TEACHING GUIDE

3

The SCIENCE Factor

FOR PRIMARY CLASSES

NICOLAS BRASCH

OXFORD
UNIVERSITY PRESS

CONTENTS

INTRODUCTION

About this series

This science series has been painstakingly written, edited, and published with one aim in mind: to provide primary school students in Pakistan with a comprehensive, engaging, informative, and entertaining experience while learning about science.

The contents follow the guidelines provided by the Cambridge International Primary Programme and the UK National Curriculum for General Science.

Some students can find the idea of studying science an ordeal. They may have been exposed to learning materials that are too dry and dense: providing basic information without considering the learning needs of today's students. We have spent as much effort in making sure our series engages the student as we have on ensuring the accuracy and relevance of the content, making this an outstanding work in all respects.

Salient features of the series

- **consistent with the nature of learning**

  This series stimulates students' curiosity and develops their interest in learning. It also provides them with activities that facilitate their capacity for problem solving and enable them to learn more about themselves and the world around them.

- **coherent**

  The ideas within this series have a logical and natural connection with each other. There is a progressive articulation of concepts, skills, and content that prepares students to understand and use more complex concepts as they advance through the learning process.

- **developmentally appropriate**

  In accordance with providing for all areas of a child's development (i.e. physical, social, emotional, linguistic, aesthetic, and cognitive), this series provides for:

  - active exploration of the environment
  - self-directed and hands-on learning activities
  - balance between individual and group activities
  - regular and supportive interaction with teachers and peers
  - balance between active movement and quiet activities.

- **comprehensive**

  A great deal of work has gone into ensuring that students who work their way through this series end up with a sound knowledge of basic scientific principles that will put them in good stead for later learning, and indeed for when they have completed their formal education.

- **feasible**

  The combination of a student text, workbook, interactive CD, and teacher's guide make learning and teaching feasible and accessible, without the need to purchase other materials.

- **useful and relevant**

  The content in this series relates directly to students' needs and interests. It enables them to understand more about themselves and the world they live in.

General suggestions and advice on teaching science

Students should be encouraged to share what they know, so invite discussion and foster an environment where students feel comfortable. Starting from what a student knows helps them to feel confident about learning new things.

The main focus of science at this level is to encourage the students to participate and investigate and this is done through asking and answering questions. Actively encourage the students to participate in the different experiments and share their experiences.

A good way to approach the learning and teaching of science in every lesson is outlined below—all you have remember is S.C.I.E.N.C.E.

S — Start by saying what the students are going to learn about.

C — Constantly encourage student participation and involvement.

I — Investigate the topic and follow students' interests.

E — Encourage all students to explore and contribute by rewarding participation and praising their involvement.

N — Notice the interests and questions of the students and explore them further.

C — Consolidate what has been learnt in the lesson and link it to other topics that have been taught and the world around them.

E — End on a positive note and explain what has been learnt and what is coming.

About this teacher's guide

This teacher's guide contains lesson plans, worksheets, and information that will enable teachers to actively support their students' development and provide opportunities for the students to acquire important knowledge and skills. Worksheets at the end of this guide and the workbook along with extension activities will help to reinforce and boost learning.

Teachers are encouraged to actively involve students in reinforcing concepts by interacting with the software CD. If the required facilities are not available assign tasks from the CD for practice at home.

The cartoon character, Super Scientist, is the narrator and has been used for generating interest in the text. His is smart since he is a scientist, but he is prone to acting silly at times. He should be referred to and made use of for eliciting laughter wherever possible.

UNIT 1 THE HUMAN BODY

Background

Students will be introduced to the functions of the skin, eye, ear, nose, and the tongue in this unit. They will have a strong background about the five senses and the corresponding body parts used by these senses. Inculcate visual materials and activities in your lesson to help students understand how these sense organs work. Reinforcement exercises in the Workbook will further support to strengthen the same.

Expected learning outcomes for the unit

Students should be able to:

- revise the five senses and consolidate this learning
- identify the sense organs and describe their function

1.1 Skin

Learning outcomes

Students should be able to:

Student's Book

- state the different functions of the skin

Resources

You will need:

- Student's Book page 5
- poster paper

Student's Book steps

1. Welcome the children into the class and direct them to sit at their tables.
2. Explain what they will be learning about the human body, but first find out what they already know.
3. Draw a table on the board with three columns with the headings Know, Want to know, and Learnt and title the table 'The human body'.
4. Ask the children to recall all that they know about the human body and what they have learnt in previous years at school and make notes under the Know heading on the board.
5. Ask the children to try and recall the sense organs.

6. Once the list is completed, ask the children to consider what are the essential parts of the human body, asking questions such as:

   What do you think is the most important part of the human body?

   What parts of the body do we need in order to live? Why?

   What parts of the body make it easier for us to live but are not essential to life? Why?

7. Remind the children of the five main senses that help us to interpret the world (touch, taste, smell, hearing, and sight) and ask them to consider their importance in our lives.
8. Encourage discussion and debate among the children by challenging their responses and encouraging them to consider the different parts of the human body and what is essential to life.
9. Read aloud the section on skin, pause at each statement, and encourage the children to ask questions.

Activities

- Arrange the children in pairs or threes and read aloud the activity for skin in the Student's Book. Ask the children to try and work out which four parts of the body are not covered by skin. The answers are: eyes, teeth, hair, and nails.
- Give the children some poster paper and ask the children to draw an accurate picture of their faces. They will need to look in a mirror and try and draw what they see. Ask them to draw an outline, and then colour and label their picture. They can complete the drawing at home.

Answers to Student's Book 1.1

- The skin holds everything else inside your body.
- The skin protects the other parts of your body from diseases.
- The skin makes sure your body is kept at the right temperature.
- The skin provides you with your sense of touch.

1.2 Eyes

Learning outcomes

Students should be able to:

Student's Book

- explain that the brain turns the images around so we can see
- explain how the eyelids and eyelashes protect the eye
- discuss the importance of the sense of sight

Workbook

- consolidate the learning from the Student's Book

Resources

You will need:

- Student's Book page 6
- Workbook page 2
- the picture that the children drew of themselves for homework
- coloured pencils
- paper bags with different objects in them, such as a leaf, a marble, a sharpener, a piece of fruit

Student's Book steps

1. Welcome the children into the class and ask them to share the picture they drew of themselves.
2. Ask them to colour their pictures in and try and use real-life colours—if their hair is brown use brown, and so on.
3. Display the posters around the room.
4. Ask the children to sit in a semicircle on the floor with you at the centre. Tell the children that they will be learning about their eyes.
5. Put the children in small groups and give them a paper bag with some different objects in it. Ask them to try and guess what the objects are by feeling them. They are not allowed to use their eyes. After some time, signal the children to stop the activity and ask the different groups to share what they felt and what they guessed the different objects to be. Allow the children to pull out the objects and look at them.
6. Discuss the importance of sight in our lives, asking the children such questions as:

   How hard was it not to look in the bag at the objects?

   When you were feeling them did you have your eyes closed or open?

   When it is dark and there is no light, do you still have your eyes open when you are trying to move around?
7. Read aloud from the Student's Book the section on eyes and pause after each statement looking at any relevant images inviting discussion.

Activities

- Ask the children to label parts of their body on their poster—skin, eyes, hair, and so on. They may write the parts of the body on paper and cut out labels and stick them on to their poster. Help the children to spell the parts of the body correctly and attach them to their poster.
- Discuss the questions from the section 'In your notebook' in small groups and then share the discussion with the entire class. Help the children to write down their thoughts.

Workbook steps

Ask the children to label the diagram of the eye using the words provided.

Answers to Student's Book 1.2

1. Your brain turns images the right way around.
2. Your eyelids close when they sense danger to your eyes. Eyelashes trap dust and other tiny particles.
3. Upside down

1.3 Ears

Learning outcomes

Students should be able to:

Student's Book

- comprehend the structure of the ear
- explain how the ear helps us to hear

Workbook

- consolidate the learning from the Student's Book

Resources

You will need:

- Student's Book page 7
- Workbook page 3
- three different forms of music such as classical, pop, and rock

Student's Book steps

1. Welcome the children into the class and direct them to sit in semicircle with you at the centre. Play the different songs and ask the children to close their eyes and listen carefully to the music. Ask them what type of music was pleasing to their ears. Why?
2. Tell the children that we are able to hear because of vibrations that travel over tiny parts in our ears. Explain that the brain then changes these vibrations into the sense of sound.
3. Read aloud from the Student's Book pausing after each statement and carefully looking at the pictures.
4. Read the labels on the pictures and point out the different parts of the ear. Encourage the children to practise pronouncing the new words.

Activities

- Ask the children to sit very quietly and listen to all the different sounds they can hear. Ask them to write down everything that they can hear. Ask different students to share their list and make a big list on the board.
- Help the children to answer the questions from 'In your notebook' in the Student's Book.

Workbook steps

1. Ask the children to label the diagram of the ear using the words provided.
2. Help them to explain how you hear sound.

Answers to Student's Book 1.3

1. The brain turns the vibrations into a sound that can be recognized.
2. The outer ear, the middle ear, and the inner ear. The outer ear collects sound as it passes by the ear. The sound then makes its way into the middle ear where it hits the eardrum. The eardrum turns the sound into vibrations which are then passed on to the brain.

1.4 Nose

Learning outcomes

Students should be able to:

Student's Book

- outline the functions of the nose

Resources

You will need:

- Student's Book page 8
- each student should bring in something they enjoy eating, such as their favourite fruit
- bring in something that has a strong smell that the students would not like, such as a raw onion

Student's Book steps

1. Ask the students which senses they use when they eat. Explain that although taste is the main sense associated with eating, the sense of smell also affects whether or not our food experience is enjoyable.
2. Cut up a food that has a smell that the students would not like.
3. Divide the students into pairs.
4. Ask one of the pair to hold the smelly food under the other one's nose while they eat the food they like.
5. Ask them to swap roles.
6. Discuss how the unpleasant smell affected the taste of their favourite food.
7. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement or question and encourage the children to respond.

Activities

- Help the children to answer the questions in the section 'In your notebook'. Remind the children that all the information they need to answer the questions is already in the Student's Book.
- Conduct the activity with the students on page 8 of the Student's Book.

Answers to Student's Book 1.4

1. The nose helps us to breathe. It allows us to smell the world around us. It allows us to taste what we are eating.
2. Irritation inside the nose causes us to sneeze.

1.5 Tongue

Learning outcomes

Students should be able to:

Student's Book

- explain that the tongue helps us to break down, chew, and swallow food
- explain that the tongue helps us to talk and taste

Workbook

- explain that different parts of the tongue help us taste different things

Resources

You will need:

- Student's Book page 9
- Workbook pages 4 and 5
- a book about someone moving, eating, or playing—any situation where some of the senses are being used
- five large pieces of paper each in the shape of a circle, one with an outline of an eye, one with the outline of a mouth, one with the outline of an ear, one with the outline of a hand, and one with the outline of a nose
- lemon juice, coffee, sugar, and salt for the children to taste

Student's Book steps

1. Welcome the children to the class and direct them to sit in a semicircle with you at the centre.
2. Read aloud from the Student's Book pausing after each statement and question, and encouraging children to react to what they can see and what they are hearing.
3. Read aloud a picture book encouraging the children to predict what they think might happen by looking at the pictures and responding to the story.

