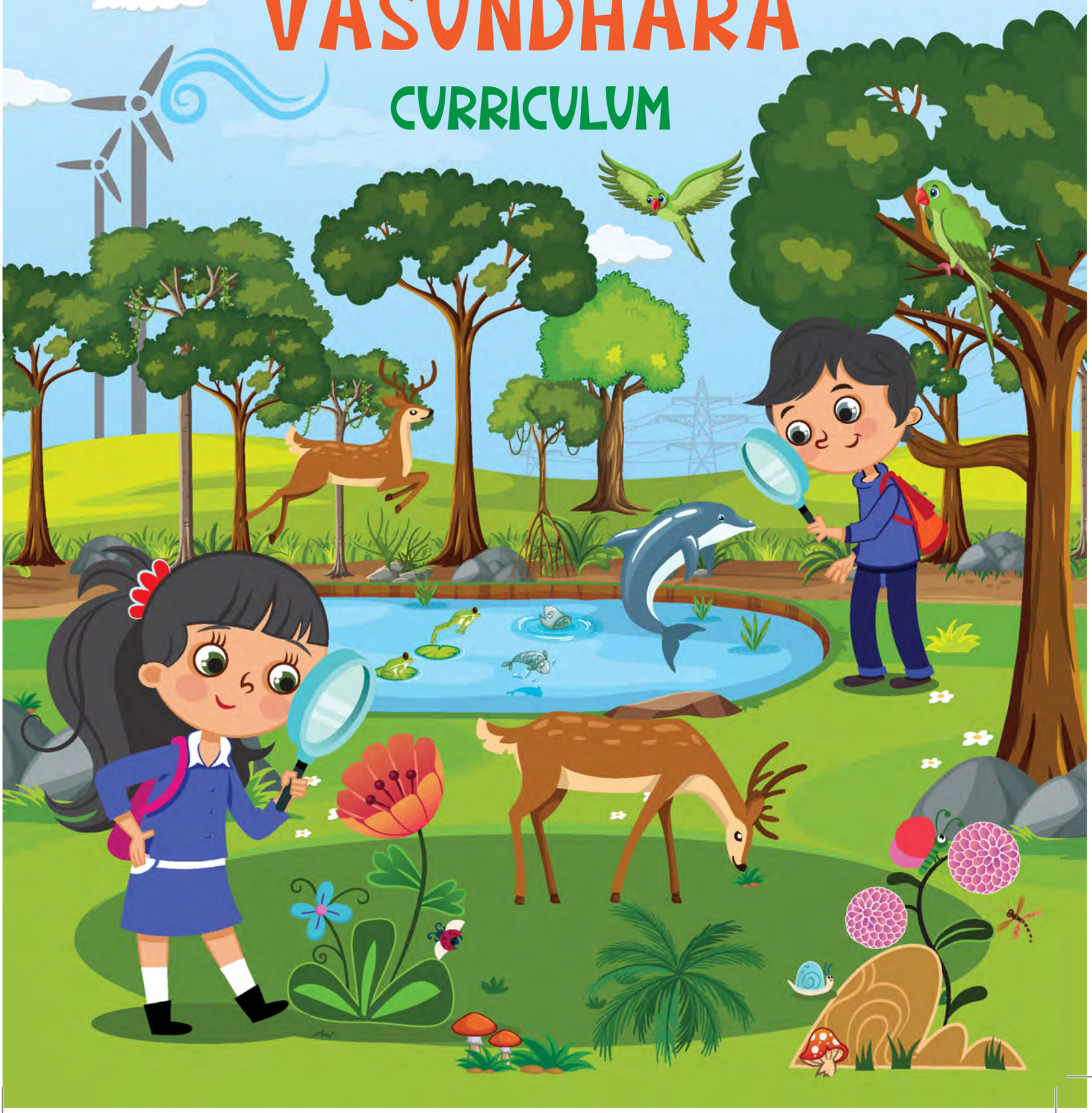
Book 1

Standard 1-4

MAJHI VASUNDHARA

CURRICULUM



सत्यमेव जयते

Government of Maharshtra

MAJHI VASUNDHARA

CURRICULUM

This environment curriculum is developed with a focus on practical and joyful learning to develop 'green habits' in the students of Grade 1st to Grade 8th

