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New Get Ahead

SCIENCE

Teaching Guide

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Based on Revised Pakistan National Curriculum

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Introduction to the Guide

The Teaching Guides for the *New Get Ahead Science* series provide guidelines for help of the teacher in classroom. This Teaching Guide includes:

- An introduction on how to approach *New Get Ahead Science* in class.
- Teaching strategies mentioned in the national curriculum.
- Sample lesson plans.
- Suggested answers to the exercises in the textbook.
- Suggested worksheet for assessments.
- Suggested scheme of work.

How to Approach *New Get Ahead Science*

To teach *New Get Ahead Science* in a more constructive manner, teachers are advised to make classrooms more Student-centered. Students are to be given a more active role in the classroom, to be encouraged to present their thoughts and ideas confidently, and be instructed to respect differing opinions. In order to achieve this, teachers are to facilitate students so that they can take more responsibility for their learning journeys. The following summarizes the methodology with which all units of *New Get Ahead Science* are to be approached, in order to make classroom more Student-centered:

- Students to be given a chance to work independently, as well as collaboratively i.e. in groups. Real-life examples to be discussed by teachers and students.
- Students to be given tasks where they share opinions with each other and with the teacher. They are to be encouraged to give reasons for their opinions.
- Teacher to role-model the ideals of respect, collaboration, and active learning in the classroom. During group discussions, all students should be encouraged to work together.
- Teacher should facilitate students only when directions are needed; most of the time, students should work on their own while reading, writing, and discussing the lessons in specific units.

Contents and Sequence of the Teaching Guide

The Teaching Guide for *New Get Ahead Science* contains suggestions for starting a lesson and provide teaching strategies for each unit. The instructional model focuses on exploring background knowledge, where students participate actively.

Recommended Schedule for an Active and Student-centered Classroom

Exploring knowledge through essential questions	5 minutes
Teaching Methodology/Activity	25 minutes
Assessment	10 minutes

The first part of each unit contains basic suggestions for taking the lesson forward in a constructive manner. The second part of the lesson contains answers to all questions present in the book. Students should be advised to come up with their own answers and teachers can use the Teachers Guide to assess students' understanding and knowledge.

Teaching Strategies as per General Science National Curriculum

Examples of effective instructional strategies include, but are not limited to, the following:

- inquiry
- questioning and discussion
- investigation and problem solving
- demonstration and laboratory work
- problem based learning
- utilizing whole class, group, and individual work
- incorporating literacy strategies (reading, writing, speaking and listening)
- using student work to inform instruction

For detailed support on teaching strategies of Science, please visit Chapter 7 pages 55 to 64 in the General Science National Curriculum 2006.

Assessment Strategies as per General Science National Curriculum

Teachers learn about student progress not only through formal tests, examinations, and projects, but also through moment-by-moment observation of students. To assess students' science knowledge, skills, and attitudes, teachers require a variety of tools and approaches, such as:

- selected response
- constructed/ created response
- performance assessment
- personal communication
- students' self-assessment

For detailed support on assessment strategies of Science, please visit Chapter 8 pages 65 to 73 in the General Science National Curriculum 2006.

Division of Syllabus into Three Terms:

1st Term	Unit 1	Living Things Animal
	Unit 2	Living Things Plants
	Unit 3	Our body and Healthy Living
2nd Term	Unit 4	Environment
	Unit 5	Water
	Unit 6	Materials
	Unit 7	Heat
3rd Term	Unit 8	Force
	Unit 9	Light
	Unit 10	The Earth and the Universe

Scheme of Studies

Unit	Lesson plan number	Topic wise allocations of periods	Learning outcome
Living Things -Animals	Lesson 1	2 periods	Discuss different types of animal body coverings. Identify the food they eat.
	Lesson 2	1 periods	Identify the sounds they make.
	Lesson 3	2 periods	Identify the different animal habitats. Identify the homes of animals and birds.
Living Things-Plants	Lesson 1	2 periods	Explain different shapes and sizes of plants.
	Lesson 2	2 periods	Recognize the parts of plants.
	Lesson 3	2 periods	Discuss the benefits of plants. Understand their importance.
Our Body and Healthy Living	Lesson 1	2 periods	Suggest methods for cleanliness.
	Lesson 2	2 periods	Discuss the basic needs of human beings. Identify different foods for healthy living.

Environment	Lesson 1	1 period	Comprehend that the environment is made up of living and non-living things.
	Lesson 2	2 periods	Understand the importance of clean environment. Keep their neighbourhood clean.
	Lesson 3	2 periods	Distinguish between types of garbage. Understand about the 3 R's. Recycle garbage by using the 3 R's.
Water	Lesson 1	3 periods	Discuss the importance of water. Be informed about the uses of water. Identify the different sources of water. Determine the characteristics of water.
	Lesson 2	2 periods	Understand how water reaches their homes. Suggest ways to save water.
Material	Lesson 1	2 periods	Understand what materials are. Classify materials.
	Lesson 2	2 periods	Explain the properties of materials.
Heat	Lesson 1	2 periods	Identify the sources of heat. Discuss how they can protect themselves from heat.
	Lesson 2	2 periods	Explain the relationship of heat and distance. Understand the uses of heat.
Force	Lesson 1	2 periods	Define force. Explain the difference between heavy and light objects.
	Lesson 2	2 periods	Understand that force changes direction.

Light	Lesson 1	2 periods	Understand the nature of light. Define and explain transparent and opaque objects.
	Lesson 2	2 periods	Understand the relationship between light and distance. Describe how shadows are formed. Identify time through shadow position.
The Earth and the Universe	Lesson 1	2 periods	Understand the Solar System. Grasp concepts about Earth, Sun, Moon, and stars.
	Lesson 2	2 periods	Understand why we see different shapes of the Moon during a month.
	Lesson 3	2 periods	Discuss the phenomena of day/night.

Living Things – Animals

Lesson Plan 1

Student learning outcomes

Discuss different types of animal body coverings. Identify the food they eat.

Materials

Pictures of birds and animals

Keywords

feathers, parrots, pigeons, sparrows, crocodiles, turtles, protect, shells, scales

Overview

Animals are of many kinds, some are big and some are small. Animals have been further classified by scientists according to whether they live on land, water or air. Body covering of animals protects them from extreme weather and enables them to adapt to their environment. Some animals eat meat and some eat plants and grains.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Can you name animals which live in very cold regions?
2. How do these animals keep warm in winter?

Method

- Begin the lesson by asking the students to take out their colour pencils to colour Activity 1 on page 1. Ask the students, which bird have they coloured? Parrot. What is the parrot covered with? The parrot is covered with feathers. What is the fish covered with? The fish is covered with scales. Are all animals covered with feather and scales? No, some are also covered with fur. All animals are not alike. Some are covered with fur like the cat, dog, horse, cow, lion, and bear. The birds are covered with feathers. The hair and feathers keep them warm. Alligators, fishes and snakes have scales on their bodies.

- What do you eat? We eat bread, meat, fruits and vegetables. What about animals? Animals also eat meat, milk, grass, grain, insects, and even smaller animals. What about cats and dogs? They eat meat and milk. What about the cows and goats? They eat grass. What about the elephant? It eats grass and sugarcane.

Assessment

1. Activity 3, page 4
2. Exercise 4, page 9

Reinforcement /homework

1. Answer the following questions.
   i. Why do some animals have fur on their body?
   ii. Which animals have shells or scales on their bodies?
   iii. What is the body covering of the birds known as?
   iv. What does an elephant eat?
   v. Which bird likes to eat fruits and chillies?
2. Collect and paste three pictures of animals with fur, scales and feathers. Name them.
3. Exercise question 2, page 8
4. Exercise question 4, page 9

Lesson Plan 2

Student learning outcome

Identify the sounds they make.

Materials

pictures of animals

Keywords

bark, meows, chirps, twitter, tweets, whistles

Overview

All animals are of different species. They live in different habitats, which requires them to have different sounds, in order to call out to each other. Some have a loud sound and some have soft sounds.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	5 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. How do we call out to one another?
2. How do you think animals call out to one another?

Method

- Call a few students to the front of the class. A name of an animal will be whispered in their ears. That student will have to make a sound that animal makes. One by one the students will mimic the sounds of animals, while the other students try to guess which animal makes that sound. The name of the animal and the sound that they heard will be noted on the board.
- Read page 4 of the Students' Book in the classroom.
- After this activity, the teacher can also ask which animal make loud noise? Dogs and lions make loud noise. Which animals make soft sounds? Birds make a soft sound. Giraffe only whistles to call its calves.