4. Ask the children to point out whenever one of the people in the story is using their senses, for example one of the characters eats an apple (taste), one of the characters kicks a ball (touch), one of the characters sees a beautiful butterfly (sight).

Activities

Read out the questions for 'In your notebook' from the Student's Book and discuss the possible answers with the children. Ask them to write their answers for homework. Remind them that all of the answers are in the Student's Book.

Going further

Divide the class into five groups and give them each a different paper circle. Assign each group a sense and ask them to draw pictures in the circle relating to that sense, for example:

Taste: *What food do we eat? Draw food you like and dislike.*

Sight: *Draw some things you can see in the light and in the dark.*

Smell: *Draw things that have a strong smell.*

Touch: *What is rough to touch? What is smooth? Draw three such things.*

Hear: *Shut your eyes and draw what you can hear.*

Allow time for the children to draw a picture in each of the circles. Ask each group to explain their pictures.

Workbook steps

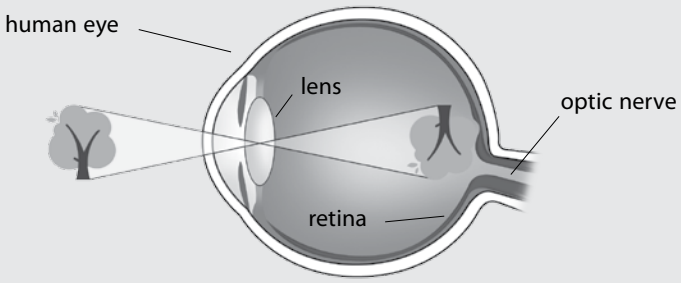
1. Tell the children that different parts of our tongue helps us to taste different things.
2. Ask the children to taste the different foods—sugar, lemon juice, coffee, and salt and record in their tasting sheet where they could taste the food on their tongue.
3. Ask the children to complete the crossword at home.

Learning is fun!

1. It is upside down.
2. The tongue is a muscle.
3. The skin
4. The nose helps us to breathe. It allows us to smell the world around us. It allows us to taste what we are eating.
5. The hammer, the anvil, and the stirrup
6. d

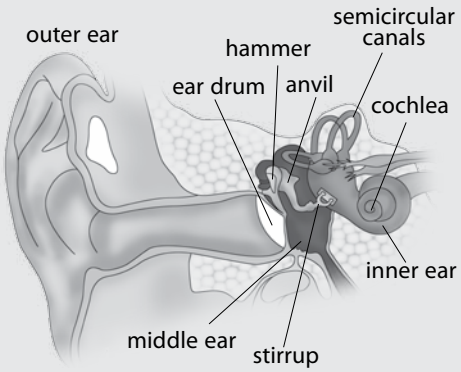
Answers to Workbook

Page 2



Page 3

1.



2. The human ear is comprised of three sections. These are called the outer ear, the middle ear, and the inner ear. Sound is collection by the outer ear as it passes the ear. It then enters the middle ear and hits the eardrum. Sound is turned into vibrations by the eardrum which is sent back to the inner ear and then the brain. Sound is then sensed by the brain. 2. The human ear is comprised of three sections. These are called the outer ear, the middle ear, and the inner ear. Sound is collection by the outer ear as it passes the ear. It then enters the middle ear and hits the eardrum. Sound is turned into vibrations by the eardrum which is sent back to the inner ear and then the brain. Sound is then sensed by the brain.

Page 4

- lemon juice—edges
- coffee—back
- sugar—tip
- salt—tip

2. Students will label the tip as sweet and salty, the edges as sour, and the back as bitter.

Page 5

Across	Down
2. skin	1. anvil
4. eye/ear	3. brain
5. cilia	4. ear drum
6. retina	7. nose
8. tongue	

UNIT 2 THE ANIMAL WORLD

Background

This unit explains what is meant by a life cycle. Students should be able to recognize growth in animals, and observe that while some grow only in size, others look different once they become adults. Use plenty of examples to explain this concept. Examples of a honey bee and a butterfly will be very useful in understanding a life cycle. Worksheets from the Workbook and the Teacher's Guide will support to build up on these ideas.

Expected learning outcomes for the unit

Students should be able to:

- explain that animals like humans, also change over time
- explain what is meant by a life cycle
- given an account of the life cycle of a honey bee

2.1 What is a life cycle?

Learning outcomes

Students should be able to:

Student's Book

- describe the life cycle of an animal

Workbook

- reinforce the learning in the Student's Book

Resources

You will need:

- Student's Book pages 10 and 11
- Workbook pages 6 and 7
- the book *The Very Hungry Caterpillar* by Eric Carle or, if you have Internet access, watch the author read the book at http://www.youtube.com/watch?v=eXHScpo_Vv8

Student's Book steps

1. Welcome the children to the class and ask them to sit in a semicircle with you at the centre. Explain that they are going to be learning about life cycles.
2. Lead a discussion on the different changes that the students have gone through from a baby to where they are now, asking questions such as:

When you were a baby what could you do?

What couldn't you do?

When you were a toddler—what was different, what could you do?

What couldn't you do?

When you were four—what had changed? How did you look?

What things had changed?

3. Read the book *The Very Hungry Caterpillar* a few times to the children. After the first reading, encourage the children to predict what will happen and identify the different stages that the caterpillar goes through in order to become a butterfly.
4. Tell the children that the book shows the life cycle of a caterpillar.

   Extension: Make a similar book that shows the life cycle of a human baby. Draw simple illustrations and colour them.
5. Read aloud from the Student's Book pausing after each statement and looking at the pictures with the children.

Activities

Ask the children to complete the activity in the Student's Book by drawing three pictures of themselves at different stages of their life cycle. They may wish to add some photos from home. Display the pictures around the room.

Going further

Divide the class into small groups and ask each group to make up a play that depicts the life cycle of a caterpillar. Encourage the groups to use any materials in the classroom to assist in their short performance and give them time to practise their performance. Encourage the groups to perform the play for the rest of the class.

Workbook steps

1. Help the children to explain what is happening at each stage of the life cycle of a honey bee.
2. For the coded exercise, ask the children to try and work out what the panda's message is at home.

2.2 Grow or change

Learning outcomes

Students should be able to:

Student's Book

- explain that baby animals may look different, and have different names from their parents

Workbook

- consolidate the learning from the Student's Book

Resources

You will need:

- Student's Book pages 12 and 13
- Workbook page 8
- copies of Worksheet 1 for all the children

Student's Book steps

1. Welcome the children into the class and ask them to sit in a semicircle with you at the centre. Ask the children if they have any pets—choose a few children to talk about their pet—its name, when they got it, and what they know about it. Ask the children to describe how their pet has changed over time.
2. Tell the children that baby animals may look different than their parents.
3. Tell the children that baby animals often have different names than their parents.
4. Ask the students if they know the name of any baby animals (perhaps start with a dog—the name of a baby dog being 'puppy').
5. Make a list of all of the names of baby animals that the students know on the board.
6. Add to the list the following names and record them on the board so the students can refer to them when completing Worksheet 1.

   foal—horse

   kitten—cat

   joey—kangaroo

   calf—cow

   cub—bear

   chick—bird

   larva—bee

   fawn—deer

   elver—eel

   tadpole—frog
7. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement to look at the pictures and encourage the children to ask questions or to comment on what they are seeing and hearing.

Activities

Ask the children to draw an animal that looks different when it is old from when it was young. They may do this at home.

Going further

Play the baby animal game. You will need cards with names of different animals on each card and another card with the name of its corresponding baby (you will need as many cards as there are students in the class and if you have an odd number it is okay to have a double-up). Divide the class in half. Direct one group to each take a card out of the animal box. Direct the other group to each take a card out of the baby animal box. Explain that the purpose of the game is for the animals and their babies to find each other but the only noise and actions that each child can make has to be particular to the individual animal they have selected from the box, for example: if a student selected a dog or puppy they can only make a barking noise and act like a dog to try and find their matching animal.

Allow the children to make as much noise as they want as long as it is applicable to the animal they have selected and to try and find their match among the class. Start the game again, mixing up the cards and allowing the children to randomly select another animal or baby animal.

Workbook steps

Help the children to describe the changes different animals go through from being a baby to being an adult.

2.3 Changes in life

Learning outcomes

Students should be able to:

Student's Book

- highlight different ways in which animals change over time

Resources

You will need:

- Student's Book pages 14 and 15
- a picture story book that has an animal/s changing or growing up

Student's Book steps

1. Welcome the children into the class and ask them to sit in a semicircle with you at the centre.
2. Read aloud from the picture story book. Encourage the children to predict what they think will happen by looking at the pictures. Encourage the children to interact with the story and characters.
3. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement to look at the pictures and encourage the children to ask questions or to comment on what they are seeing and hearing.

Activities

Help the children to write down some of the ways in which they have changed since they were a baby. Ask them to recall discussions that you have had in class and use them to make a list. Help the children to write down some of the things they expect to happen as they get older.

Answers to Student's Book 2.3

A. 1. A life cycle is all the changes that an animal goes through from birth to death.
2. Animals change in size, colour, shape, and become better at survival.
3. Answers will vary.

B.

Across	Down
4. changes	1. size
7. nutrients	2. cycle
	3. tadpoles
	5. shape
	6. colour

2.4 An animal life cycle

Learning outcomes

Students should be able to:

Student's Book

- explain the stages in the life cycle of a bee

Resources

You will need:

- Student's Book pages 16 and 17
- image of the life cycle of a bee, as in Student's Book page
- if you have Internet access—YouTube video (if possible) similar to http://www.youtube.com/watch?v=RZP9hHwDimk
- access to the Internet or other resources that depict the life cycle of a bee
- if you have Internet access—the song *Five busy honey bees* [a version can be found at http://www.dltk-teach.com/rhymes/bumblebee/index5.htm]

Student's Book steps

1. Welcome the children to the class and ask them to sit in a semicircle with you at the centre.
2. Revise the previous lessons by asking individual children to explain the different stages of life that humans go through. Reward the children for trying, even if they don't get the answer correct.
3. Ask individual children to describe the changes that any animal goes through. Praise the children for trying, even if they don't get the answer correct.
4. Help the children to identify the four different stages of the life cycle of a bee from the resources provided: egg, pupa, larva, and adult.

5. Learn the *Five busy honey bees* song and sing it as a class.
6. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement to look at the pictures and encourage the children to ask questions or to comment on what they are seeing and hearing.

Activities

Help the children write down the answers to the questions from the section 'In your notebook'. Remind the children that all the answers are in their Student's Book.

Answers to Student's Book 2.4

1. egg, larva, pupa, and adult
2. There are three types of adult bees: queens, workers, and drones. The queen lays the eggs.

Answers to Workbook

Page 6

I need water and food to live.

I also need energy to help me grow.

Page 7

1. Queen lays egg in wax cell.
2. Worker feeds hatched larva.
3. Larva reaches full growth.
4. Worker seals cell.
5. Larva becomes a pupa.
6. Adult bee leaves cell.