with an inspiration and encouragement from

Honourable Minister, Environment and Tourism, Government of Maharashtra

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unicef for every child

ALL INDIA INSTITUTE OF LOCAL SELF - GOVERNMENT

RCUES Mumbai

CEE Centre for Environment Education

Under the Guidance of

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2. Regional Centre for Urban and Environmental Studies (RCUES) of All India Institute of Local Self Government (AIILSG), Mumbai

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INTRODUCTION

Under the guidance of Hon'ble Minister of Environment and Tourism, Government of Maharashtra, the Department of Environment and Climate Change (DoE-CC) has launched 'Majhi Vasundhara' (My Earth) based on the theme of five elements of nature- Bhumi (Earth), Jala (Water), Vayu (Air), Agni (Energy), Akash (Enhancement), aims to support the state in the implementation of climate change mitigation and adaptation measures. To achieve this, Majhi Vasundhara (MV) targets to engage stakeholders from different sectors and age groups through six initiatives. 'Majhi Vasundhara- Curriculum' is one of the six initiatives under 'Majhi Vasundhara' that aims to inculcate green values in future generations of Maharashtra by developing environment curriculum for school going children.

The existing state curriculum focuses on the basic sciences and its applications whilst the 'MV Curriculum' particularly sheds light on environment education for standards 1st to 8th. Environmental issues and climate change are application-based subjects that require mindfulness from young age. These miscellaneous issues are global to local that necessitate comprehensive understanding of the topic along with traditional and local knowledge. As a result, MV Curriculum is taking roots with manifold projects and activities to develop environmental system understanding among the children. Active learning pedagogy through this curriculum booklet will help in imbibing the subject knowledge as life skills rather than mere information. The four themes of this Curriculum are:

a. **Biodiversity Conservation**

b. **Solid Waste Management and Personal & Community Health**

c. **Water Resource Management**

d. **Energy, Air Pollution and Climate Change**

The process of development of this activity-based learning curriculum was initiated on 3rd December 2020 in the august presence of Hon'ble Minister of Environment and Tourism, Government of Maharashtra, the partner organisations including United Nations Children's Fund (UNICEF) Maharashtra, Regional Centre for Urban and Environmental Studies (RCUES) of All India Institute of Local Self Government (AIILSG), Mumbai and the domain experts. Core Group- to conceptualise and structure the MV Curriculum and Working Group – to draft the lesson plans were formed, represented by the DoE-CC, GoM, its partner organisations and the domain experts.

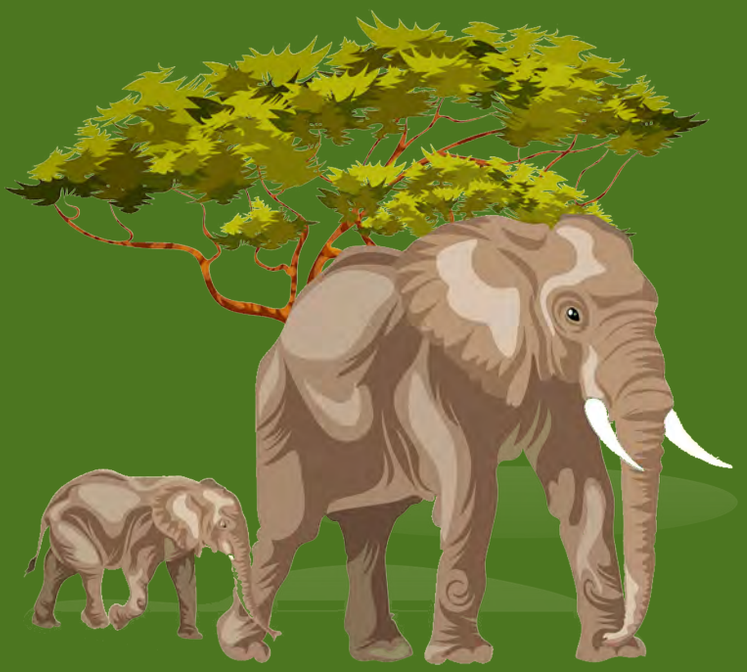
This curriculum has been developed in the form of activity-based lesson plans. The process of development of 'MV Curriculum' involved the stages of – assessment of existing curriculum, development of framework for the lesson plans and development of the lesson plans, complimenting the existing curriculum. The focus of the lesson plans has been on learning pedagogy and enhancing cognitive skills of the students.

