provide specific examples to illustrate their points. For example, planting more trees, preserving water purity and cleaning up waterways, using renewable energy sources rather than non-renewable fossil fuels…etc.
4.

Renewable	Non-renewable
Sunlight, wind, water, wood	Oil, natural gas, coal

5. Students should be encouraged to do some personal research and consider the benefits of organic farming (e.g. better for the environmental) and the pitfalls of organic farming (higher costs).
6. i. Students should explain in their own words using examples.
   ii. Students should explain in their own words using examples.

Unit 8: Earth's Weather and Climate

P115 Discuss and answer

Discussion of the weather and the climate should focus on ensuring students can differentiate between the two terms and describe the local weather and the climate accurately.

P117 Concept Check

1. Humidity is the amount of water vapour in the air.
2. Seawater is salty because of runoff (water from rain and rivers washing salt from the land into the sea). There are also vents and volcanoes under the sea that release salt into the ocean.

Discuss and answer

Students' responses in their own words should draw from the information in the unit.

Exercises

1. i. a. d. ii. b. iii. c. iv. c. v. b.
2. i. Fog is thicker than mist.
   ii. The air is cooler the higher you go.
   iii. Climate is the average weather in a place over a long time. Weather is the amount of rain, wind, sun, or the temperature at a particular time over a particular area.
   iv. Snowflakes are ice crystals.
   v. Humidity is the amount of water vapour in the air.
3. i. ice crystals ii. frost iii. hailstones or snowflakes
   iv. fog v. humid vi. continental
4. i. Climate is the average weather in a place over a long time.
   ii. Weather is the amount of rain, wind, sun, or the temperature at a particular time over a particular area.
   iii. Students can give examples based on geographical location or season or both.
   iv. After a cold night, dew can be seen on grass and leaves.
   v. Frost forms when the temperature drops to below 0C, after dew has formed, and turns the dew into frost.
5. Students should do some research into different areas in Pakistan, the local weather there, and report back. There is snowfall in the mountainous regions.
6. i. Students should explain in their own words, drawing on their own experiences, if they have them.
   ii. Students should explain in their own words using examples.

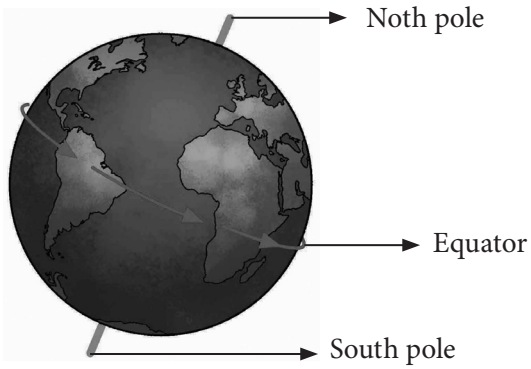
Unit 9: Earth in the Solar System

P122 Discuss and answer
An extra day in February every four years (the leap year).

P123 Concept check
Students should explain in their own words, giving their own reasons.

P124 Concept check
Students can use round objects and a torch.

Exercises

1. i. c. ii. a. iii. c. iv. a. v. d.
2. i. axis ii. rotation iii. revolution iv. orbit v. axis
   vi. summer vii. winter viii. day ix. of the sun of the moon
3. i. Summer is hotter than winter because the part of the earth experiencing summer is closer to the sun due to the tilt of the axis of the Earth.
   ii. Summer, autumn, winter, spring (four seasons)
   iii. When the whole of the side of the moon facing the Earth is lit by the Sun's light, we see a full moon.
   iv. A lunar eclipse is what occurs when the moon, the Earth and the Sun are in line so the moon is completely covered by the shadow of the Earth and none of the Sun's light can reach it.
   v. A solar eclipse is what occurs when the moon is directly between the Sun and the Earth partially or fully obscured the view of the Sun from the Earth.
4. i. The Earth takes 365.25 days to revolve around the Sun.
   ii. The Earth spins on its axis.
   iii. The revolution of the Earth around the Sun and the tilt of the Earth on its axis is what causes seasons.
   iv. The equator is an imaginary line running around the middle of the Earth.
   v. The Earth is divided by the equator into two hemispheres.
5. 

6. Discuss these – take ideas then get groups to do research to find answers themselves. The questions are tricky (and fun to think about)!
   i. The person is walking on Earth! The Earth takes a year to orbit the sun.
   ii. It takes the earth one day to rotate!
   iii. and iv. gravity!
7. i. Students should explain in their own words using examples.
   ii. Students should explain in their own words.