Page 8

The human baby has grown into an adult. Changes can be observed in size. The adult looks different and is able to survive in a better way.

The tadpole has grown into a frog. Changes can be observed in shape, size, and appearance. Adult frogs can live on land also while tadpoles live under water.

The baby chick has grown into a chicken. Changes can be observed in shape, size, colour, and appearance.

The cub has grown into a lion. Changes can be observed size, shape, and appearance. The lion is also adapted for its survival in a better way.

The baby rabbit has grown into an adult rabbit. Changes can be observed in size. The adult rabbit is better adapted to survive in its environment.

Changes can be observed in size, shape, and appearance. The adult animal can adapt to its environment in a better way for survival. It has grown horns also and gained weight.

Answers to Worksheet 1

The baby of a frog is a tadpole.

The baby of an eel is an elver.

The baby of a deer is a fawn.

The baby of a bee is a larva.

The baby of a bird is a chick.

The baby of a bear is a cub.

The baby of a cow is a calf.

The baby of a kangaroo is a joey.

The baby of a cat is a kitten.

The baby of a horse is a foal.

UNIT 3 THE PLANT WORLD

Background

Students will have prior knowledge about the life cycle of a plant and what they need for their survival. Through this unit, they will learn about the process of photosynthesis through which plants make their own food. They should also be able to identify the things plants need from the environment as well as the end products of this process. Experiments to show how each of these things are vital for photosynthesis should be conducted.

Expected learning outcomes for the unit

Students should be able to:

- identify the basic needs of plants for survival
- explain how photosynthesis helps plants in order to survive

3.1 Photosynthesis

Learning outcomes

Students should be able to:

Student's Book

- explain that plants are living things that need water and food to survive
- explain the process of photosynthesis

Workbook

- reinforce the learning from the Student's Book

Resources

You will need:

- Student's Book pages 18–21
- Workbook pages 9, 10, and 11
- organize a visit outside into the school yard
- a small patch of garden to observe

Student's Book steps

1. If possible, start the lesson outside in a garden. Welcome the children and tell them that they are going to learn about plants.

2. If you are outside, look around at the different plants and encourage the children to smell, touch, and look carefully at the different plants. If you are in the class, allow the children to smell, touch, and feel the plants you have brought in.
3. Divide the students into pairs or threes and ask them to think about and discuss living and non-living things.
4. Emphasize that plants and animals are living things. They need food to survive.
5. Take them to a small garden area and ask them to create a frame with their hands around their eyes to focus their attention, and to closely observe one small part of the garden.
6. Ask them to consider a dead leaf and explain that although it is dead, it is still a living thing because it was once alive and a rock is a non-living thing because it was never living.
7. Return to the classroom and ask the children to share with their small group all the things that they saw.
8. Ask the groups to make a list of all the living things they saw. Ask them to draw and label one of them—they might draw a plant and label the leaves, stem, and roots going into the ground.
9. Tell the children that in order to grow, plants need photosynthesis—just like animals need food.
10. Emphasize that photosynthesis needs four things to occur: water, carbon dioxide, sunlight, and chlorophyll. Write these words on the board.
11. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement and look at the pictures and encourage the children to interact.
12. Emphasize the four things that need to occur for plants to live: water, carbon dioxide, sunlight, and chlorophyll. Write the word 'photosynthesis' on the board.

Activities

- Help the children to draw a line from the terms on the left in 'Your turn' in the Student's Book to the definitions on the right.
- Ask the children to answer the questions from 'In your notebook' at home.

Going further

Choose a houseplant that you can use for this experiment. Use cardboard or aluminium foil shapes and clip or tape each shape on a different leaf. Place it near a window where it will get plenty of sunlight. Ask the students to guess what the covered spots will look like. After four days, remove the shapes from the leaves. Compare the areas on the leaf that were covered with the shape with the other parts of the leaf. Ask the students:

What has happened to the leaves?

What has or has not happened in the different parts of the leaf?

What do you think could have affected the leaves? Have you seen similar effects in nature?

The activity on page 20 of the Student's Book can also be used here.

Workbook steps

1. Help the children choose the correct answer from the True or False exercise.
2. Encourage the children to fill in the blanks and come up with a recipe for photosynthesis.
3. Help the children to explain the process of photosynthesis in their own words.
4. The children can complete the crossword for homework.

Answers to your turn!

photosynthesis	the process by which plants make their own food
chlorophyll	a substance that turns sunlight into a form that can be used to help make food
carbon dioxide	a gas that plants take in from the air and use to make food
glucose	a type of sugar produced by plants
oxygen	a gas that plants give out and that humans breathe

Answers to Student's Book 3.1

1. water, carbon dioxide, sunlight, and chlorophyll
2. Photosynthesis is a process that takes place in the leaves containing a substance called chlorophyll. Plants collect water from the ground, and sunlight from the Sun. They absorb carbon dioxide from the atmosphere. The chlorophyll in the leaves changes the sunlight, so it can be used by the plant. Sunlight combines with carbon dioxide and water creating glucose which is a type of sugar. It contains food which is needed by the plant to grow. Just like glucose, oxygen is also released by the plant.

   Check if the diagrams drawn are correct with the correct labels.
3. No. I don't think carbon dioxide is so cool because it is not healthy to breathe. It pollutes the air and heats up our planet.

Answers to Workbook

Page 9

I.

1. False
2. False
3. True
4. False
5. True
6. False
7. True
8. False
9. True
10. False

II. Recipe for photosynthesis

light energy—comes from the Sun
water—comes from the ground
chlorophyll—comes from the leaves
carbon dioxide—comes from the air

Directions:

Mix together the water, chlorophyll, and carbon dioxide. Add light from the Sun. Soon glucose and oxygen will be formed through a process called photosynthesis.

Page 10

1. Sun
2. sugar, oxygen
3. leaves
4. roots

Page 11

Across

1. chlorophyll

Down

1. carbon
2. sunlight
3. sugar
4. plants
5. oxygen

UNIT 4 FOOD AND DIET

Background

This unit introduces herbivores, carnivores, and omnivores and relates the type of teeth they have to suit their particular diet. Students should be able to recognize the different types of teeth and their purpose. The importance of oral health should be stressed.

Expected learning outcomes for the unit

Students should be able to:

- explain that we need food for energy
- define omnivores, herbivores, and carnivores
- explain that different teeth are used for different purposes

4.1 Why we need food

Learning outcomes

Students should be able to:

Student's Book

- explain that food gives us fuel for energy and keeps our body healthy

Resources

You will need:

- Student's Book pages 22 and 23

Student's Book steps

1. Welcome the children into the class and direct them to sit in a semicircle with you in the centre.
2. Explain that food provides the fuel that we need for growth and for performing at our very best.
3. Explain that there are choices that we can make to help keep our bodies and minds healthy and one of the most important choices we can make is about what we eat and drink.
4. Explain that eating enough healthy food is very important for good health.
5. Divide the students into small groups and ask them to discuss what their favourite foods are.
6. Ask them to discuss if they think their favourite foods should be eaten rarely, sometimes, or often.
7. Read aloud from the Student's Book asking the children to follow in their own books.
8. Emphasize that healthy foods give us energy to do all the things we want to do.

Activities

- Ask the students to keep a food diary for two days and nights, making sure that they include everything that they consume during this time—even small snacks.
- Help the children to record all the things that they do each day that they need energy for. Explain that if they needed one litre of fuel each day for each thing, they need to work out how many litres of fuel they would need each day.

4.2 Carnivores, herbivores, and omnivores

Learning outcomes

Students should be able to:

Student's Book

- differentiate between carnivores, herbivores, and omnivores

Resources

You will need:

- Student's Book pages 23–25

Student's Book steps

1. Welcome the children into the class and ask them to sit at their desks.
2. Write the words 'Carnivore', 'Herbivore', and 'Omnivore' on the board.
3. Ask the children if they know what these words mean.
4. Draw a picture of a lion or write the word lion under 'Carnivore'.
5. Ask the children what lions eat. Tell them that lions eat other animals. They eat meat. Tell the children that lions are carnivores.
6. Draw a picture of a cow or write the word cow under 'Herbivore'.
7. Ask the children what cows eat. Tell them that cows eat grass. They do not eat meat. Tell the children that cows are herbivores.
8. Draw a picture of a chicken or write the word chicken under 'Omnivore'.
9. Ask the children what a chicken eats. Tell them that a chicken eats both meat and grass. It eats everything. It is an omnivore.
10. Divide the class into three groups and give each group a word—'Omnivore', 'Herbivore', or 'Carnivore'.
11. Tell the group to try and come up with a definition for the word given to them. Elicit names of other animals for each group of animal.
12. Write the correct definition of each animal group on the board.

13. Read aloud from the Student's Book pausing after each statement; and encouraging the children to ask questions and to interact.

Activities

- Encourage the children to answer the questions from 'In your notebook' individually.
- Put the children in pairs or threes and ask them to complete the three steps. Walk around the class assisting the children and checking online the category to which the different animals belong—herbivore, carnivore, or omnivore.

Answers to Student's Book 4.2

1. (a) Herbivores only eat plants.
   (b) Omnivores eat meat and plants.
   (c) Carnivores only eat meat.
2. Answers and lists will vary.

4.3 Using teeth

Learning outcomes

Students should be able to:

Student's Book

- recognize the types of teeth and their function

Workbook

- reinforce the learning from the Student's Book

Resources

You will need:

- Student's Book pages 26–29
- Workbook pages 12, 13, and 14
- hand mirrors or a large mirror where the children can look at their teeth

Student's Book steps

1. Welcome the children into the class and direct them to sit in a semicircle with you in the centre.
2. Explain that they will be learning about teeth.
3. Ask them to look at their teeth in a mirror and allow them to look at the teeth of other students to notice the shapes. Encourage the children to try and guess what the different types of teeth might be used for.
4. After some time, tell the children to sit down and listen. Tell them that the different shape and size of teeth means that these teeth are used for different things.

5. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement and look at the corresponding picture inviting different children to describe what they can see.
6. Reinforce the point that different teeth are meant for breaking down different types of food.

Activities

- Ask the children to draw the different types of teeth and to write a sentence next to each of the drawings explaining what these teeth are used for.
- Help the children to complete the questions from the section 'In your notebook'.

Going further

- Ask the students to describe their favourite food and then explain which teeth would be used to help them eat that food.
- Show the children an apple. Tell them to pretend that it is a tooth. Poke a hole into the apple. Explain to the children that holes, or cavities, can form in our teeth when we do not brush, floss, eat healthy foods, and visit the dentist regularly. Tell them the hole you just put in the apple is called a cavity.

Workbook steps

1. Ask the children to complete the code for the Code game.
2. Help the children complete the table about what animals eat.
3. Put the children into small groups and ask them to discuss the answers to the questions on teeth. Ask the children to individually record their answers.

Learning is fun!

I. 1. For energy and to keep their bodies healthy
   2. Omnivores
   3. Canines, incisors, molars, and premolars
   4. a. Canines
      b. Molars
   5. To help us eat different kinds of food

II.