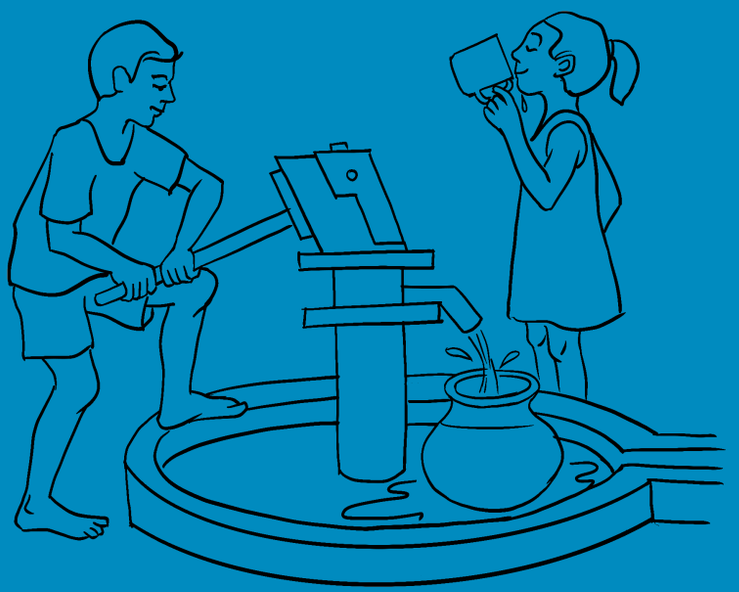
Every lesson plan has been structured to incorporate Activity or Project Plan with a focus on- concept, key questions to address, curriculum links, activity timing and duration, material and preparation needed, approach, method and the learning outcome/ green habit to be inculcated. It also includes frequently asked questions (FAQs), references and additional resources that can be used as guide notes by the teachers as well as children, while implementing the activities.

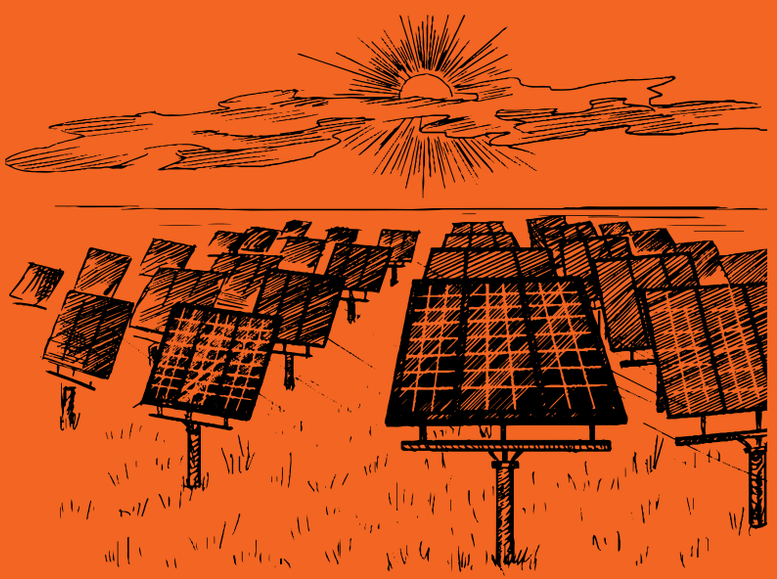
The 'MV Curriculum' is developed to enhance existing school curriculum and is being handed over to the School Education and Sports Department, Government of Maharashtra for appropriate adoption.