Unit 10: Technology in Everyday Life

P131 Discuss and answer

Personal ideas and opinions

P134

Personal reflection

P135

37C thermometer 120/88 mmHg

P137

Make a class list.

Exercises

1. i. F ii. F iii. T iv. F
2. i. pressure ii. thermometer iii. envelopes iv. string v. wood
3. i. if we go out when unwell (to protect others) ii. A digital thermometer takes the temperature without touching the body. A clinical thermometer contains mercury. iii. special occasions
4. Personal experimentation.

Sample Assessment Paper

Maximum marks: 50 1st Term Examination Time Allowed: 1 hour

Q1. Fill in the blanks: [1 mark each= 5 marks]

i. The stomach is an example of _____ muscles.

ii. Vitamin D is made by the _____ in sunlight.

iii. New substances are not formed in a _____ change.

iv. _____ is the measure of the average energy of particles in a substances.

v. _____ has a sloping surface that reduces the force needed to raise a load.

Q2. Choose the correct answers: [1 mark each= 5 marks]

i. A door hinge is an example of a

A. lever B. screw

C. wedge D. wheel and axel

ii. The bulb of thermometer contains a liquid which can be

A. milk B. mercury

C. water D. juice

iii. Which muscles perform their jobs without your instructions?

A. voluntary muscles B. biceps

C. involuntary muscles D. skeletal muscles

iv. When ice cube is melting what type of change has taken place?

A. change of colour B. chemical change

C. physical change D. none of the above

v. The normal human body temperature on the Celsius scale is

A. 37 °C B. 40 °C

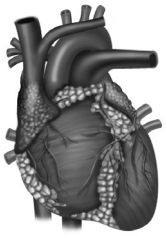
C. 98.6 °C D. 0 °C

Q3. Label the following diagram: [1 mark each= 4 marks]

A. 

organ _____

system _____

B. 

organ _____

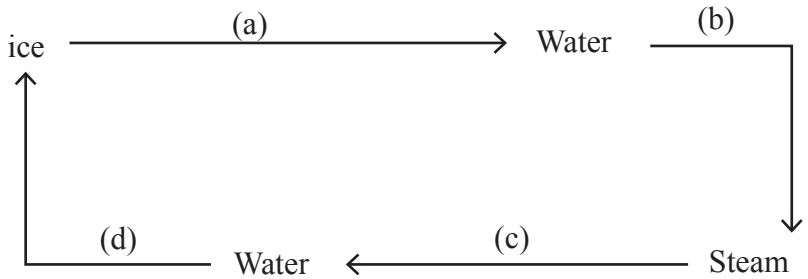
system _____

Q4. Complete this table to show function of each food group.

[1 mark each= 4 marks]

Food group	**What is its job?**
	source of quick energy
Proteins	
	give us energy and help to keep the body warm
Dietary fibre	

Q5. Write the name of the processes: [1 mark each= 4 marks]



Q6. Give reasons of the following: [1 mark each= 5 marks]

i. Solids do not change shape and size.

_____

_____

ii. A screw is an inclined plane.

_____

_____

iii. All joints cannot move in all directions.

_____

_____

iv. Dietary fibre has no food value.

_____

_____

v. A wheelbarrow is made up of several simple machines.

_____

_____

Q7. Identify the simple machines in a bicycle: [1 mark each= 3 marks]

Q8. Circle the correct word to complete the statements: [1 marks each = 5 marks]

i. Melting is caused when particles gain/lose energy. _____

ii. A decrease / an increase in size or volume occurs when a substance is heated. _____

iii. An increase / a decrease in volume occurs when a solid changes into a liquid. _____

iv. The change of state from a liquid to a solid is caused by heating / cooling. _____

v. The change of state from a liquid to a gas is caused by heating / cooling. _____

Q9. Draw and label a clinical thermometer. [2 marks]

Q10. Use the formula: speed = distance/time, [2.5 marks each = 5 marks]

i. Calculate the speed of a car which travels 200 km in 4 hours.

_____

_____

ii. Calculate the distance travelled by a car moving at a speed of 100 km/h for 2 hours.

_____

_____

Q11. List two things that force can do: [1 marks each = 2 marks]

_____

_____

Q12. Draw the arrangement of particles in the boxes below. [1 marks each = 3 marks]

solid liquid gas

Q13. Name the type of simple machine: [1 marks each = 3 marks]

i. It has a long arm which can lift a heavy load by applying very little effort.

_____

ii. It is a sloping surface along which a heavy load can be pulled in order to raise it.

_____

iii. It is two inclined planes that increase and change the direction of the force.

_____

Note