Assessment

1. Activity 4, page 4
2. Exercise question 3, page 8

Reinforcement/homework

Find out what sounds do the following animals make.

Animal	**Sounds**
Hens	*quack*
Donkey	*bray*
Horse	*cluck*
Snake	*neigh*
Ducks	*roar*
Lions	*hiss*

Lesson Plan 3

Student learning outcomes

Identify the different animal habitats. Identify the homes of animals and birds.

Materials

Picture of a desert, a forest, and lake. Pictures of different animals.

Keywords

desert, camel, store, forest, tigers, Lions, Foxes, wolves, crocodiles, crabs, octopuses, fishes, whales

Overview

All animals live according to their habitat. They all need protection and a safe place to live. The animals in the wild find shelter in caves and underground, while domesticated animals are provided with shelter by man.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential Question

Begin the lesson by asking questions to assess background knowledge of the students.

1. Where do we live?
2. Where do most animals live?

Method

- Pass A-4 sheets to the students. The students will be asked to fold the sheet into half. They will be asked to draw a picture of any animal that lives on land on one half and one animal which lives in water. After 10 minutes, the teacher will ask the students which animal they had drawn. Where do they live on land? Some live in the forest, some in a desert and some as domestic animals on farms. Some animals that live in water are, fish, frogs, crocodile, and turtles.
- Habitat is a place where different animals are found. Wild animals are found in forests, which have many trees. A desert is a dry sandy place, which is very hot during the day and cold at night. The water is a habitat for fishes and other sea animals. The teacher will put up charts showing different habitats. Pictures of different animals will be distributed among the students. Students will come to the soft board by turns to put the pictures of animals in the correct habitat.

- Read pages 5 and 6 of the Students' Book in the classroom.
- Some animals build homes, for e.g. birds build nests, bees make a hive, a rabbit makes a burrow. Some animals are kept in special places by their human owners, for e.g. dogs are kept in a kennel, cows in a barn and horses in a stable. Most of the wild animals live in caves called dens–lions, bears and wolves.

Assessment

1. Activity 5, page 6
2. Activity 6, page 7

Reinforcement/homework

1. Collect and paste pictures of three birds found in Pakistan.
2. Exercise question 1, page 8
3. Answer the following questions.
   i. What is a habitat?
   ii. Why does the camel have a hump on its back?
   iii. What is a forest?
   iv. Name some sea animals?
   v. Where do ducks and frog make their habitat?
   vi. Name some animals which can live in water and land.
   vii. Where are horses kept?
   viii. Name the animals which live in holes in the ground.
   ix. Where do birds make their nests?
   x. Which animals live in dens?

UNIT 2

Living Things – Plants

Lesson Plan 1

Student learning outcome

Explain different shapes and sizes of plants.

Materials

Some pictures of trees, shrubs, herbs and mosses. Mint and coriander plants.

Keywords

woody, trunks, shrubs, mosses, moist

Overview

Plants are of different kinds. We have tall trees, bushy shrubs, and the weak stemmed herbs. The different kinds of plants all have a similarity that is they have the roots, stem, leaves, flowers and seeds. The ferns and mosses differ as they do not have stems.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Do all plants look alike?
2. How do plants help us?

Method

- Begin the lesson by reading pages 10 and 11 of the Students' Book in the classroom.
- Explain to the students that plants come in different sizes and shapes. Ask students to name some trees. The answers will be noted on the board. Put up a chart to show pictures of different kinds of trees. Mango, Papaya, Guava, Pine, Neem, Date and Coconut. The leaves, the trunks of the tree, and the branches will all be pointed out to the students. Make them notice, how thick the trunk is, with strong branches to provide shade, and remind them some trees also give us fruits.

- Show a picture of a shrub. Ask the students, if trees and the shrubs are similar to each other or not. Why? Shrubs do not have a strong trunk and branches. They are not very tall. They are short and bushy.
- The herbs will then be passed around the class. The students will notice that the stems are very weak, and they are soft. They grow close to the ground.
- A fern plant will be shown. It does not have any stem or flowers. Mosses also do not have flowers.
- Some plants have flowers which have a sweet smell like a Rose flowers, which are used for decoration. The flowers make seeds. The students will then give names of fruits which will be noted on the board.

Assessment

1. Activity 1, page 11 (the teacher can take the students into the school playground to see the different kinds of trees and shrubs)
2. Exercise question 1, page 16
3. Exercise question 2, page 16

Reinforcement /homework

1. Find out names of 3 trees, 3 shrubs, 3 herbs, note your finding in your notebooks.
2. Answer the following questions.
   i. What are the stems of trees called?
   ii. What are shrubs?
   iii. What kind of stems do herbs have?
   iv. Where do mosses grow?

Lesson Plan 2

Student learning outcome

Recognize the parts of plants.

Material

A chart showing different part of a plant. One small plant with all its parts intact.

Keywords

roots, stem, leaf, flower, carrot, radish, turnips, beans, peas, celery, lettuce, spinach, cabbage, butterflies, nutrients

Overview

All plants have the same parts and they all have the same functions. There are some part of the plant which can be eaten by both, humans and animals.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Do all plants have the same parts?
2. Where are seeds found?

Method

- Begin the lesson by reading page 12 of the Students' Book in the classroom.
- Draw a picture of a plant on the board or a chart to be put up on the soft board. The students will be asked to name the parts of the plant. The answers will be noted on the board. Why are the roots important for plants? The roots hold the plant firmly in the ground. What other task does the root perform? It absorbs the water from the soil. Do we eat any roots? Yes, we eat carrots, turnips, and radishes as they are thick, food storing roots.
- From which part of the plant do we get new plants? We get new plants from the seeds which are buried in the soil, watered carefully so that a new plant can grow. Where are the seeds found? Seeds are found in the fruit of the plants. Which seeds do we eat? Beans, peas, and corn. Some fruits have one seed like mango, peach and apricot. Some fruits have few seeds like apples, oranges and pears. Some fruits have many seeds like watermelon, papaya, and guava.
- Read page 14 of the Students' Book in the classroom. What part of the plant provides support to the leaves, fruits and flowers? The stem of the plant carries food to all parts of the plant, it also the part that grows upwards towards the sky. Name the stem we eat? Sugarcane and celery. The leaf of the plant gives the plant its green colour. The leaf also uses sunlight and water to make food for the plant. We eat spinach, cabbage, lettuce.
- What is the most beautiful part of the plant? The flowers. The flowers attract the insects, to pollinate it. We eat cauliflowers.

Assessment

1. Activity 2, page 13
2. Activity 3, page 13
3. Exercise question 3, page 16

Reinforcement /homework

1. Answer the following questions.
   i. Give two ways in which the roots help the plant?
   ii. Name the parts of the plant.
   iii. What does the flower change into?
   iv. What protects the fruit?
   v. What do seeds contain for the new plants?
   vi. Do all leaves look the same?
2. Collect pictures of 3 flowers, 3 fruits, 3 roots that we can eat, 3 leaves we can eat. Paste them in your notebooks.

Lesson Plan 3

Student learning outcomes

Discuss the benefits of plants. Understand their importance.

Material

pictures of different things made from plants

Keywords

cotton, furniture, clothes, paper, sunflower, almonds, coconuts, medicines

Overview

Plants are useful to us in many ways. We not only eat the different parts of the plants, we also use the wood of the plants to make furniture, doors, windows, and even paper. Some plants are used for medicinal purposes and to give us cooking oil. Plants are useful in eliminating pollution from the atmosphere.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. How do we use plants?
2. Name some things made from plants.

Method

- Read page 15 of the Students' Book in the classroom. Brainstorm with the students to name things made from wood or plants-doors, desks, chairs, pencils, clothes, paper. The name of the objects will be noted on the board. It will be explained that wood from trees is also used to make doors, windows, furniture and even small boats. We also get pencils and paper from trees. The bark of some trees are used to make medicines, or used as spices. The tree helps in keeping our environment clean. The students already know that we eat some fruits, seeds, leaves and roots.
- Draw four columns on the board. The headings of each column will be seeds, fruits, leaves and roots. The students will contribute to this activity.

Assessment

Activity 5, page 15

Reinforcement/homework

1. Write 6 points of how plants are useful to us, in your notebooks.
2. Make a list of 3 roots, 3 stems, 3 fruits, and 3 leaves that we eat, to be noted in notebooks.

Our Body and Healthy Living

Lesson Plan 1

Student learning outcome

Suggest methods for cleanliness.