Across	Down
3. molars	1. premolars
4. incisors	2. canines

Answers to Workbook

Page 12

omnivores—canines, incisors, molars, and premolars

herbivores—incisors, molars, and premolars

carnivores—same as omnivores

Page 13

1. energy
2. plants
3. omnivore
4. hibernating
5. canines
6. incisors
7. molars
8. fish
9. exercise
10. water

Page 14

1. dog—carnivore

   elephant—herbivore

   lion—carnivore

   bear—omnivore/carnivore

   sheep—herbivore

   human—omnivore

   rabbit—herbivore

Students' choice of dinner will vary.

2. Students will label the teeth according to the diagram on page 26 of the Student's Book.

UNIT 5 THE ENVIRONMENT

Background

Since students are already familiar with the term 'habitat', begin the lesson by asking questions relating to it. This will not only refresh their memory but will also prepare them for what's to follow. Introduce the different types of natural habitats and allow the students to imagine what life in each one would be like. Continue to inculcate the idea of a healthy environment. Also explain what endangered species are, using examples and gathering ideas about how they can be protected.

Expected learning outcomes for the unit

Students should be able to:

- define a habitat
- identify the different types of habitats and their features
- discuss ways of protecting the environment and reducing extinction

5.1 What is a habitat?

Learning outcomes

Students should be able to:

Student's Book

- define a habitat
- name animals and plants that share their habitat with them

Workbook

- consolidate the learning in the Student's Book

Resources

You will need:

- Student's Book pages 30 and 31
- Workbook page 15

Student's Book steps

1. Welcome the children to the class and direct them to sit in a semicircle with you at the centre. Tell the children they will be learning about habitats—a place where something lives.
2. Tell the children that their habitat is their house.

3. Lead a discussion about the features of their houses and how they make their day-to-day living more comfortable, asking questions such as:

   Why do you have windows in your house?

   Why do you have a roof?

   If you have different levels in your house, why do you think this is so?

   What covers the floor—why is this so?

   Is there a wall around the building?

   Why/why not? What are some of the features of your outside area?

   Why do you think you have them?

4. Read aloud from the Student's Book pausing to look at the pictures. Ask individual children to describe the different animals, plants, and habitats that they can see. Praise them for their efforts.

Activities

Help the children to make a list of some of the animals and plants that share their habitat.

Going further

Draw a picture of your home. Label the different features of your home including the windows, roof, floor coverings, beds, and so on.

Workbook steps

Ask the children to complete the 'Environment' worksheet.

Answers to Student's Book 5.1

Answers will vary.

5.2 Habitats on Earth

Learning outcomes

Students should be able to:

Student's Book

- name the four main types of habitats on the Earth
- identify the features of these habitats

Workbook

- reinforce the learning in the Student's Book

Resources

You will need:

- Student's Book pages 32–39

- Workbook pages 16 and 17
- copies of Worksheets 2A and 2B for all of the children

Student's Book steps

1. Welcome the children into the class and direct them to sit in a semicircle with you in the centre.
2. As a class, brainstorm the different features of four different environments—deserts, polar regions, rivers and seas, and rainforests, asking questions such as:

   What do you think it might feel like to be in a polar region?

   What sort of clothes do you think you would choose to wear?

   Describe what most days would feel like in a desert.

   What might it look like in a rainforest?

   How often do you think it might rain? If you lived in a polar region, what sort of house might best suit your need? Why?
3. Write the different features on the board.
4. Divide the children in small groups and ask them to discuss what differences and similarities there might be between their house and a house built in a desert, a polar region, on a river or sea, or in a rainforest.
5. Ask one child from each group to report back on their discussion.
6. Ask the children to think about how different their house would be if it was in a desert, a polar region, on a river or the sea, or in a rainforest.
7. Ask one child from each group to report back on their discussion.
8. Record the similarities and differences between houses located in different environments on the board and use different colours to show the similarities and differences between each region.
9. Read aloud from the Student's Book pausing after each statement and looking at the pictures. Write some of the key points on the board and ask the children to highlight them in their Student's Book.
10. Ask them to identify the water animals on page 38. The largest animal is the whale and the smallest a plankton, a very small form of animal life in water.

Activities

- Read aloud the activity at the end of each habitat description and brainstorm as a class how it might feel to be walking through this habitat. Help the children to write down some points to describe how they would feel, and what they would sense in each habitat.
- Read aloud the questions from 'In your notebook' and help the children to write down the answers.
- Ask the students to complete Worksheet 2a and 2b and display their pictures around the classroom with all of the polar regions in one area, all of the deserts in one, the rainforests in one and the rivers or sea in another area. Discuss some of the features of the clothing that the people are wearing and why this might match the environment they are living in.

Going further

Ask the children to choose one of the four different environments and draw what their house might look like if it was located in one of these different environments, and label its features.

Workbook steps

1. For 'Habitats of the world' ask the children to colour in the different pictures of habitats.
2. For the exercise 'Missing vowels' ask the children to individually try and fill in the missing gaps with vowels to get the answers. Write the vowels on the board to remind the children—a, e, i, o, u.
3. For 'Odd one out' ask the children to cross out the animals that don't belong to the environment.

Answers to Student's Book 5.2

1. A habitat is a place where living things live.
2. Natural habitats are formed by nature. Man-made habitats are natural habitats that have been changed by humans (e.g. cities).
3. a. Animals and plants that live in the desert need to be able to survive for a long time without water. Examples may include antelopes, porcupines, camels, rattlesnakes, and species of lizards among many others.
   b. Animals in the polar regions should be able to stand the cold. Therefore, they need to have lots of fur, thick feathers, or a layer of fat. Examples may include blue whales, seals, arctic foxes, penguins and polar bears among many others.
   c. Animals in seas and rivers need to be able to swim, or at least travel in water. Examples may include dolphins, sharks, crocodiles, crabs and lobsters among many others.

5.3 Protecting the environment

Learning outcomes

Students should be able to:

Student's Book

- discuss ways to protect the environment

Resources

You will need:

- Student's Book pages 40 and 41

Student's Book steps

1. Welcome the children into the class and direct them to sit in a semicircle with you in the centre. Ask the children to recall what a habitat is.

2. Ask the children to think about the different habitats they came to know about in the previous lesson.
3. List the habitats on the board and add the features that the children recall.
4. Tell the children that we need to protect these environments by keeping the Earth, the water, and the air clean.
5. Explain that if we don't look after these habitats plants and animals can become sick and die.
6. Read aloud from the Student's Book pausing after each statement to look at the pictures and to invite discussion.
7. Praise individual children for offering their thoughts and opinions.

Activities

Help the children to answer the questions from 'In your notebook'. Remind the children that the answers are in the Student's Book.

Answers to Student's Book 5.3

a. It is important to keep the Earth clean because if the Earth becomes polluted, then trees and plants will not be able to grow. Animals need trees and plants to produce the air that we breathe. Animals also need plants for food and trees for shelter.

b. It is important to keep the water clean because animals need to drink clean water.
We also need to keep bodies of water clean so that fish can live and grow.

c. It is important to keep the air clean because animals need to breathe clean air. If the air is not clean, animals may become ill—and even die.

5.4 Protecting endangered species

Learning outcomes

Students should be able to:

Student's Book

- explain the difference between extinct animals and endangered species
- suggest ways the endangered species may be saved.

Workbook

- revise the learning from the Student's Book

Resources

You will need:

- Student's Book pages 42 and 43
- Workbook page 18
- access to the Internet or books where students can research extinct animals

- pictures of the following extinct animals: a dodo, a quagga, Irish deer, Caspian tiger, great auk, Passenger pigeon, Caribbean monk seal, Bubal hartebeest, Tecopa pupfish, Baiji river dolphin, golden toad
- copies of Worksheet 3 for all the children

Student's Book steps

1. Welcome the children into the class and ask them to sit in a semicircle with you in the centre. Tell the children that we need to protect the environment otherwise many plants and animals die.
2. Tell the children that we have already lost animals and plants that are now known as extinct. These animals have died out because their environment became polluted.
3. Tell the children that animals and plants that are nearly extinct are called endangered species.
4. Write the words 'extinct' and 'endangered species' on the board and write down their definitions. Ask the children to copy them down.
5. Read aloud from the Student's Book pausing after each statement and inviting the children to comment or discuss their learning. Look at the pictures together.

Activities

- Divide the students in pairs or groups of three and give them the name and picture of an extinct animal. Ask them to research the animal and complete Worksheet 3.

  Extension: Encourage the students to research different extinct animals and record their findings.
- Ask the children to complete 'In your notebook' at home. Remind them that all the answers are in the Student's Book.

Going further

Arrange the children into small groups and ask them to create a short play that shows the life and extinction of an animal. They can use their research to help show why their animal died out. Provide time for the students to rehearse and gather any props from around the classroom. Encourage the students to perform their play for the rest of the class to show the life and extinction of their animal.

Workbook steps

For the exercise 'Extinct or Living', ask the children to put an 'X' next to the animals they think might be extinct.

Answers to Student's Book 5.4

1. An endangered species is a group of living things that is at risk of dying out completely. If something is not done to protect them, they will soon be lost to the Earth forever. Five examples are: dodo, great auk, dinosaurs (all types), quagga, and Tasmanian tiger.
2. The main causes for species becoming endangered are destruction of habitats, the introduction of other species, climate change (global warming).
3. Endangered animals are low in numbers and there is a possibility that they will all die out. Extinct animals no longer exist.

Answers to Workbook

Page 15

soil—worm and centipede

forest—rabbit, birds, and butterfly

pond—water snail and frog

ocean— fish, crab, starfish, and shark

Page 16

Students will label the layers of the rainforest with the emergent zone at the top, then the canopy zone, next understorey, and the forest floor at the bottom.

Page 17

1. Antarctica
2. Sahara Desert
3. rainforest
4. Africa, Asia, Australia, South America
5. carbon dioxide
6. temperature
7. ice
8. adapt
9. food, water, shelter

Odd one out

1. elephant
2. deer
3. lion
4. frog
5. raccoon
6. koala bear
7. tortoise
8. snow leopard
9. ostrich
10. lynx

Page 18

Students will put an X (extinct) next to the dodo, pterodactyl, auk, Tasmanian tiger, sea cow, and the quagga. A tick will be placed next to the sea lion, ostrich, antelope, elephant, tiger, and the kangaroo.

Answers to Worksheet 2A and 2B

Students will correctly label the polar region, desert, rainforest, and the sea. In Worksheet 2B, students will shade polar regions, ice, and penguins in one colour. They will use a different shade for deserts, rocks, mountains and camels. Rainforests, tall trees, and monkeys will be shaded using another colour. Rivers, seas, oceans, water, and dolphins will be shaded in a different colour.

Answers to Worksheet 3

Answers will vary.

UNIT 6 MATTER AND MATERIALS

Background

This unit introduces atoms and molecules. It'll greatly help students if these are presented in the simplest possible way so that the students develop a clear understanding of them. Matter and its three states are also introduced. The aim of this series, as you are well aware, is to create the love of science among students. If you lay the foundation of this among your students then you have done your bit. You are requested to make full use of the textbook and the workbook to help you in this endeavour and to make your lessons as interesting as possible.