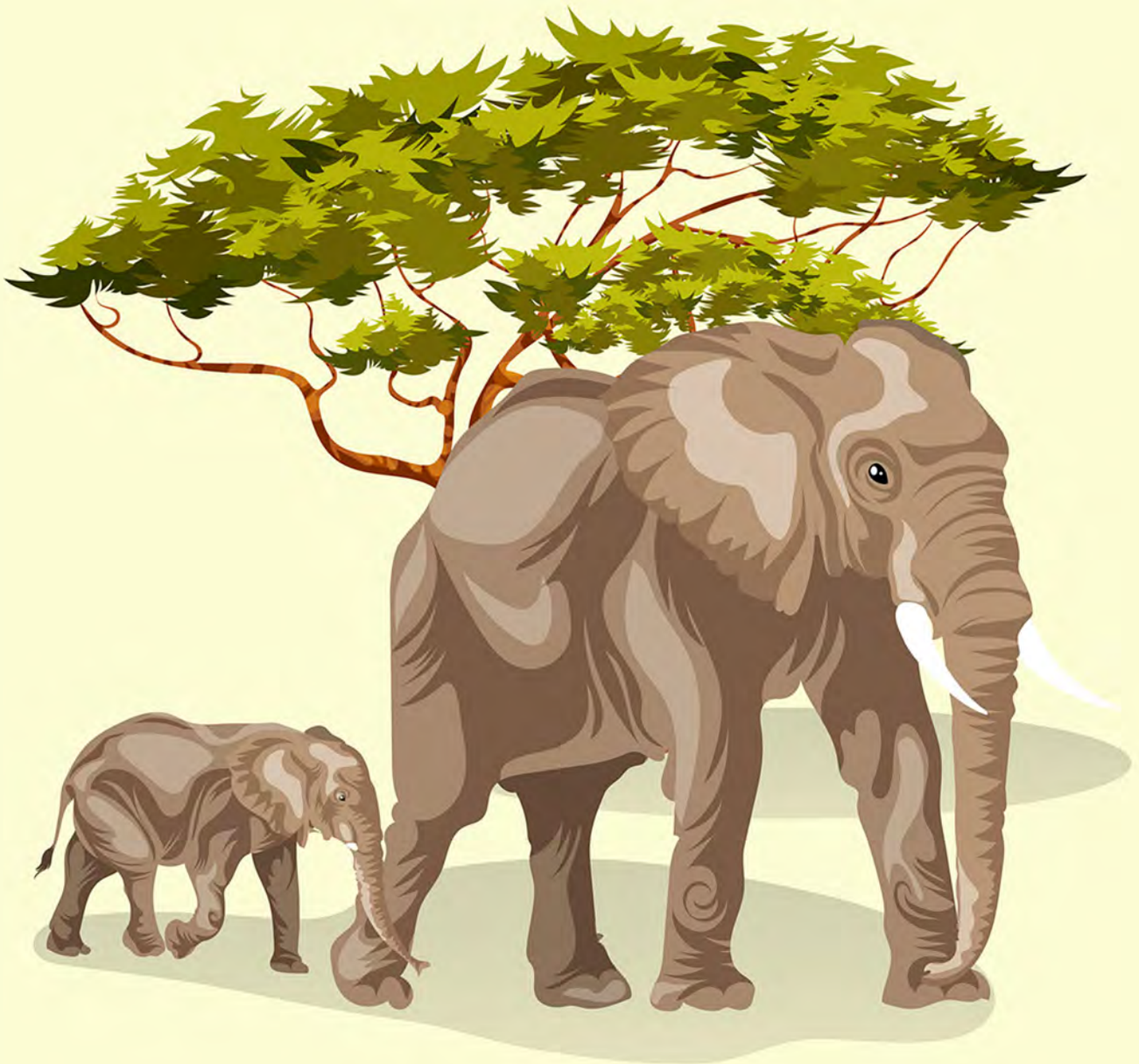
This book (MV Curriculum- Part I) presents the lesson plans for the Grades 1st to 4th. While Part-II of the book presents the lesson plans for the Grades 5th to 8th.