Material

a chart showing the different parts of the body

Keywords

shoulder, elbow, mouth, finger, forehead, thigh, knee, calf

Overview

In this lesson, the students will learn the names of the different parts of the body and how their functions help us in our movements. Students learn how to look after their bodies through healthy habits.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Does everything we see around us have a name?
2. Do we all have names?

Method

- Begin by calling a student to come in front of the class. The parts of the body will be pointed out and the other students will be asked, turn by turn, to name the part. Activity 1 on page 17 also can be conducted, so that all the students fully grasp the names of the different parts of the body.
- The teacher will then discuss the importance of keeping your body clean in order to stay healthy. Page 18 of the Students' Book is to be read in the classroom. Some easy to do habits have been mentioned in Activity 2 on page 18. These habits will be noted in the student notebooks after each has been discussed in class. The students

will understand that cleanliness helps them from not falling sick and having to visit the doctor. It is important to wash hands before eating, after using the washroom and coming back from school, playing or visiting. The use of a tissue or handkerchief for wiping the nose or mouth is also a good habit.

- It is also important that we keep our surroundings clean by not writing on the walls or throwing rubbish/garbage all over the place. It is also important to eat healthy food which includes fruits and vegetables, go to sleep early at night to get up early in the morning, take a bath every day and wear clean clothes. It is important to brush teeth twice a day, and to drink at least eight glasses of clean boiled water.

Assessment

1. Activity 3, page 19
2. Activity 4, page 19 (to be conducted under the supervision of the teacher, who will help the students to make index cards and allot duties)
3. Exercise question 2, page 22
4. Exercise question 5, page 23

Reinforcement/homework

1. Use a coloured A-4 size paper to make a list of good habits for your class soft board.
2. Exercise question 1, page 22
3. Exercise question 6, page 23

Lesson Plan 2

Student learning outcomes

Discuss the basic needs of human beings. Identify different foods for healthy living.

Material

pictures of foods, some greens, fruits, and vegetables

Keywords

hungry, thirsty, sleepy, tired, dirty, messy, healthy, muscles, cereals, diseases, minerals, strong, protect, illness

Overview

This lesson discusses the basic needs of humans. Food, water, rest and cleanliness are an important part of life. If we eat healthy food we will have the energy to work and study. Water is needed not only to drink but to clean ourselves.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. What would happen if we do not eat food and drink water?
2. Why is it important to rest and keep ourselves clean?

Method

- The students to be asked to read page 20 of the Students' Book in the classroom. Ask them what are the important things that animals and plants need in order to live? All living things need food, water, and air. Similarly, human beings also need food, water and air. We also need to rest when we are tired. We should take a bath daily, wash our hands carefully, and we must keep our room, house, and surroundings clean.
- Next, read page 21 of the Students' Book in the classroom. Enquire from the student, is it enough to keep clean to be healthy? No, we also need to eat healthy food and drink lots of water. Students will brainstorm about what they like to eat. Make two columns on the board: healthy and unhealthy. If the students mention chips, biscuits, and candies, then note it in the unhealthy column. Milk, chicken, apples, and potatoes will be noted in the healthy column. The teacher will then explain that in order to live a healthy life, we should eat healthy foods. The five main food groups will be noted on the board and the students will help in completing the columns, like the example given below.

Meat	**Cereal**	**Fruits**	**Vegetables**	**Dairy**
Fish	Atta	Mango	Peas	Milk
Chicken	Rice	Apples	Beans	Butter
Beef	Cornflakes	Oranges	Potatoes	Yoghurt

- The teacher will then tell the students that meat helps the body to grow and build healthy muscles. Cereals are a good source of energy. Fruits and vegetables provide us with vitamins and minerals. Dairy products provide us with calcium to help make strong bones and teeth. Besides these, we must also have eight glasses of water in a day.

Assessment

1. Exercise question 3, page 22
2. Exercise question 4, page 22

Reinforcement/homework

1. Answer the following questions.
   i. Why is it necessary to eat food?
   ii. Name some food that comes from animals?
   iii. Why is it important to eat meat?
   iv. Which foods are a great source of energy?
   v. What do fruits and vegetables provide us?
   vi. What is important for strong teeth and bones?
2. Make a page in your notebook labelled as Diary. Note down what you ate on each day of the week. If it was unhealthy write it in the unhealthy food column, and if it was healthy write it in the healthy column. At the end of the week, you will be able to find out whether you are a healthy eater or not.

Environment

Lesson Plan 1

Student learning outcome

Comprehend that the environment is made up of living and non-living things.

Material

picture of location, a beach, a park, a congested bazaar, a playground, an apartment building, houses in a street

Keywords

environment, living, non-living, humans, surroundings

Overview

An environment is a space, it can be big or small. Introducing environment to the students, it is important that they understand that environment means the soil, the air, the animals and the plants. All these things have an impact on all living things.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	30 min
Assessment	5 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Where would you like to live?
2. Why do you want open spaces around your house?

Method

- Show the pictures of a house on a beach or on a mountain. Where would you like to live, on the beach or mountain? The class will be asked to raise hands where they would like to live. Now, why in such lonely places? Because it has beautiful scenery and it is so peaceful. These were pictures of peaceful environment.
- Show a picture of a noisy bazaar and an apartment building. Who would like to live here? Very few hands were raised. The teacher will explain that an environment is made by the people, animals and plants in an area. It is important that as humans we should try to keep the environment clean so that the animals and plants also stay in it.
- Read page 24 of the Students' Book in the classroom.

Assessment

Exercise question 3, page 29

Reinforcement/homework

Draw a picture of the surroundings of your home, in your notebooks.

Lesson Plan 2

Student learning outcomes

Understand the importance of clean environment. Keep their neighbourhood clean.

Material

A picture of a clean room and another of a dirty or untidy room

Keywords

blackboard, teaching, reducing

Overview

This lesson focuses on introducing the concept of an environment to the students. An environment can be big or small. It can be a home, a bedroom, a school, a classroom. All these places are examples of an environment that the students are acquainted with.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. What do all living things need?
2. What is an environment?

Method

- Begin by reading pages 24 and 25 of the Students' Book in the classroom. Ask a few students questions related to the topic. What is an environment? The student might answer our home, our school, our classroom, or mention the bazaar, a cinema, a park. To the class explain that an environment is our surroundings. These surroundings consist of living and non-living things. All living things have their own environment. We live inside our homes, while animals live in the forest, desert, and water. The soil also changes according to different locations, e.g. the sand at

seaside is different from that in the garden. The air in the city can be polluted but it is pure in the villages. Living things need a clean environment to survive.

- Your school environment is different to that of your home. The students can discuss this and then put on the board. A school has many rooms and lots of student. There are many different kinds of sounds, students reciting, singing, playing and the other sounds of the surrounding areas.
- On the other hand, a home has fewer rooms and people. The sounds are also different. It is important that we must take care of the environment, where we spend most of our time. We should work to keep it clean.

Assessment

1. Activity 1, page 25
2. Activity 2, page 25

Reinforcement /homework

1. Exercise question 2, page 29
2. Have a cleanliness Day in class. Make posters emphasizing on the importance of having a clean and healthy environment around us. Display these posters neatly a few days before The Day.

Lesson Plan 3

Student learning outcomes

Distinguish between types of garbage. Understand about the 3 R's. Recycle garbage by using the 3 R's.

Material

Pictures of a garbage dump and a garden. Picture of wet and dry garbage.

Keywords

garbage, pollute, diseases, compost, decay, reduce, reuse, recycle

Overview

The emphasis in this lesson, will be on having a healthy atmosphere, to better improve the general environment around us. To make a better environment, it is important to keep it healthy, by practising the three "R's"—reusing, reducing, and recycling.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential Question

1. How does the environment get dirty?
2. Give ways in which we can keep it clean.

Method

- The students will be shown pictures of a garbage dump and a garden. Which picture looks nice? The picture of the garden looks better. Why does the garden look good to the eyes? It looks good as the grass is properly cut and all the flower beds are also neat with the flowers blooming. The garden is a healthy place to visit.
- The garbage dumps are ugly to look at and unhealthy for the environment as they have an unhealthy environment, and promote pollution. The garbage dumps are a source of small insects which spread different kinds of diseases and dirty smells which pollute the environment. Discuss Activity 5 on page 26 with the students.
- Read pages 27 and 28 of the Students' Book in the classroom and explain that there are two types of garbage: wet / dry. Wet garbage comes from the kitchen, and can be recycled into compost as it decays. Dry garbage are broken pieces of glass, plastic, tin cans and paper. These do not decay.
- It is important to put and collect garbage according to the three R's. The teacher should put the three R's on the board:

  Reduce – Use less

  Recycle- Make something new out of waste

  Reuse - Use it in some other way

Assessment

1. Activity 6, page 28
2. Activity 7, page 28

Reinforcement/homework

1. Have 'Save the Environment Day'. Students should bring empty jam bottles and old newspapers. The jam bottles can be painted and decorated to make a vase or a pencil holder. The old newspapers can be used to make shopping bags. These bags can also be painted colourfully.
2. Make a poster on A-4 size paper emphasizing on keeping our surrounding clean. To follow the 3 R's. Not to pollute the environment by burning garbage in the garbage dumps.
3. Exercise question 1, page 29

Lesson Plan 1

Student learning outcomes

Discuss the importance of water. Be informed about the uses of water. Identify the different sources of water. Determine the characteristics of water.