Expected learning outcomes for the unit

Students should be able to:

- explain the terms, 'states of matter', 'atoms', and 'molecules'
- define the three forms of matter

6.1 What is matter?

Learning outcomes

Students should be able to:

Student's Book

- explain that everything is made of matter
- describe the three forms of matter

Resources

You will need:

- Student's Book pages 44 and 45
- different things as examples of different forms of matter (solid, liquid, and gas), such as an apple, a block of wood, some fruit juice, some water, a gas balloon

Student's Book steps

1. Welcome the children to the class and explain that they will be learning about matter.
2. Tell the children that everything around us is made of matter.
3. Tell the children that matter comes in three main forms—solid, liquid, and gas. All matter is made up of particles so tiny that they can only be seen through a microscope.

4. Write 'Matter is made up of tiny particles.' on the board.
5. Explain that when matter is in the form of a solid it is easier to identify because it holds its shape and size and the only way it changes shape is by force. The particles are packed very tightly and that is why the solid does not move unless force is applied.
6. Explain that when matter comes in liquid form, it has size or volume but no shape. It simply fits the size of the container it is contained in. The particles can move around freely past each other. This is why a liquid flows freely.
7. Explain that when matter is in gas form, it is hard to identify because it has no colour or shape. There is a lot of free space between the particles. For that reason gas can move freely in the air.
8. Write these explanations in table form and display them on the board through the course of the unit.
9. Divide the class into groups of four. Show the different objects and ask each group to discuss whether it is a solid, liquid, or gas.
10. Ask the children to take a deep breath and feel what is going into their lungs—ask them to classify this as well.
11. Ask each group to report back on their finding. Reward the children for their efforts, even if they are not correct.
12. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement and look at the pictures with the children, choosing some children randomly to describe what they can see.
13. Before the end of class, give a recap of the lesson.

Activities

Help the children to complete the questions from 'In your notebook' Remind the children that they will find the answers in the Student's Book.

Answers to Student's Book 6.1

1. Solid, liquid, and gas
2. Atoms are the tiniest particles that all matter is made of. They are so tiny that they can be seen only through very powerful microscopes.
3. Two or more atoms join together to form a molecule.
4. The amount of matter contained by an object is its mass.
5. The amount of space that matter takes up is called its volume.

6.2 Solids, liquids, and gases

Learning outcomes

Students should be able to:

Student's Book

- explain that matter can change its form
- differentiate between the forms of matter

Workbook

- consolidate the learning in the Student's Book

Resources

You will need:

- Student's Book pages 45–49
- Workbook pages 19, 20, and 21
- access to the Internet or other resources that define the three forms of matter
- copies of Worksheet 4 for all the children
- fruit juice
- ice cube trays
- toothpicks
- sugar
- glass bowl
- boiling water

Student's Book steps

1. Welcome the children to the class and ask them to recall the three different types of matter—solid, liquid, and gas.
2. Give a short recap of the last lesson, emphasizing that everything around us is made from matter.
3. Read aloud from the Student's Book pausing after each statement to emphasize the main points and to look at the pictures. Invite the children to ask questions and to interact.
4. Ask the students to use the Student's Book and other resources to complete Worksheet 4.

Activities

- For the solids activity—help the children to identify 10 different solids around the classroom and make a list.

- For the liquids activity—use different shaped containers to show how water takes the shape of its receptacle.
- Ask the children to complete the 'How much do you remember?' section and the 'In your notebook' at home. They can check their answers in the next class. Remind the children that all the information they need to answer the questions is in the Student's Book.

Going further

You will need to use the freezer to conduct this simple experiment. If there's one available in the school kitchen or the tuck shop, please, make use of it. Otherwise instruct children to carry out the experiment at home. This experiment will show how matter changes its state—you will need to allow at least one night for the juice to freeze. Explain that matter can change its state when heated or cooled. Put the children into small groups and ask them to pour the fruit juice into ice cube trays. Put a toothpick in each slot. Ask the students to identify the state of matter the fruit juice is in. Put the ice cube trays in the freezer and ask the students to predict if the fruit juice will change state. When it is frozen, allow the students to have the ice lollies and check if their prediction was accurate.

Extension: Access this online game to see what happens to different types of matter when heated and cooled http://www.fossweb.com/modulesK-2/SolidsandLiquids/activities/changeit.html

Workbook steps

1. Ask the children to fill in the blanks for the exercise on page 19. Remind the children that all of the answers are in the Student's Book.
2. Ask the children to complete the crossword on page 20 at home.
3. Explain the 'Amazing matter' worksheet. Each block either names or gives information about one state of matter. Ask the children to colour each block according to the colour code.

Answers to Student's Book 6.2

1. a. Anything that takes up space is matter.

   b. Solid — Has a definite shape, mass, and volume
   Particles are tightly packed and usually don't move.

   c. Liquid — Does not have a definite shape
   Has a definite mass and volume
   Takes the shape of its receptacle
   Particles are close together with no regular arrangement and can slide past each other.

   d. Gas — Does not have a definite shape, mass, or volume
   Takes the shape of its receptacle
   Will fill the space it is in
   Particles are separated with no regular arrangement.

2. Answers will vary.

Answers to Workbook

Page 19

1. atoms	2. mass, volume, and shape	3. volume	4. mass
5. liquids and gases	6. gas	7. air and clouds	8. liquid
9. milk and juice	10. solid	11. chair and ice	12. liquid

Page 20

Across	Down
2. atoms	1. water vapour
4. shape	3. gas
5. volume	4. snow
9. carbon dioxide	6. liquid
10. ice	7. oxygen
11. solid	8. petrol
12. mass	9. container

Page 21

red	yellow	red	yellow and green	yellow	green
green	green	yellow	yellow	red	yellow
red	yellow	red	red	red	yellow
green	red	yellow	red	yellow	green
green	red	green	red	yellow	green

Answers to Worksheet 4

1. solid
2. gas
3. gas/liquid
4. liquid
5. liquid/gas
6. gas
7. solid
8. liquid
9. solid
10. solid
11. gas
12. liquid/gas
13. gas
14. liquid
15. solid
16. solid/liquid

UNIT 7 WATER

Background

Students' prior knowledge will base on the importance of water in our lives. They will also be familiar with the water cycle. Introduce the terms related to the stages of the water cycle and help the students to remember them by using a variety of reinforcement activities such as, matching correct answers, fill-in-the-blanks, multiple choice questions, or labelling a diagram. Through these exercises, they will eventually be able to define or explain each stage in detail.

Expected learning outcomes for the unit

Students should be able to:

- describe the four stages of the water cycle

7.1 All life needs water

Learning outcomes

Students should be able to:

Student's Book

- explain the importance of water for all living things

Workbook

- consolidate the learning in the Student's Book

Resources

You will need:

- Student's Book pages 50 and 51
- Workbook page 22

Student's Book steps

1. Welcome the children to the class and explain that they will be learning about water.
2. Lead a discussion on water and its importance in our lives, asking questions such as:

   What is it like when you are thirsty?

   What about water in puddles?

   What about sea water? Why?

3. Explain through diagrams that 75% of the Earth is made up of water, 97% of the Earth's water is not suitable for drinking. And of the 3% that is suitable for drinking, 75% of that water is frozen in the polar ice caps. Draw a pie chart on the board showing the different percentages. Explain this by using a glass of water. Fill it to three-quarters first. Show your students that if Earth were this glass, three-quarters of it would be water and only one-quarter land. Go ahead to explain the last point further.
4. Ask the children where they think the water in their body is. Then explain that most of their blood is water; that about 80% of the human brain is water; and that even bones are made up of 10-15% water.
5. Write these percentages on the board and draw a basic picture showing what they relate to.
6. Discuss where the children's families get their water from.
7. Read aloud from the Student's Book asking the children to follow in their own books. Pause after each statement or question and encourage the children to comment. Reward the children for participating by praising their responses.

Activities

Ask the children to copy down the picture of the pie chart and to colour in and label the different slices of the pie. Remind the children what the different percentages mean.

Extension: Ask the children to make up a pie chart showing how much of their brain and bones are made up of water.

Workbook steps

Ask the children to complete the 'Water' worksheet at home, after explaining what is required.

7.2 The water cycle

Learning outcomes

Students should be able to:

Student's Book

- define evaporation, condensation, precipitation, and run-off in the context of the water cycle

Workbook

- consolidate the learning in the Student's Book

Resources

You will need:

- Student's Book pages 52 and 53
- Workbook page 23
- chart paper
- coloured markers

Student's Book steps

1. Welcome the children into the class and ask them if they can recall what the water cycle is.
2. Tell the children that the water cycle is the cycle of water, from rivers and oceans to clouds to rain, and back to rivers and oceans.
3. Write the four stages of the water cycle on the board: evaporation, condensation, precipitation, and run-off.
4. Emphasize that the water comes down as rain falls from the sky that actually comes from the Earth.
5. Read aloud from the Student's Book pausing after each statement and looking carefully at the pictures and diagrams with the children.

Activity time

Help the children match the different stages of the water cycle with the correct definition.

Going further

Ask the children to make a chart that shows the different stages of the water cycle: evaporation, condensation, precipitation, run-off. Help them to label the different stages correctly and display the charts around the classroom. This can be a group project.

Workbook steps

Ask the children to complete the wordsearch at home.

Activity time

evaporation	when water is heated and is turned from a liquid into a gas
condensation	when cold air cools the gas and it changes into a liquid
precipitation	when the liquid in the sky falls to the ground
run-off	when the rain that has fallen to Earth runs downhill and back into the ocean

Answers to Student's Book 7.2

Rain falls from the sky but it does not start its life in the sky. Rain starts its life on the Earth. It rises into the air and falls back onto the Earth. This is known as the water cycle. There are four stages to the water cycle:

- evaporation
- condensation
- precipitation
- run-off (or collection)

Evaporation is when the water is heated and is turned from a liquid into a gas. Because gases are lighter than air, the gas rises to the sky.

Condensation is when cold air cools the gas and it changes into a liquid. When the gas has turned into a liquid, it forms clouds. Clouds are made of tiny water droplets.

Precipitation is when liquid water in the sky falls to the ground.

Run-off is when the rain that has fallen to Earth runs downhill and back into a lake or the ocean. Then the cycle starts all over again.

Answers to Workbook

Page 22

1. evaporation
2. precipitation
3. condensation

Page 23

Students will circle the drops on the window, the bottle on the refrigerator, the ice cream in the freezer, the pot on the stove, and jelly on the kitchen counter.

Page 24

Students will highlight the words in the box. They will appear horizontally and vertically.

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

UNIT 8 FORCE, WORK, AND ENERGY

Background

Important concepts of physics are being introduced in this unit and it's important to do it in the most interesting manner. Science should be presented as a subject students can relate to their everyday life, finding its application all around them. Make use of such examples in the textbook and add your own where possible. Hands-on activities will prove most beneficial.