CONTENTS









SECTION 1:

Biodiversity

1.1. INTRODUCTION

1.1.1. OVERVIEW

We are a part of biodiversity, the variety of life. We depend on the benefits from nature, for our basic needs of food and clothing, for a large proportion of livelihoods and the economy, and for our spiritual and cultural well-being.

The biosphere and its myriad constituent life forms have a functional role of cycling nutrients, chemicals, materials, waste and energy through the Earth system. The biosphere removes pollutants from the water and air, regulates the climate, and nourishes soils.

Biodiversity helps to adapt to the changing planetary conditions.

Unfortunately, biodiversity degradation and loss interfere with these functions. Helping students learn about biodiversity and the need for its conservation is among the most needed actions today.

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

1.1.2. RATIONALE AND EXPECTED LEARNING OUTCOMES

It is expected that school students would understand what is biodiversity and how biodiversity sustains our life; further, what is causing the destruction and degradation of biodiversity. Importantly, it is expected that teachers and students know what is being done, and what more needs to be done to conserve biodiversity.

The expected learning outcomes for Standards 1 to 4 are:

- Develop skills to observe and appreciate nature
- Become aware of living things around us
- Develop the skills to express oneself and describe elements in nature
- Understand the variety of plants and animals around us, including their shapes, sizes, colours, parts, calls, habitats etc.
- Understand our relationships and co-existence with wildlife
- Understand the interconnectedness between living and non-living things in ecosystems and with humans.

TOPICS

Students often have a ready interest in activities related to animals, birds, small experiments and explorations in patches of wilderness around the school and neighbourhood. The content, exercises, examples, related to the theme 'Biodiversity' are plentiful and very creatively included in the textbooks of almost all the subjects from standards 1 to 8.

Strengths -

- There is a considerable volume of content on biodiversity in Bal Bharati textbooks for standards 1 to 8, across almost all subjects.
- In the lower classes, the treatment is of introducing a variety of living things and interrelationships of humans with other species. The species introduced include those that the students are likely to see around them, as well as species from other regions. The portrayal is both scientific as well as creative and whimsical.
- Habitats and ecosystems are also introduced from an early age, and are addressed in more detail in the higher classes.
- A range of benefits that humans derive are introduced, including, food, fibre, raw materials, cultural and recreation values etc
- An idea about the richness of biodiversity in the oceans as compared to land based biodiversity is provided.
- A number and range of activities is included in the textbook itself.

Opportunities for co-curricular programmes -

- Real life explorations in and around the school, which would complement the numerous images and descriptions in the textbooks
- Integrative activities that help build an understanding of ecosystems, ecological interrelationships, and social-ecological systems
- Content and activities on threats to biodiversity
- The need for biodiversity conservation and practical projects

Keeping in view the strengths of the textbook content and opportunities for co-curricular learning about Biodiversity, certain key topics are selected for the preparation of activities and projects. The selection has been done given the importance of the theme, and the possibility of complementing the existing rich curricular content.

The critical topics suggested to be covered through co-curricular activities, complementary to the core syllabus and textbook contents are:

1. Behaviour, characteristics, interdependence, interrelationships
2. Benefits - aesthetic benefits; cultural, spiritual; provisioning (food, fibre, medicines, timber); supporting role (nutrient cycling); economic value, livelihoods
3. Conservation by communities; government and laws
4. Diversity – Agrobiodiversity; ecosystems, species, varietal
5. Habitats and ecoregions
6. Seasons - weather, natural cycles
7. Threats to biodiversity - climate change, destruction, land conversion, fire, poaching, pollution
8. Other