Material

a glass of water, a thermos of hot water, some ice

Keywords

substances, surface, cooking, bathing, washing, dishes, clothes, oceans, rivers, streams, springs, solid, liquid, gas

Overview

This lesson will focus on the characteristics of water. It will be explained that water is used by all living things. Through class discussions, students will learn about the ways humans use water.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. How do we clean something?
2. Why do all living things need water?

Method

- Begin lesson by reading page 30 of the Students' Book in the classroom. Ask students to name important things, without which we cannot live. Put the answers on the board. Air, food, and water. Explain that water is the most important liquid on planet Earth. All living things will die if there was no water.
- The students will be asked what they had done before coming to school. Did you use water? You washed your hands and face, you brushed your teeth, you took a bath, and you also drank some water. Some of you might have watered the plants.

- Plants and animals are similar in that they will die if they do not get water.
- Water is used in factories and even used to make electricity. Where does this water come from? Ask the students to name the sources that they know. Rain, rivers, oceans, lakes, and springs. These are natural sources of water. We can get water from wells, dams and canals. These sources are man-made.
- Ask students, what does water taste like? Does it have a smell? A few students will taste the water in the glass. No taste. A few students will be asked to smell the water. No smell. Does it have any colour? No colour. Is it found in all three states of matter? Yes. The teacher will show the bowl of ice, she will open the thermos to show the steam and liquid is water. The students will note down these observations in their notebooks.

Assessment

1. Activity 1, page 31
2. Exercise question 1, page 33

Reinforcement/homework

1. Collect pictures of a river, lake, well, sea, and paste in your notebooks.
2. Exercise questions 3 and 4, page 33
3. Answer the questions.
   i. Can electricity be made from water?
   ii. Name the sources of water.
   iii. Do animals and plants use water?
   iv. What are the characteristics of water?

Lesson plan 2

Student learning outcomes

Understand how water reaches their homes. Suggest ways to save water.

Material

chart showing water distribution

Keywords

reservoirs, filtration, cleaned, network

Overview

Students are aware of the different sources of water. In this lesson, student will now learn that water cannot be used without being treated or cleaned. The water that is used by us in our homes, passes through various processes to make it clean. Water has to be conserved, so we should use it carefully, for e.g. by not leaving the taps running needlessly.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Where does water come from?
2. How does water come into the taps?

Method

- Begin the lesson by asking the students what they use to wash their hands, take a bath, and wash clothes. They used water, and it came from the tap. How did the water come into the tap? Read page 32 of the Students' Book in the classroom, and then put up the chart about the distribution of water.
- The water from the river is taken to the filtration plant by means of huge water pipes. In the filtration plant, the leaves, sand and other waste products are removed. Some chemicals are added to the water to make it clean. It then flows into a network of pipes to reach our homes.
- A lot of water on the planet is not fit to be used by us, so it is important that we do not waste it. The teacher will ask the students that how can we save water. Their answers will be noted on the board.
    i. To close the taps after use.
    ii. To keep the tap closed when brushing teeth.
    iii. To take a five-minute shower or a bucket-bath.
    iv. Use the water from washing fruits and vegetables to water the plants.
    v. Water can be recycled and used in the gardens.
    vi. In this way, the three "R's" are used–Reduce, Recycle, Reuse.

Assessment

Exercise question 2, page 33

Reinforcement/homework

1. Explain how water gets to our taps. Draw the diagram given on page 32.
2. Give 3 ways in which we can save water.

UNIT 6

Materials

Lesson Plan 1

Student learning outcomes

Understand what materials are. Classify materials.

Material

Things made from material from the ground - clay and metal; Things made from material from plants - wood and cotton; Things made from material from animals - leather, silk and wool.

Keywords

materials, natural, leather, plastic, petrol

Overview

The students will be explained that everything that we use is made from one or the other material. We get materials from plants, animals, and from the ground. These materials are known as natural material. The natural material is sometimes further processed to make a newer material, which is known as man-made material.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. What are walls made of?
2. Why do they need that material?

Method

- Arrange the material brought for display on three tables marked, Ground, Plants, and Animals. First point to the table marked ground and ask the students if they can name any other material from this source. Oils and metals. Oils and metals come from the ground. We use oil to run factories, transport and even in our homes. Metals are used as steel for buildings and for making pots and pans. Clay is used to make bricks and flower pots.

- Now point to table 2 on which things made from plants are kept. The students will be asked what we get from plants besides fruits and vegetables-wood, cotton fibre which makes clothes, and rubber.
- The third table has things made from animals-leather, silk, and wool. We even use feathers to fill pillows and for decorations. All these things are made using the natural materials.
- When natural material is used to make a new material then it is known as man-made. For example, we use oil to make plastic and nylon. We use silica sand to make glass.

Assessment

1. Activity 1, page 34
2. Exercise question 2, page 36
3. Activity 2, page 35

Reinforcement/homework

1. Answer the questions.
   i. Name the two kinds of materials.
   ii. What is natural material?
   iii. What is man-made material?
2. Make three columns in your notebook. In one column write down the names of things made from metal and clay. In the second column write the names of things made from plants, and in the third column write the names of things made from animals.

Lesson Plan 2

Student learning outcome

Explain the properties of materials.

Material

pictures of different materials used for different jobs

Keywords

strong, waterproof, nylon, plastic

Overview

Materials can be classified into hard and soft, waterproof or not and whether it can float or sink. In this way, certain materials can be combined and used in different ways.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Do all materials have the same property?
2. What would we use to protect ourselves from the rain?

Method

- Show metal scale, a sheet of paper and a piece of cloth. The students will be asked to touch the objects and say how each item feels when touched. The metal scale is hard, the paper can be folded, while the cloth is soft to touch. Read page 35 of the Students' Book in the classroom, and explain that most things are made of materials.
- Steel and bricks are hard and strong so they are used to build buildings. What materials are your clothes made of? They are made of cotton cloth. They are made using cotton fibres, because they are soft and absorbent. They also keep our body covered. We use cotton cloth during summer to keep us cool, and wool during the winter to keep us warm.
- There are some materials which are waterproof. They are made from plastic and protect us from the rain. Can you name two items, which protect us from rain? Umbrella and waterproof raincoat. Some things are made of materials which can bend easily like the water pipe in the garden. What is the water pipe made of? Plastic, nylon, or rubber.

Assessment

1. Activity 3, page 35
2. Exercise questions 1 and 4, page 36

Reinforcement/homework

1. Make a chart showing objects which are made of man-made material. Display it on the class soft board.
2. Exercise question 3, page 36

Lesson Plan 1

Student learning outcomes

Identify the sources of heat. Discuss how they can protect themselves from heat.

Materials

Picture of the Sun, electric heater, and wood fire. A thermos of hot water and another with cold water. 2 cups, a candle, and a match box.

Overview

The students will be introduced to the Sun being the most important source of heat. We also have other sources of heat for example, electricity, gas, wood and coal. Take protection from the heat of the Sun, by using an umbrella as a shade.

Keywords

electricity, natural, produced, rubbing, stones, burning

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. What is the most important source of energy?
2. Why is heat important?

Method

- Take two Thermos and place them on the table with the two cups. The students will be asked to watch carefully. Water will be poured in one cup, call a few students to the table. They will first touch the empty cup. It will be cold. Then the cup with hot water is to be touched. It will be hot. Heat is an energy which can be transferred to anything cold.
- What is the most important source of heat? The Sun is the most important source of heat. What other sources of heat energy are there? Wood, coal, gas, and electricity

are the other heat sources. Read page 37 of the Students' Book in the classroom. By rubbing two solid objects heat is produced. The Sun rays heat the land, water and air.