Expected learning outcomes for the unit

Students should be able to:

- recall that force changes speed and direction of a moving object
- identify tools and machines, and explain how they work
- explain the relationship between force and work and between work and energy

8.1 Force and motion

Learning outcomes

Students should be able to:

Student's Book

- explain that movement is caused by force
- explain that force can speed up or slow down objects

Workbook

- consolidate the learning in the Student's Book

Resources

You will need:

- Student's Book pages 54 and 55
- Workbook pages 25 and 26
- rubber balls
- modelling clay
- bats and balls
- copies of Worksheet 5 for all the children
- chalk

Student's Book steps

1. Welcome the children to the class and ask them to sit in a semicircle with you in the centre.
2. Push a chair in the centre and ask a child if he can make it move without touching it. Allow them to touch it to cause motion, both forward and backward.
3. Tell the children that you pushed the chair and it moved and then you pulled it and it moved again.
4. They already know that push and pull are forces.

Activities

- Allow the children to experiment with hitting a ball with a bat against a wall. Ask them to predict what will happen when they apply more force.
- Ask the children to complete Worksheet 5—they may do this at home.

Workbook steps

- Ask the children to complete the worksheet.
- Arrange the children in pairs or threes and give them each a piece of chalk. Take them outside and ask them to mark out a short distance and to run from the start to the finish slowly and note when they come to a complete stop. Ask them to run faster and to note where they stop. Explain that the faster they run, the more force they use to push themselves forward the harder it is to stop. Explain that Isaac Newton was the first person to discover this.
- Give workbook page 26 for homework.
- First demonstrate to children that the harder their push or pull, the stronger the movement in the object they are applying force to. Let them experience with different objects.

8.2 Force and work

Learning outcomes

Students should be able to:

Student's Book

- define force and work
- explain what tools and machines do

Resources

You will need:

- Student's Book pages 55 and 56
- copies of Worksheet 6 for all the children
- scissors

Student's Book steps

1. Welcome the children into the class and direct them to sit in a semicircle with you in the centre.

2. Ask individual children to share what their parents or relatives do for work.
3. Read aloud from the Student's Book pausing to emphasize the definition of work. Ask individual children to explain the images. Elicit examples from children to explain the difference between force and work.
4. Emphasize that simple machines can use force to make work a lot simpler.
5. As a class, brainstorm a list of simple machines that make life easier and record them on the board.
6. Hand out Worksheet 6 and ask the children to complete it.
7. Ask individual children to explain how they found the task.
8. Emphasize that scissors are simple machines that can make our lives a lot easier.
9. Return to the list of simple machines on the board and brainstorm some more simple machines that make our lives easier.

Activities

Encourage the children to draw and label pictures of tools and machines that help us work.

Going further

Have several students attempt to open an empty paint can with their hands. They can also be asked to move a heavy desk or another heavy object. The students should be able to understand that although force was applied, the objects did not move and there was no motion. Then have a student open the paint can by using something to remove the top of the can. Explain that the object was used as a lever, one kind of simple machine, and that a machine is something that makes work easier to do.

8.3 Work and energy

Learning outcomes

Students should be able to:

Student's Book

- define energy
- name the four types of energy mentioned in the unit and explain what each type does
- explain with examples kinetic and potential energy

Resources

You will need:

- Student's Book pages 57–59
- Workbook page 28

Student's Book steps

1. Children must first understand what energy is. It's the ability to do work. Just as humans need energy to function so does every other thing that does some kind of work. It may be a match, a battery cell, a TV, a car, rain falling from the sky, or food being cooked. Give them more examples and elicit examples too. Tell them that although all of this work needs energy, the energy is of a different kind in each case. Then go on to explain the four types of energy in the book.
2. Explain the difference between kinetic energy and potential energy. Give a lot of examples and scenarios, asking children to point out when potential energy turns into kinetic energy.

Activities

Help the children to complete the answers for 'In your notebook'. Remind them that all of the answers are in the Student's Book they just need to look through the section again.

Answers to Student's Book 8.3

1. Work is when a force is applied to an object and it moves that object.
2. Tools and machines help humans to do work like lifting heavy loads, cutting through objects, and making it easier to do several tasks at once.
3. Energy is what is used to do work or make something change.
   a. Chemical energy is stored in chemicals, which is released when they react. The reaction is usually caused by heating.
   b. Heat energy is also known as thermal energy. It comes from wood, coal, gas, and oil.
   c. Gravitational energy is motion that is caused by a force which tries to pull two objects towards each other.
   d. Electrical energy is when electricity creates motion, light, or heat.
4. Potential energy is energy that is stored and not being used, while kinetic energy is energy that has been released.

Answers to Workbook

Page 25

1. a. ii
   b. i
   c. iii
   d. ii
2. a. lower the plank
   b. increase force with which she's pushing it
   c. pedal slowly
   d. hitting it hard with force

Page 26

The chalk marks will move ahead and further away from the stop line.

Page 27

Activities in pictures marked A will have potential energy.
Activities in pictures marked B will have kinetic energy.

Page 28

motor bike—chemical energy

fire place—heat energy

barbecue meat—heat energy

water wheel—gravitational energy

electric kettle —electrical energy

ferris wheel—gravitational energy/electrical energy

corns on coal—heat energy

Answers to Worksheet 5

a stapler—push

a yo-yo—both

a light switch—push

a pram—both or push

a piano—push

Answers to Worksheet 6

Answers will vary.

UNIT 9 HEAT AND LIGHT

Background

Students should easily be able to differentiate between heat and light based on their learning from the previous years. Existing knowledge about movement of atoms and molecules will be useful to explain how heat is produced and transferred. Talk about temperature, how it is measured, and the scales used for its measurement. Demonstrate how light travels in a straight line using an experiment. Also point out that light travels in waves and the length of each wave depends on its colour.

Expected learning outcomes for the unit

Students should be able to:

- explain how heat is produced
- explain that light travels in waves, but in straight lines
- know that light only travels in a straight line
- define temperature and name the scales and the instrument used for measuring it
- differentiate between luminous and non-luminous objects

9.1 Heat

Learning outcomes

Students should be able to:

Student's Book

- explain how heat is produced
- explain that temperature tells us how hot or cold something is
- name the two scales used for measuring temperature

Resources

You will need:

- Student's Book pages 60 and 61
- Workbook pages 29, 30, and 31
- ice cubes

Student's Book steps

1. Introduce the lesson to the class and revise what children have learnt about molecules.
2. Explain that heat is produced due to the movement of molecules.
3. Make them jump standing in their places. They'll start to feel warm. Explain that in the same way when molecules start to move heat is produced. Ask if they have heard the word temperature. The smart ones might speak of fever, weather, the AC.
4. Explain that when people speak of temperature they mean how hot or cold something is. On a hot day the temperature is high. In winter the temperature is low. When it snows the temperature is freezing. There is an instrument to measure temperature. After eliciting answers, tell them it is called a thermometer. Tell them about temperature scales.
5. After the discussion, read aloud from the Student's Book asking the children to follow in their own books. Remember to pause after each statement or question and encourage the children to interact. Praise individual children for attempting to answer or ask questions.

Activities

Give the children an ice cube to hold in their hand or put in their mouth. Tell the children that the ice starts to melt because their mouth or hand is hotter than the ice cube. Tell the children that heat will be transferred from the hotter object to the cooler one until they reach the same temperature.

Answers to Student's Book 9.1

1. Heat is produced when molecules start moving.
2. Temperature tells us how hot or cold something is. Temperature is measured on a thermometer, on the Celsius scale.
3. Ice cream melts because heat is transferred from the environment to the cold ice cream.
4. 

9.2 Light

Learning outcomes

Students should be able to:

Student's Book

- explain that the length of a light wave depends on its colour
- explain that light only travels in a straight line
- define luminous and non-luminous objects and give examples of each

Workbook

- consolidate the learning from the Student's Book

Resources

You will need:

- Student's Book pages 62 and 63
- Workbook pages 32 and 33
- a small lamp or light
- a candle and matches
- three pieces of card (the same size)
- modelling clay
- pencil
- torch
- hole punch
- ruler
- copies of Worksheet 7 for all the children

Student's Book steps

1. Welcome the children into the classroom and explain that they will be learning about light.
2. Tell the children that light is often connected to heat, such as fire, volcanoes, and the Sun.
3. Find a dark corner of the classroom and turn off all the lights except for a small lamp.
4. Ask the children to consider the importance of light in their lives, asking questions such as:

   How does light help us in our lives?

   What are the things that we can do because we have light?

   When is light essential for us?

   Think about trains in tunnels, lights in hospitals, lights in mines, lights in shops at night.
5. Ask the children to put their hands close to the light (but not touch it) and feel the heat coming from the light.
6. Ask the students to consider the importance of heat in their lives, asking questions such as:

   Why do we need heat?

   What things do we need heat for—think of staying warm, cooking, boiling water?
7. Turn off the lamp and light the candle.
8. Ask the students to put their hands close to the candle (but not touch it) and feel the heat coming from the candle. Take each child's hand a safe distance close to the candle yourself. Do not allow them to try this on their own.
9. Tell the children that light travels in waves though we don't see them, and the length of light wave depends on its colour.

10. Explain with examples luminous and non-luminous objects.
11. Read aloud from the Student's Book pausing to look at the images and carefully reading the labels and captions.

Activities

- Read aloud from the 'Try this!' section in the Student's Book. Help the children to mark the centre of each card and make the hole in the right spot. When the cards are lined up dim the lights and help the children to see that light can only travel in straight lines because when you move a card, the light doesn't appear through the last hole. Repeat the activity so all of the children can experiment with light.
- Help the children to answer the questions about light.
- Ask the children to complete Worksheet 7 at home.

Going further

Allow the children time to play with the torches in a dim room—making shadows and experimenting with creating different shapes with light and shadows.

Workbook steps

1. Ask the children to complete the 'Colour these waves' and unjumble the different light waves.
2. Ask the children to complete the 'Shadows' worksheet after explaining the text.

Answers to Student's Book 9.2

1. Light travels in a straight line. This can be demonstrated by using three pieces of cardboard and mark their centre. Make a hole in the centre of each piece of the cardboard and use modelling clay to support these cards, placing each one at an equal distance from each other. Turn on the torch, placing it at one end of the cards. Switch off the lights in the room. Move the cards so the holes do not appear in a line. Therefore, through this experiment we learn that light travels in straight lines.

   A diagram similar to that on page 62 of the Student's Book can be drawn also.
2. The length of a light wave depends on its colour.
3. A shadow is formed when light is blocked.
4. Luminous objects are those that give out light on their own. Non-luminous objects are objects that don't give out light on their own.

Answers to Workbook

Page 29

1. b
2. a
3. c
4. b
5. a

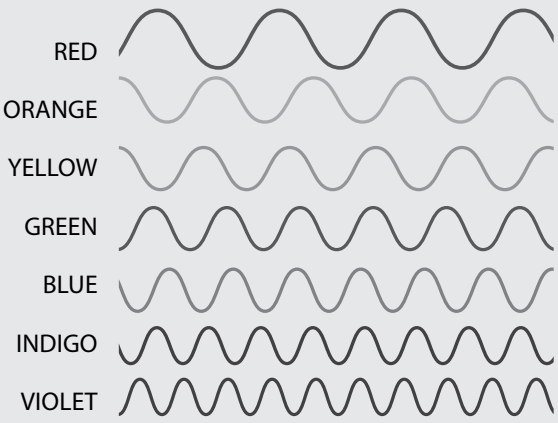
Page 30

1. 20°C
2. 0°C
3. 100°C
4. 85°C

Page 31

Heat is produced when molecules start moving. The faster they move, the hotter the object gets. When they slow down, the matter that the molecules are in gets cooler. Therefore the colour will spread faster in warmer water than in cold water.