- Light a candle and ask the students to place their hand near it, to feel the heat. They will also be told to rub their hands and place them on their cheeks to feel if the hands have become warm (Activity 1, page 37).
- Can we feel the heat of the Sun? Yes, we can. We can also protect ourselves from the heat by using an umbrella, or the shade of a tree.

Assessment

Exercise question 3, page 39

Reinforcement/homework

Answer the questions.

i. Name some things which give us heat.
ii. How is heat produced by rubbing two objects together?
iii. Can the Sun's heat warm the land, air, and water?
iv. Name two objects which give us shade?
v. Does burning wood/coal/paper give us heat?

Lesson Plan 2

Student learning outcomes

Explain the relationship between heat and distance. Understand the uses of heat.

Material

hairdryer, electric heater, iron, electric burner

Keywords

closest, farthest, stove, sources, winter

Overview

The students already know about heat energy. In this lesson, they will learn how heat energy is transferred. A fire can be used to explain how heat is transferred, as those close to the fire are warmer than those who are further away from it. They will understand the different ways heat is used.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Who will be warmer, the person sitting closest or the farthest?
2. What other sources of heat are there?

Method

- First arrange the class in rows, then turn on the electric heater. Ask which students felt the heat first, the ones nearest to the heater or the ones who were further away from the heater? The students further away will not feel the heat.
- Read page 37 of the Students' Book in the classroom. Heat is used in many different ways in our daily life. The students will be asked to sit in pairs and make a list of other sources of heat in our daily life. Wood, coal, gas, and electricity. Solar energy can also be used.
- Brainstorm with the students about the uses of heat. Heat is used for cooking, heating, drying, sterilizing, and many kinds of industry.

Assessment

Exercise question 2, page 39

Reinforcement/homework

1. Exercise question 1, page 39
2. Draw pictures in your notebooks of how we use heat in our everyday life.

UNIT 8

Force

Lesson plan 1

Student learning outcomes

Define force. Explain the difference between heavy and light objects.

Materials

a toy car, a box, a board duster, a few marbles

Keywords

light, heavy

Overview

This lesson will clear the concept of force. Force is when we push and pull things in order to cause movement. The students will also understand that a heavy object will require greater force than a lighter object.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Do all the things weigh the same?
2. What did you use to push the door open?

Method

- Enter the classroom, push the door to close it. After a few minutes, the door will be pulled to open it. Ask students, what has been done? The door was pushed and pulled.
- Read page 40 of the Students' Book in the classroom. Explain to the students that pushing and pulling actions are used to apply force. The students will be asked to push their desk forward and pull their chairs nearer. What did you do? We applied force. Every time we move an object, force is applied to move it. Living things can move but non-living things can't move. In order to move them, we apply force.
- Do Activity 1, page 40 in class with the students.

- The teacher will ask a student to push the toy car. Was it easy to push? Yes. Now push this big box. Was it easy? No. The car was small so it moved easily, the box was heavy that is why it was difficult to push. Things that are light move easily, while things which are heavy, as they require more force.

Assessment

1. Activity 2, page 40 (to be done under the supervision of the class teacher)
2. Activity 3, page 41
3. Activity 4, page 41
4. Exercise questions 3 and 4, page 42
5. Push a chair. Now try to push a big table. Make a note of your findings in your notebooks.

Reinforcement/homework

Fill in the blanks

i. Pushing and pulling is _____.
ii. We use _____to move our body.
iii. A non-living object _____by itself.
iv. We need_____ force to move heavy objects.
v. We need _____force to move light objects.

Lesson Plan 2

Student learning outcome

Understand that force changes direction.

Material

sports materials like ball, bats, racquets

Keywords

change, directions, towards

Overview

Understanding that force can be used to change the direction of a moving object. Explore these possibilities with the students in the playground.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential question

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Can a cricketer or a footballer change the direction of a ball?
2. What can cause change in the direction of a free-flying piece of tissue paper?

Method

- Take some sports material to class. The students will be divided into teams. One group will get the cricket bat and ball, the other the football and the last group will get the racquets and tennis ball. Explain to them that they have to observe what they did with the ball. How the players changed the direction of the ball while playing. How was the ball saved from the goal? How did the bowler bowl the ball to change the direction it would go?
- The students will read page 41 of the Students' Book in the classroom. The students will then write what they had observed, during the earlier activity, in their notebook.

Assessment

1. Activity 4, page 41
2. Exercise question 2, page 42

Reinforcement /homework

Exercise question 1, page 42

Lesson Plan 1

Student learning outcomes

Understand the nature of light. Define and explain transparent and opaque objects.

Material

a candle, matchbox, torch, lamp, card paper eye mask, clear cellophane sheet

Keywords

natural, artificial, torch, candles, transparent, opaque

Overview

The students should have an understanding that they are able to see because there is light. We can see in the day with the help of the Sun and at night with electricity. There are some objects that allow light to pass through them: they are known as transparent. Opaque objects are those through which light cannot pass.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Can you see through a door or the window?
2. How do we see in the dark?

Method

- Enquire from a few students, Are you able to see in the dark? No. What can help you to see? Light helps us to see. Read page 43 of the Students' Book in the classroom. Explain to the students that in the day the Sun is shining so it is easy to see. The Sun provides us with natural light. The Moon and the stars also shine at night. The Moon and the stars also provide natural light at night. During the night we also use the light bulb, candle, torch, and even a wood fire to give us light.

- Distribute bands made of card paper and a piece of clear cellophane. All the students cover their eyes with the band. Can you see through it? No. Take the band off, see through the clear cellophane. Can you see now? Yes. The card paper band was opaque, that is why you could not see through it. You could see through the clear cellophane because it was transparent. Objects through which light can pass through are called transparent. An object through which light cannot pass is known as opaque. Ask the students to name some opaque things present in the classroom. Door, desk, ruler, school bag books.

Assessment

1. Activity 1, page 43
2. Activity 2, page 43
3. Exercise question 2, page 47

Reinforcement/homework

1. Answer the following questions.
   i. How do we see during the day?
   ii. Name some artificial lights which we use at night?
   iii. What is the natural source of light in the night?
   iv. What objects can light pass through?
   v. Can light pass through paper, metal, and wood?
2. Draw two objects which are transparent and two objects which are opaque.

Lesson plan 2

Student learning outcomes

Understand the relationship between light and distance.

Describe how shadows are formed. Identify time through shadow position.

Material

a candle, a torch

Keywords

required, difficult, easier

Overview

The students have understood that light travels in a straight line. Shadows are formed when the light rays are blocked. Shadows can be used to tell the time by using the sundial or by the movement of the Sun in the sky during the day.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	30 min
Assessment	5 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. Do you know how shadows are formed?
2. When does the length of the shadow become long?

Method

- Conduct activity 4 on page 44. Darken the classroom and light a candle. Ask the students to read page 44 of the Students' Book in the classroom. The students sitting close to the candle will be able to read their books. The students sitting away from the candle will face difficulty in reading. This demonstrates that with a source of light near, it is easier to see. If the light is far, it becomes difficult.
- Remind the students that they could see through the transparent cellophane sheet but not through the opaque band. When light falls on an opaque object it bounces back. Read page 45 of the Students' Book in the classroom. Explain to the students that a dark image is made in front or back of the object. This image is called a shadow.
- The sunlight causes shadows during the day. The shadow in the morning and evening will be long because the Sun is farther away. At noon the shadow is short as the Sun is overhead. In the morning the shadow will fall In front of the object. In the evening the shadow will fall at the back of the object.

Assessment

1. Activity 5 and 6, page 45
2. Activity 7, page 46

Reinforcement/homework

1. Exercise question 1, page 47
2. Answer the following questions.
    i. Can transparent objects make a shadow?
    ii. What is a shadow?
    iii. Are shadows of the same shape as the object?
    iv. Where does the shadow fall?

v. When are shadows longer in the Sunlight?
vi. Why are shadows short at Noon?

3. Exercise question 3, page 47

The Earth and the Universe

Lesson Plan 1

Student learning outcomes

Understand the Solar System. Grasp concepts about Earth, Sun, Moon, and stars.

Material

A chart showing the planets of the Solar System.

Keywords

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Solar System, planets

Overview

The students will learn the names of the eight planets, and remember the order of the planets, nearest to the farthest from the Sun. Learn about the Earth, Moon and the stars.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. What is the shape of a ball?
2. What is the yellow ball in the sky during the day?

Method

- Begin lesson by reading pages 50 and 51 of the Students' Book in the classroom. Explain that the yellow ball we see during the day, it gives us light and heat is the Sun. The other planets like the Earth also move around the Sun. They all appear round. The Sun and the Planets with their moons make up the Solar System. The names of the Planets are written closest to the farthest to the Sun. The planet we live on is the Earth, it is the third in the Solar System. The surface of earth is covered three fourth by water. The other planets beginning from closest to the Sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Do Activity 1 in class.

- Read page 52, and explain that the Sun is a Star. It has its own light. It is millions of miles away from the Earth. All the planets move around the Sun. It looks like a very bright, yellow coloured ball from the surface of the earth.
- Some stars are bigger than the Sun, but because they are so far away from the Earth, they look so small.
- Moon does not have its own light, it reflects the light of the Sun. The Moon goes around the Earth. It looks silvery at night.

Assessment

Exercise questions 1 and 2, page 56

Reinforcement/homework

1. Draw the diagram of the Sun and the 8 planets given on page 49.
2. Write the names of the 8 planets in your notebooks. Learn the spellings of these names.
3. Activity 2, page 53
4. Write a few lines about the Sun.
5. What do you know about the Stars? Write 3 things about them.

Lesson Plan 2

Student learning outcome

Understand why we see different shapes of the Moon during a month.

Material

chart showing the different shapes of the Moon

Keywords

round, coin, half-circle, reflect, different, complete, crescent

Overview

To help clear the concept of the Moon revolving around the Earth. It is for this reason that we get to see different shape of the Moon during the month. The Moon does not have its own light. The moon reflects the light of the Sun.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. What is the silver coin in the sky at night?
2. What is the shape of the Eid moon?

Method

- Read Page 52 of the Students' Book in the classroom. Why is it so difficult to see the new moon before Eid? It is too small. The moon looks like a silver ball or a coin during the full moon. It appears as a banana as the moon begins to get smaller. When it rises as a new moon again, it appears as small as a cut fingernail.
- Explain that the moon revolves around the Earth and that is why we see different shapes during a month. It takes the moon 30 days to go around the Earth. The part of the moon facing the Sun shines, as the moon doesn't have light of its own. The new moon is called a Crescent.

Assessment

Activity 2 and 3, page 53

Reinforcement/homework

1. Exercise question 3, page 56
2. Answer the following questions.
    i. What does the full moon look like?
    ii. What does the Moon revolve around?
    iii. Does the Moon have its own light?
    iv. Which part of Moon do we see?
    v. What does a half moon look like?
    vi. What is the crescent?

Lesson Plan 3

Student learning outcome

Discuss the phenomena of day/night.

Materials

a globe, a torch

Keywords

Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Axis, revolves

Overview

This lesson explains the concept of the Earth rotating on its Axis which causes the phenomena of Day and Night.

Teaching methodology

Exploring knowledge through essential questions	5 min
Method/activity	25 min
Assessment	10 min

Essential questions

Before starting the lesson, ask some questions to explore the background knowledge of students:

1. When does the Sun shine?
2. What shines at night?

Method

- Bring and place globe on the table and ask the students to come closer to the table. A lit torch will be pointed at globe, the part that it shines on is bright, while the other side is dark. Now explain that the Earth is like a ball. It revolves around the Sun, but at the same time, it rotates on its own Axis.
- Rotate globe to show how the Earth rotates on its axis. The part of the Earth that faces the Sun has day and the other part which does not get the sunlight has night. A new day begins with the rising of the Sun and ends with the setting of the Sun. Seven days and nights make a week. There are 24 hours in a day.

Assessment

Activity 4, page 54

Reinforcement /homework

Write the names of the days of the week in your notebook.

Answer to the Exercises

Unit 1

1. Answer the questions.
   i. Why do animals need body coverings?
      To keep warm and for protection.
   ii. Give two examples of animals which have hair on their bodies.
      Bear and cat
   iii. Where do lions and bears live?
      Lions and bears live in dens.
   iv. What do giraffes do when they have to call their young ones?
      They whistle.
   v. Why does a camel have flat feet?
      So that the camels feet do not sink in the sand.
2. Write true or false.
   i. True
   ii. False
   iii. True
   iv. False
   v. False
3. Who am I?
   i. Frog
   ii. Fish
   iii. Horse
   iv. Parrot
4. Draw your favourite animals in the space given. Answer depends on the students.

Unit 2

1. Answer the following questions.
   i. Seeds turn into new plants.
   ii. Shrubs are plants which are short with many branches.
   iii. A trunk is the stem of a large tree
   iv. Carrots

v. The leaf is responsible for catching sunlight for the plant.

2. Label this diagram with the help of the figure on page 12. Refer to the Students' Book.
3. Circle the correct answer.
   i. fruit
   ii. roots
   iii. coconuts
   iv. cloth
   v. medicine

Unit 3

1. Write the names of five neat and tidy places in your school.
   i. Principal's office
   ii. school hall
   iii. library
   iv. computer room
   v. nurses room
2. What do you do to keep your school clean?
   i. to throw waste paper in the dustbin
   ii. not to throw chewing gum on the floor
   iii. to put pencil shavings in the dustbin
3. Write the names of five main groups of food.
   i. meat
   ii. cereal
   iii. fruits
   iv. vegetables
   v. dairy
4. Write true/false.
   i. True
   ii. False
   iii. True
   iv. True
   v. True
5. Label the different body parts using the boxes. Refer to page 17 of the Students' Book.

6. Fill in the blanks.
   i. food
   ii. hands
   iii. handkerchief
   iv. boiled
   v. basic
   vi. sleep

Unit 4

1. Answer the following questions.
   i. What is an environment?
      The surroundings we live in is our environment.
   ii. Name a few non-living things which make up an environment.
      The soil, air, water are the non-living part of an environment.
   iii. Name two types of garbage.
      Wet garbage and dry garbage.
   iv. What is meant by 'recycle'?
      Recycling means reusing some dry garbage.
   v. How can you reduce the use of paper?
      Paper can be used to make paper bags.
2. Fill in the blanks using the words given below.
   i. animals
   ii. school
   iii. tidy
   iv. reduce
   v. wet
3. What are some ways in which you can make your home environment better?
   i. To keep our own house clean and tidy by keeping things in their right place.
   ii. Not to throw rubbish on the street.
   iii. Not to disturb others by playing loud music or playing outside.

Unit 5

1. Answer the following questions.
   i. How do we use water in our homes?
      We use water for washing, cooking, drinking and bathing.

ii. Write three natural sources of water.
Spring, river, lakes.
iii. Compare water with a soft drink and write their characteristics.
Water has no smell, taste or colour. A soft drink has a flavour, smell and colour.
iv. Why is water taken into filtration plants?
Water is taken to filtration plants for removing the impurities in the water.
v. Why do you think it is important to avoid wastage of water?
Only 1% of all the water on Earth is fit for drinking.

2. Fill in the blanks.
i. 71%
ii. water
iii. life
iv. cook
v. factories

3. Write true or false.
i. False
ii. False
iii. True

4. List three ways in which water is used by you in your daily life.
i. for cooking
ii. for bathing
iii. for drinking

Unit 6

1. Answer the following questions.
i. What is everything around us made of?
It is made of material.
ii. Is cotton a natural or man-made material?
Cotton is a natural material.
iii. Why do you think umbrellas are made of nylon?
Umbrellas are made of nylon because they are water-proof.
iv. Which material is used to make a table?
Wood is used to make a table.
v. Why is brick used to build a wall?
Bricks are hard and strong.

2. Fill in the blanks:
   i. natural
   ii. trees
   iii. ground
   iv. cloth
3. Write true / false:
   i. False
   ii. False
   iii. False
   iv. True
   v. True
4. Things made from man-made or natural material.

Man-made	Natural
Plastic	Wood
Paper	Leather
Glass	Stones

Unit 7

1. Answer the questions.
   i. Where do we get heat from?
   We get heat from the Sun, wood, coal, gas, and electricity.
   ii. Name three things which produce heat.
   Wood, coal, gas
   iii. Besides fibreglass what else can protect us from heat?
   Shade of the tree.
   iv. What do we use in winter to keep ourselves warm?
   We use woollen clothes and a Heater.
   v. How can we get heat from wood?
   We get heat from wood by burning it.
2. Write true or false.
   i. True
   ii. True
   iii. False
   iv. False

3. Write five ways to keep yourself warm in winter.
   i. Wear a sweater.
   ii. Use a blanket.
   iii. Drink hot milk.
   iv. Turn on heater.
   v. Make a wood fire.