Page 32



Page 33

Students will circle Maha's name.

Answers to Worksheet 7

a window—light (yellow)

a lamp over a desk—light (yellow)

an oven—heat (red and orange)

a heater—heat (red and orange)

a light bulb in a room—light (yellow)

UNIT 10 ELECTRICITY AND MAGNETISM

Background

This unit introduces electrical conductors and insulators, again something that can easily be related to the world around them. Students will also find magnetism a very interesting concept. Using different types of magnets available to you, point out the magnetic poles and how everyday objects like a compass, refrigerator, or a train use magnetism. Encourage students to ask questions so that your lessons become interactive.

Expected learning outcomes for the unit

Students should be able to:

- differentiate between conductors and insulators and explain their uses and properties
- define magnetism

10.1 Electrical conductors and insulators

Learning outcomes

Students should be able to:

Student's Book

- explain that electricity is made available to us at homes, offices, etc. because it travels through conductors from the place where it is made.
- differentiate between conductors and insulators

Workbook

- consolidate the learning in the Student's Book

Resources

You will need:

- Student's Book pages 64 and 65
- Workbook pages 34 and 35

Student's Book steps

1. Welcome the children to the class.
2. Bring them around to the topic by asking where they think electricity comes from. Elicit answers and later tell them that it is produced in power houses from where it travel to our homes, shops, houses, hospitals, etc. through wires.

3. Tell them that it can only pass through conductors so the wires have to be made of conductors.
4. Tell the children that we need electricity in order to light our homes and offices, run our trains, and computers.
5. As a class, brainstorm all the different ways that we use electricity in our lives. Write the list on the board.
6. Read aloud from the Student's Book pausing after each statement and looking carefully at the images.
7. Emphasize that conductors pass electricity, and insulators stop electricity.
8. Show examples of the above if possible.
9. Write these words on the board and practise pronouncing them as a class.
10. Give examples of conductors and insulators.
11. Help the children complete the questions. Remind them that all of the answers are in the Student's Book.

Workbook steps

1. Ask the children to identify which coat would be the best to wear in a lightning storm.
2. Ask the children to make a sign to show that electricity can be dangerous. Put the signs around the room near power points or electrical appliances.

Answers to Student's Book 10.1

1. Conductors are materials through which electricity can flow—copper, water, gold, silver
2. Insulators do not allow electricity to flow through them—glass, rubber, plastic
3. We need to be careful around electricity, because humans are good conductors of electricity which means electricity can flow through us and give us an electric shock.

10.2 What is magnetism?

Learning outcomes

Students should be able to:

Student's Book

- define magnetism
- explain that like poles repel and unlike poles attract

Workbook

- reinforce the learning in the Student's Book

Resources

You will need:

- Student's Book pages 66 and 67
- Workbook page 36

- stick
- string
- magnets
- small objects (metallic and non-metallic)

Student's Book steps

1. Welcome the children to the classroom and ask them to sit in a semicircle with you at the centre.
2. Give them bar magnets to play with. Hold south poles of two magnets and try to bring them together. They'll repel each other. But unlike poles will attract each other. Explain this to students.

Activities

Help the children set up for the 'Go fishing' game in the Student's Book. They may need help tying the string to the stick. Allow them time to play the game and experiment with trying to pick up the different materials to see which are magnetic and which are not.

Workbook steps

Ask the children to complete the worksheet 'Attract or repel' and label the magnets correctly.

10.3 Using magnetism

Learning outcomes

Students should be able to:

Student's Book

- discuss how magnets are used

Resources

You will need:

- Student's Book pages 68 and 69
- a compass
- magnets
- string
- pieces of wood
- bowls of water
- copies of Worksheet 8 for all the children

Student's Book steps

1. Welcome the children into the class and ask them to sit in a semicircle with you at the centre.

2. Ask individual children if they remember which poles of the magnet attract each other and which poles repel each other.
3. Show compass to children and explain how it works. Ask about different situations when a compass would come in handy.
4. Explain how a maglev train works. Give them an idea about the high speed at which it travels and what makes it possible.
5. Bring some fridge magnets from home and show them to the children. Attach them to a metallic surface in class.
6. Read aloud from the Student's Book pausing after each statement and looking carefully at the images together.
7. Guide the students to complete Worksheet 8.

Activities

- Read aloud the activity 'Floating Magnet'. Help the children set up the experiment.
- Help the children to complete the answers to 'In your notebook'. Remind them that all of the answers are in the Student's Book.

Answers to Student's Book 10.3

1. Magnetism is a force that involves objects attracting and repelling each other.
2. a. The north and south poles of magnets will attract each other.

   b. The two north poles will repel each other and the two south poles will repel each other.
3. Answers will vary. They may include fridge magnets, magnets inside electrical appliances.

Answers to Workbook

Page 34

Students will circle the rubber and plastic coats.

Page 35

Drawings will vary. They should depict safety with electricity such as not touching a power point with wet hands, not plugging too many appliances into a power point, and not poking around with an electrical appliance when it is in use.

Page 36

Combination A will repel.

Combination B will attract.

Combination C will repel.

Combination D will attract.

Answers to Worksheet 8

rubber band—insulator

coin—conductor

fur jacket—insulator

tooth pick—insulator

key—conductor

paper clip—conductor

brass vase—conductor

glass microscopic slide—insulator

candle wick—conductor

puddle of water—conductor

1. b
2. a
3. b
4. b
5. a
6. b
7. a

The Science Factor 3 cover

You can plan out a complete lesson based on the cover of the Student's Book. Students can be asked to point out as many uses of electricity as they can. Also explain where it is produced and how it is made available to us in our homes.

UNIT 11 THE SOLAR SYSTEM

Background

The purpose of this unit is to explore the solar system in greater detail. Add to students' knowledge about the Sun using text from the Student's Book. Using a suitable model, if available, or diagrams in the Student's Book, encourage students to clearly differentiate between rotation and revolution, and how each of these causes day, night, a lunar month, and a year. Students should also be able to recognize asteroids, comets, meteors, and meteorites.

Expected learning outcomes for the unit

Students should be able to:

- give basic description of the Sun
- explain revolution and rotation of the Earth
- explain how day and night occur
- describe asteroids, comets, meteors, and meteorites

11.1 The Sun

Learning outcomes

Students should be able to:

Student's Book

- describe the Sun
- explain the revolution and rotation of the Earth, and how day and night and year occur because of them

Resources

You will need:

- Student's Book pages 70 and 71

Student's Book steps

1. Welcome the children to the class.
2. Explain revolution of the Earth around the Sun by using an orange and taking it around a child who's standing stationary.
3. Read the text and explain the topic with the help of pictures.

Activities

Help the children complete the questions. Remind them that all of the answers are in the Student's Book.

Answers to Student's Book 11.1

1. a. Astronomers work out how long a year takes by how long the Earth travels around the Sun.
   b. Astronomers work out how long a day is by how long it takes for the Earth to spin on its axis.
2. The Sun is the largest body and the centre of our solar system. It is important for life on Earth as energy from the Sun provides heat and light. It is shaped like a sphere and is a huge ball of hot gases. It is actually a star, but looks big because it is close to the Earth.
3. a. Revolution is the Earth's movement around the Sun.
   b. Rotation is the Earth's movement on its own axis.

11.2 Day and night

Learning outcomes

Students should be able to:

Student's Book

- explain that rotation of the Earth causes night and day

Workbook

- consolidate the learning from the Student's Book

Resources

You will need:

- Student's Book pages 72 and 73
- Workbook pages 37 and 38
- copies of Worksheet 9 for all the children
- dictionaries
- orange
- candle

Student's Book steps

1. Explain how day and night are caused by using a candle and an orange.
2. Rotate the orange holding it up near the flame and explain that just like the orange the side of the Earth that faces the Sun has day and the side in darkness has night.
3. Read the text and explain.

Activities

- The children will need to record their observations of the Sun over the course of the day. Remind the children never to look directly at the Sun.
- Help the children to draw a picture to show how night and day comes about.
- Put the children in pairs and ask them to complete Worksheet 9.

Workbook steps

1. Ask the children to fill in the blanks. Remind them that the answers are all in the Student's Book.
2. Help the children to draw a picture showing night and day and where the Sun and the Earth is.

Answers to Student's Book 11.2

Students will do their own work.

11.3 Other celestial bodies

Learning outcomes

Students should be able to:

Student's Book

- describe some other celestial bodies

Resources

You will need:

- Student's Book page 73
- images of the night sky

Student's Book steps

1. Welcome the children into the class and ask them to sit in a semicircle with you at the centre.
2. Show the children images of the night sky, of meteors, meteorites, stars, and black holes.
3. Read aloud from the Student's Book pausing after each statement and looking carefully at the pictures.

Activities

- Ask the children to complete the answers to 'In your notebook' at home. Remind them that all the answers are already in the Student's Book.
- Draw a picture of the night sky with comets, meteors, and stars.

Answers to Student's Book 11.3

1. Asteroids are rocky objects that move around the Sun in their own orbits.
2. Comets are lumps of ice and dust that sometimes come into the centre of the solar system. As they get closer to the Sun they start to evaporate which gives them the appearance of having a long tail.
3. Meteors are objects that enter the Earth's atmosphere at very high speeds—they are sometimes called shooting stars. When they reach the ground, they are called meteorites.

Answers to Workbook

Page 37

I. 1. orbits

2. Sun

3. planets and moons

4. 365

5. axis

6. comet

7. 29

8. Sun

9. centre

10. faces

II. Drawings will vary, but will be similar to the one on page 70 of the Student's Book.

Page 38

The Sun is shining from the right which is the unshaded part of the Earth. Students will draw an arrow pointing to this area.

Answers to Worksheet 9

Answers will vary depending on students' choices.

The Universe is made up of everything that exists, including planets, stars, galaxies, and all forms of matter and energy.

A space shuttle is a spacecraft for carrying people and supplies between Earth and outer space. When a space shuttle returns to Earth, it lands like an airplane.

A telescope is a special tool used to look through, so that things that are far away seem closer and larger. Telescopes are used to look at stars, planets, and other objects in outer space.

An orbit is the path an object in space takes while it moves.

An eclipse is the partial or total blocking of light of one celestial object by another. An eclipse of the Sun or Moon occurs when the Earth, Moon, and Sun come in one straight line.

In a solar eclipse the Moon comes between the Sun and Earth. In a lunar eclipse all or a part of the Moon enters the Earth's shadow and is no longer illuminated by the Sun. Lunar eclipses occur only during a full moon, when the Moon is directly opposite the Sun.

Astronomy is the study of the Sun, Moon, stars, planets, comets, gas, galaxies, gas, dust, and other non-Earthly bodies.