Unit 8

1. Answer the following questions.
   i. Do objects move by themselves?
      No, objects cannot move by themselves.
   ii. What do we do to move objects?
      We push or pull them.
   iii. What do we do to stop a moving object?
      We change its direction.
   iv. What is force?
      Force is pushing or pulling.
   v. Can a non-living object move by itself?
      No, it cannot move itself.
2. Write true or false.
   i. False
   ii. False
   iii. False
   iv. True
   v. True
3. Make a chart of things that you could move by lifting, pushing, or pulling it. Answer depends on the students but a sample is given below.

	Lifting	**Pushing**	**Pulling**
1	school bag	stroller	curtain
2	chair	trolley	toy car
3	table	swing	box
4	toy	door	chair

4. Mention which action is pull and which is push
   i. push
   ii. pull
   iii. push
   iv. pull
   v. push

Unit 9

1. Answer the following questions.
   i. What is natural light?
      Natural light is the light of the Sun.
   ii. What are the two sources of light at night?
      Light bulb and gas light
   iii. What are transparent objects?
      Transparent objects are those through which light passes through.
   iv. What are opaque objects?
      Opaque objects are those through which light does not pass through.
   v. What is the shape of the shadow?
      The shape of the shadow is the same as the object.
2. Make a list of transparent and opaque objects. The answer depends on the students but a sample answer is provided below.

Transparent Objects	**Opaque Objects**
Glass bottles	Wooden door
Window panes	Steel door
Clear plastic covers	Thick cloth
Water	Leather
Lenses of glasses	Stone
Glass pot covers	Bricks

3. Write true or false.
   i. True
   ii. True
   iii. False
   iv. True
   v. True

4. Fill in the blanks.
   i. transparent
   ii. longer
   iii. shorter
   iv. opaque
   v. two
5. Draw some sources of light. Refer to page 43 for ideas.

Unit 10

1. Answer the following questions.
   i. What looks like a round ball of fire and can be seen in daytime?
      The Sun looks like a round ball of fire.
   ii. What looks like a white ball and can be seen at night?
      The moon looks like a white ball in the night.
   iii. Which planet do we live on?
      We live on the planet Earth.
   iv. Why do stars appear small to us?
      The stars look small because they are very far away from the Earth.
   v. On which days of the week do you have holidays from School?
      Saturday and Sunday.
2. Write true or false.
   i. True
   ii. True
   iii. False
   iv. True
   v. False
3. Fill in the blanks.
   i. seven
   ii. round
   iii. reflects
   iv. eight
   v. three-fourths

Notes

باب 6

کچھ اشیا کمرۂ جماعت میں لے کر آیئے، مثلاً پنسل کیس، کپڑے کا ڈسٹر یا صافی، پنسل، پلاسٹک کا گلاس، اور پلاسٹک کا شاپنگ بیگ۔ طلبا اس بات پر اظہار خیال کریں گے کہ ہر چیز کس مٹیریل یا مادّے سے بنی ہے۔ قدرتی مٹیریل (Natural material) اور انسانی ساختہ مٹیریل (Man-made material) کے مابین فرق بیان کیجیے۔ بحث کیجیے کہ کچھ مٹیریل سخت کیوں ہوتے ہیں جب کہ کچھ آسانی کے ساتھ موڑے جاسکتے ہیں، مثلاً اینٹ اور پودوں کو پانی دینے والا پائپ۔ طلبا کو بتایئے کہ کچھ چیزیں واٹر پروف اور کچھ غیرواٹر پروف کیوں ہوتی ہیں۔

باب 7

طلبا سے پوچھیے کہ دھوپ میں کھڑا ہونے پر وہ کیا محسوس کرتے ہیں؟ گرمی! اسے حرارت کہا جاتا ہے۔ سورج کی قدرتی حرارت اور گیس، بجلی اور لکڑی کی آگ کی انسانی ساختہ حرارت کے درمیان فرق سمجھنے میں طلبا کی مدد کیجیے۔

باب 8

کچھ طلبا کو اپنی ڈیسک آگے دھکیلنے اور کچھ کو اپنی کرسیاں کھینچ کر ڈیسک کے قریب کرنے کی ہدایت کردیجیے۔ انھوں نے کیا کیا ہے؟ انھوں نے دھکیلنے اور کھینچنے کے دوران قوت لگائی ہے۔ بے جان اشیا اپنے طور پر حرکت نہیں کرسکتیں، انھیں کھینچنا یا دھکیلنا پڑتا ہے۔ طلبا سے پوچھیے کیا وہ فٹبال، کرکٹ یا رسا کشی جیسے کھیل کھیلنے کے دوران قوت کا استعمال کرتے ہیں۔ قوت سے سمت تبدیل کرنے کا کام بھی لیا جاتا ہے۔

باب 9

ایک طالب علم کی آنکھوں پر پٹی یا اسکارف باندھ دیجیے۔ اب اس سے پوچھیے کیا وہ اپنے دوستوں کو دیکھ سکتا / دیکھ سکتی ہے۔ جواب No (نہیں) ہوگا۔ طلبا کو بتایئے کہ وہ طالب علم / طالبہ اس لیے نہیں دیکھ سکتا / دیکھ سکتی کیوں کہ اس کی آنکھوں کے سامنے روشنی نہیں تھی۔ دیکھنے کے قابل ہونے کے لیے ہمیں روشنی کی ضرورت ہوتی ہے۔ دن میں سورج کی روشنی (دھوپ) دیکھنے میں ہماری معاون ہوتی ہے۔ رات میں ہم بلب، ٹارچ، اور موم بتی کی روشنی میں دیکھ سکتے ہیں۔ شفاف اور غیرشفاف اجسام کا باہمی فرق بیان کیجیے۔

باب 10

ایک گلوب کلاس میں لے کر آیئے اور طلبا کو زمین کی شکل و صورت دکھایئے۔ واضح کیجیے کہ ستارے گول نظر کیوں نہیں آتے۔ بیان کیجیے کہ روشن اور غیرروشن اجسام کیا ہوتے ہیں۔ بحث کیجیے کہ مہینے کے مختلف دنوں میں ہمیں چاند کی مختلف اشکال کیوں دکھائی دیتی ہیں۔

نوٹس برائے اساتذہ

باب 1

مختلف جانوروں، پرندوں، اور مچھلیوں کی تصاویر دکھائیے۔ بیان کیجیے کہ ہر ایک جان دار کا جسم کس چیز سے ڈھکا ہوا ہے۔ بحث کیجیے کہ جانوروں کی جلد یا کھال کیسے ان کی حفاظت کرتی ہے اور ہر جانور کیا کھاتا ہے ۔ کچھ طلبا کو دھاڑنے، بھوں بھوں کی آواز نکالنے اور میاؤں میاؤں کرنے کی ہدایت کر دیجیے، اور باقی طلبا سے کہہ دیجیے کہ وہ پہچانیں کہ کس جانور کی آواز ہے۔

باب 2

ایک اصل پودا کلاس میں لے کر آیئے اور طلبا سے کہیے کہ اس کے مختلف حصوں کے نام بتائیں۔ اس بات کو زیر بحث لایئے کہ پودے کے مختلف حصے ہمارے لیے کس طرح مفید ہیں۔ طلبا کو بتایئے کہ ہم پودوں کے کچھ حصے کھاتے ہیں، کچھ پودے دوائیں بنانے میں استعمال ہوتے ہیں جب کہ کچھ سے فرنیچر، دروازے اور گھر بنائے جاتے ہیں۔

باب 3

طلبا کے ساتھ کلاس میں Simon says کھیلیے۔ طلبا سے کہا جائے گا کہ جسم کے مختلف حصوں کی طرف اشارہ کریں۔ طلبا کوئی مخصوص ایکشن یا عمل اسی وقت انجام دیں گے جب Simon says کہا جائے۔ اگر آپ Simon says کہے بغیر طلبا کو کوئی ہدایت کریں تو انھیں اس پر عمل نہیں کرنا چاہیے۔ عمل کرنے والا طالب علم کھیل سے باہر ہوجائے گا۔ اپنے جسم کو صاف ستھرا رکھنے اور اچھی عادات اپنانے کی اہمیت پر زور دیجیے۔ صحت بخش انداز سے رہنے کا مطلب صحت بخش غذا کھانا ہے۔