A galaxy is a large group of stars, dust, gas, and dark matter held together by gravity. They vary in size with some containing millions of stars, while others could contain as many as a trillion. They can also form in different shapes such as elliptical galaxies and spiral galaxies.

Name: _____ Date: _____

Name the baby animal

Complete the sentence and draw a picture of the baby animal in the box.

The baby of a frog is a _____.

The baby of a bear is a _____.

The baby of an eel is a _____.

The baby of a cow is a _____.

The baby of a deer is a _____.

The baby of a kangaroo is a _____.

The baby of a bee is a _____.

The baby of a cat is a _____.

The baby of a bird is a _____.

The baby of a horse is a _____.

Name: _____ Date: _____

Identifying environments

Identify each natural environment and write its name.

_____

_____

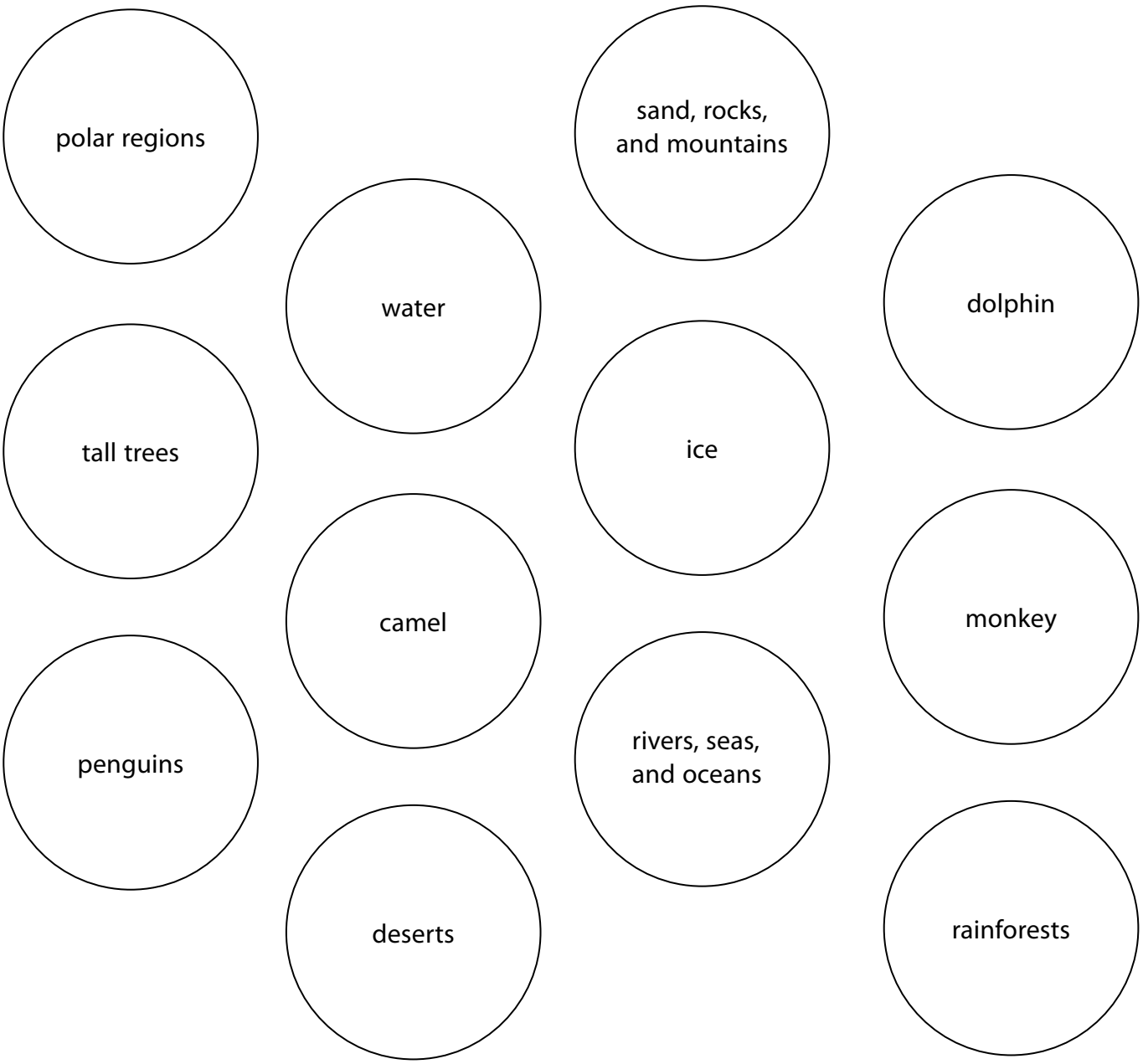
_____

_____

Name: _____ Date: _____

Habitats

The circles have four habitats, some features of each, and some animals that live there. Identify each habitat and colour the circle. Also colour the circles with features and animals. Use a different colour for each set of circles.



Name: _____ Date: _____

Gone forever

Look up information about two animals that have become extinct. Using your research, complete the information below.

1. Animal name _____

   Date it became extinct _____

   List the reasons why the animal became extinct.

   (Such as: loss of habitat, hunted for food, hunted for a special feature)

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

2. Animal name _____

   Date it became extinct _____

   List the reasons why the animal became extinct.

   (Such as: loss of habitat, hunted for food, hunted for a special feature)

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

Name: _____ Date: _____

States of matter

Below are the properties of the different states of matter. Write the name of the correct state of matter in front of each property.

1. has a definite shape _____
2. does not have a definite volume _____
3. takes the shape of its container _____
4. particles are close together with no regular arrangement _____
5. does not have a definite shape _____
6. fills space evenly _____
7. size can change according to force applied _____
8. have definite mass and volume _____
9. particles are tightly packed and usually don't move _____
10. has a definite mass _____
11. does not have a definite volume _____
12. does not have a definite shape _____
13. particles are separated with no regular arrangement _____
14. does not fill space evenly _____
15. does not take the shape of its container _____
16. has a definite volume _____

Name: _____ Date: _____

Push me pull me

Label the following images as either push, pull, or both. Draw some other images of objects in the empty boxes and test a friend to see if they can classify them as either push, pull, or both.

Name: _____ Date: _____

Tools

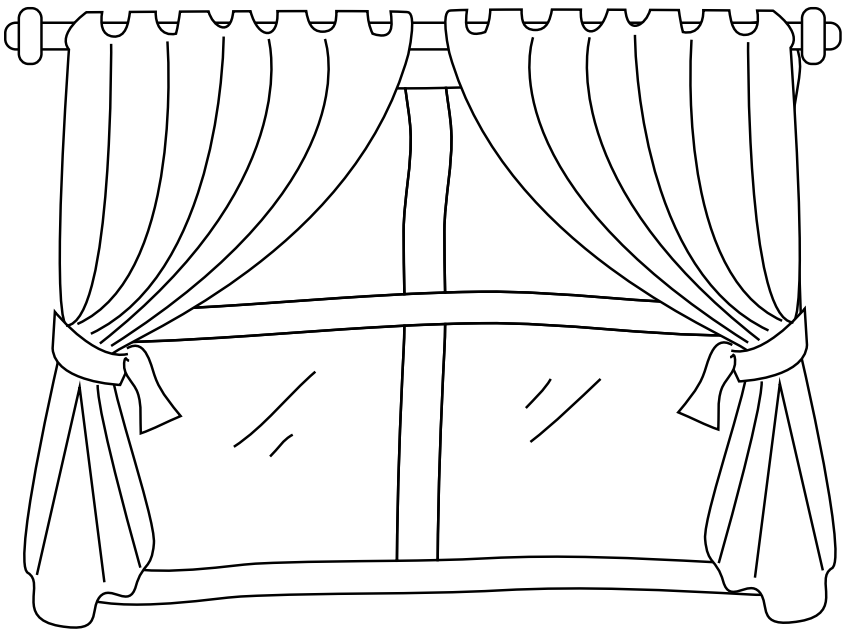
Think about four of the tools you came across today. Write the name of the tool and draw it in the first box. Explain how the tool is used in the second box.

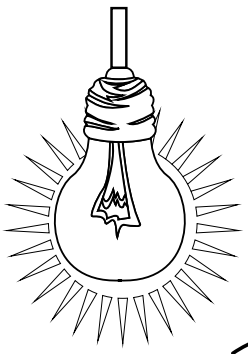
Tool	How it is used

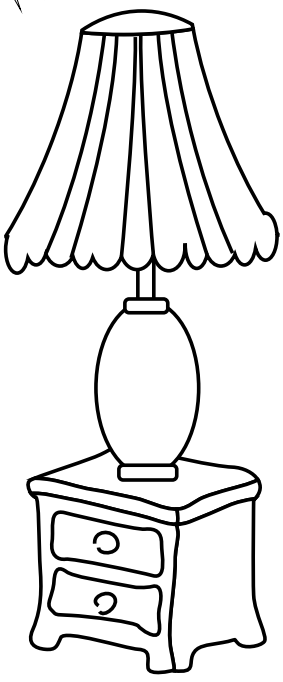
Name: _____ Date: _____

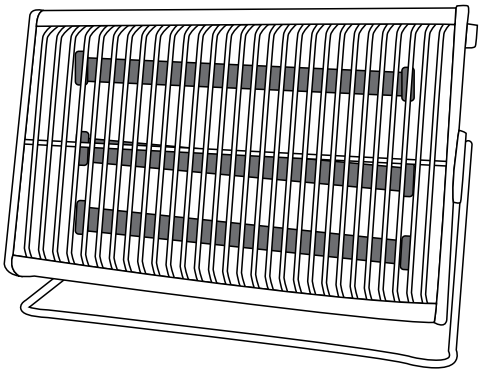
Heat and light in your home

Below are the different sources of heat and light. Use red and orange to colour sources of heat and yellow for sources of light.









Name: _____ Date: _____

Electricity and magnetism

I. Observe the objects below. Decide whether each is a conductor or an insulator. Complete the table by placing a tick in the correct column.

Object	Conductor	Insulator
rubber band		
coin		
fur jacket		
tooth pick		
key		
paper clip		
brass vase		
glass microscopic slide		
candle wick		
puddle of water		

II. Circle the correct answer related to magnets.

1. Which object will a magnet attract?
   a. plastic comb b. paperclip
   c. shoelace
2. Which object will a magnet not attract?
   a. glass b. screw c. nail
3. A bar magnet is strongest at the:
   a. middle b. poles
4. The Earth is like a giant:
   a. force b. magnet c. iron
5. Repel means:
   a. push away b. come together
6. Poles that are not alike:
   a. repel each other
   b. attract each other
7. Poles that are alike:
   a. repel reach other
   b. attract each other

Name: _____ Date: _____

Improve your space vocabulary

Choose four words to look up in a dictionary from the box below. Write the definitions of the word in the space provided.

Universe	Space shuttle	Telescope		Orbit	Eclipse
	Astronomy		Galaxy		

Word 1: _____

Definition _____

_____

_____

Word 2: _____

Definition _____

_____

_____

Word 3: _____

Definition _____

_____

_____

Word 4: _____

Definition _____

_____

_____