باب 4

ہر جان دار شے کے لیے صحت بخش ماحول کی اہمیت بیان کیجیے۔ ہر جگہ اور مقام کا اپنا ماحول ہوتا ہے۔ اسکول ہو، گھر، کھیل کا میدان، یا پھر شاپنگ سینٹر، ہمیں ان سب کو صاف ستھرا رکھنا چاہیے تاکہ فضا صحت بخش ہوجائے۔ کلاس کو ماحول کے طور پر لیجیے اور طلبا سے استفسار کیجیے کہ وہ کیسے اسے صاف ستھرا رکھ سکتے ہیں۔ تین R پر زور دیجیے: reduce (کم یا محدود کرنا)، recycle (ازسرنو کارآمد بنانا)، اور re-use (دوبارہ استعمال کرنا)۔ طلبا سے کہیے وہ جام کی خالی بوتل کو پنسل ہولڈر یا گلدان کے طور پر استعمال کریں۔

باب 5

طلبا کو تمام جان داروں کے لیے پانی کی اہمیت سے آگاہ کیجیے۔ بحث کیجیے کہ کیا ہم پانی کے بغیر زندہ رہ سکتے ہیں۔ طلبا سے اس بات پر تبادلۂ خیال کیجیے کہ ہم کیسے پانی کا استعمال کر سکتے ہیں اور کن طریقوں سے پانی کو ضایع ہونے سے بچاسکتے ہیں۔ طلبا کی حوصلہ افزائی کیجیے کہ وہ تحفظ آب کے بارے میں پوسٹر بنائیں۔

قومی نصاب برائے جنرل سائنس کے مطابق جانچ (Assessment) کی حکمت عملیاں

استاد طالب علم کی تعلیمی کارکردگی سے نہ صرف روایتی ٹیسٹ، امتحانات اور عملی کام (پروجیکٹ) کے ذریعے واقف ہوتے ہیں بلکہ طلبا کا لمحہ بہ لمحہ مشاہدہ بھی اس میں معاون ہوتا ہے۔ سائنس کے بارے میں طلبا کی معلومات، سائنسی مہارتوں، اور رویوں کو جانچنے کے لیے اساتذہ کو مختلف النوع اوزار (tools) اور طریقہ ہائے کار کی ضرورت ہوتی ہے۔ مثلاً:

- ☆ مخصوص ردعمل
- ☆ تعمیری/تخلیقی ردعمل
- ☆ کارکردگی کی جانچ
- ☆ ذاتی ابلاغ (personal communication)
- ☆ طلبا کی خود تشخیصی (self-assessment)

سائنس کی تشخیصی حکمت عملیوں پر مفصّل ہدایات کے لیے قومی نصاب برائے جنرل سائنس 2006 کا باب 8، صفحہ 65 تا 73 ملاحظہ کیجیے۔

رہنمائے اساتذہ کے مشتملات اور ترتیب

رہنمائے اساتذہ برائے نیو گیٹ اہیڈ سائنس میں سبق کا آغاز کرنے کے لیے تجاویز شامل ہیں نیز ہر باب کے لیے تدریسی حکمت عملیاں بھی فراہم کی گئی ہیں۔ ہدایاتی ماڈل کا مرکز ومحور سابقہ یا پہلے سے موجود معلومات کو کھنگالنا ہے جس میں طلبا کی سرگرم شرکت کی حوصلہ افزائی کی جاتی ہے۔

ایک فعال اور طالب علم محور کمرۂ جماعت کے لیے سفارش کردہ ترتیب کار (شیڈول)

سابقہ/ پہلے سے موجود معلومات کو کھنگالنا بذریعہ بنیادی سوالات	5منٹ
آموزش (learning) بذریعہ بحث/ سرگرمی	25 منٹ
نتیجہ/ ماحصل بذریعہ جانچ	10 منٹ

ہر باب کا ابتدائی حصہ تعمیری انداز میں سبق کو آگے بڑھانے کے لیے بنیادی تجاویز پر مشتمل ہے۔ دوسرے حصے میں کتاب میں موجود تمام سوالات کے جوابات دیے گئے ہیں۔ طلبا کی حوصلہ افزائی کی جائے کہ وہ اپنے ذہن سے کام لیتے ہوئے جوابات دیں اور پھر استاد ان جوابات کی بنیاد پر طلبا کی تفہیم اور معلومات کی جانچ کر سکتے ہیں۔

قومی نصاب برائے جنرل سائنس کے مطابق تدریسی حکمت عملیاں

مؤثر ہدایاتی تدریسی حکمت عملیوں میں مندرجہ ذیل شامل ہیں (تاہم حکمت عملیاں انھی تک محدود نہیں ہیں):

- تحقیق وتفتیش (انکوائری)
- سوالات اور گفتگو
- تحقیق اور مسئلے کا حل
- عملی مظاہرہ اور تجربہ گاہی کام (لیبارٹری ورک)
- مسائل پر مبنی آموزش (problem based learning)
- پوری جماعت، گروپ، اور انفرادی کام سے استفادہ
- خواندگی کی حکمت عملیوں (پڑھنا، لکھنا، بولنا اور سننا) کی شمولیت
- طالب علم کے کام کی بنیاد پر ہدایات کی فراہمی

سائنس کی تدریسی حکمت عملیوں پر مفصّل ہدایات کے لیے قومی نصاب برائے جنرل سائنس 2006 کا باب 7، صفحہ 55 تا 64 ملاحظہ کیجیے۔

تعارف

نیو گیٹ اہیڈ سائنس سیریز کے لیے تیار کردہ رہنمائے اساتذہ کمرۂ جماعت میں استاد کی معاونت کے لیے ہدایات فراہم کرتی ہیں۔ اِس رہنمائے اساتذہ میں شامل ہے:

- کمرۂ جماعت میں نیو گیٹ اہیڈ سائنس کی مؤثر تدریس کا طریقہ
- قومی نصاب میں مذکور تدریسی حکمت عملیاں
- سبق کی تدریس کی منصوبہ بندی کے نمونے
- نصابی کتاب میں دی گئی مشقوں کے مجوزہ جوابات
- جانچ (assessments) کے لیے مجوزہ ورک شیٹ
- کام کی مجوزہ اسکیم

نیو گیٹ اہیڈ سائنس کی تدریس کیسے کی جائے

نیو گیٹ اہیڈ سائنس کی مزید تعمیری انداز میں تدریس کے لیے اساتذہ کو مشورہ دیا جاتا ہے کہ طالب علم کو کمرۂ جماعت کا محور بنائیے۔ طلبا کو کمرۂ جماعت میں زیادہ فعال کردار دیا جائے، اُن کی حوصلہ افزائی کی جائے تاکہ وہ اپنے خیالات اور تصورات کو اعتماد کے ساتھ پیش کریں، نیز انھیں مختلف آرا کا احترام کرنا بھی سکھایا جائے۔ یہ تمام مقاصد حاصل کرنے کی غرض سے اساتذہ کے لیے ضروری ہے کہ طلبا کی معاونت کرتے ہوئے انھیں آسانیاں فراہم کیجیے تاکہ وہ زیادہ ذمے داری کے ساتھ اپنا سفرِ آموزش (learning journeys) طے کرسکیں۔ مندرجہ ذیل سطور میں ان تدریسی طریقوں کا خلاصہ کیا گیا ہے جن سے کام لیتے ہوئے کمرۂ جماعت کو زیادہ سے زیادہ طالب علم محور بنانے کے لیے نیو گیٹ اہیڈ سائنس کے تمام ابواب پڑھائے جائیں گے:

- طلبا کو انفرادی اور اجتماعی، یعنی گروپ میں، کام کرنے کا موقع فراہم کیا جائے۔ اساتذہ اور طلبا حقیقی زندگی سے مثالیں زیر بحث لائیں۔
- طلبا کو ایسے کام / ذمے داریاں تفویض کی جائیں جنھیں انجام دیتے ہوئے وہ آپس میں، اور استاد کے ساتھ تبادلۂ خیال کرسکیں۔ طلبا کی حوصلہ افزائی کی جائے کہ وہ اپنی رائے یا خیالات کے پس پردہ وجوہ بیان کریں۔
- استاد کے لیے ضروری ہے کہ وہ کمرۂ جماعت میں خود کو عزت و احترام، شرکت اور فعال آموزش (active learning) کے آئیڈیل کے طور پر پیش کریں۔ گروپ کے مباحثوں کے دوران مل جل کر کام کرنے کے لیے طلبا کی حوصلہ افزائی کی جائے۔
- استاد کو طلبا کی معاونت اس وقت کرنی چاہیے جب انھیں رہنمائی کی ضرورت ہو؛ پڑھتے، لکھتے اور مخصوص ابواب میں اسباق پر بحث کرتے ہوئے بیشتر وقت طلبا اپنے طور پر کام کریں گے۔