This list is suggested based on two perspectives:

- Most important topics in the domain of biodiversity that the author consider that students must be exposed to, considering the status of this area of sustainable development, as well as considering the age-appropriateness of these topics.
- The need to complement the existing curriculum in relation to the theme, identified through a review of the textbooks for standards 1 to 8

1.1.3. ACTIVITY FRAMEWORK

Curriculum-mapped Activity and Project Plan for Biodiversity

SN	Topics and subtopics	Presence in textbooks	Concepts	Activities / Projects
1	Introduction to Biodiversity	Standard 1 Marathi, Math, English Standard 2 Maths, English Standard 3 EVS, Marathi Standard 6 Hindi, Play do and learn Standard 7 General Science Standard 8 Science (Ecosystems)	Understand and observe various types of leaves and tree bark, understand the purpose served by modifications in leaves	Std 1 • Leaf / Bark Autographs Std 3 • Leaf Forms Std 4 • Tree Scrap Book
2	Living things around us	Standard 1 Marathi, Math, English Standard 2 Maths, English Standard 5 Marathi Standard 6 Science	Awareness of living things around us, their colours, and parts, calls, habits and habitats	Std 2 • "Go and touch ..." • Tree of Life Std 3 • Birds Around Us • Know Insects Around Us
3	Co-existence with wildlife	Standard 2, 3 and 4 - English, Marathi, Math	Conserve and co-exist with wildlife	Std 3 • Animals in our lives
4	Appreciation of Biodiversity	Standard 2 - English Standard 6 Geography Standard 6 Science	To observe and appreciate nature and express oneself	Std 4 • Poet in every child
5	Interconnection & Interdependence	Standard 3 - Marathi, English, EVS Standard 4, 6 - English Standard 8 - Science	Interconnectedness between living and non-living things in an ecosystem and humans	Std 4 • Web of Life • Jobs in the biotic community
6	Studying biodiversity	Standard 6 Science	Morphology of plants and animals Quadrats and transects to study biodiversity	Std 1 • Tree autographs Std 3 • Leaf Forms
7	Natural Heritage	Standard 6 Marathi, cover page has a picture of the State Tree	Appreciate natural heritage at various levels and encouraging its protection	Std 3 • Natural Heritage

1.2. ACTIVITIES/PROJECTS

1 LEAF/BARK AUTOGRAPHS

Level/ Class: 1

Curriculum links: Science

Activity duration: 30 minutes inside class and about 60 mins outdoors for students.

Activity timing: Ideally at the beginning of rainy season.

Materials needed:

For students: Digging tools to be used by elders in the family.

For teacher: Saplings to be gifted to students for planting, which ideally be raised in school nursery by std.7/8th students as part of project, School Nursery and Plantation (included in part 2 of the MVA Activity booklet).

Approach: Field Visit/at home premise such as kitchen garden or road side.

TOPIC:
Biodiversity

CONCEPT:
Careful observation of the natural world reveals patterns of growth—how plants grow and respond to their natural environment. Students' awareness of plants begins with a variety of informal encounters in their environment; however, deeper understanding grows best from experience. Have students look at pictures of trees and discuss the parts of the trees: buds, seeds, leaves, branches, trunks, roots, and root hairs. Ask students to use describing words for the properties of trees. Some of the properties may include colour, size, shape, texture, and scent.

AIMS:
To identify different types of leaves and tree bark and take their impressions.

KEY QUESTIONS TO ADDRESS:
- What are the shapes of different types of leaves?
- What is the texture of tree bark in different trees around us? Is tree bark the same in all species or is it different?

PREPARATION:
- Identify a suitable place to conduct the activity. The place should have several trees of different species.

Texture on tree bark

METHOD/GUIDE:

1. Take the students to the selected place and let them observe different types of leaves.

2. Ask students to collect different fallen leaves and take their prints/autographs in the following way:

   - Place the leaf on a notebook, with the lower surface (veins seen prominently), facing upwards.
   - Place a sheet of paper firmly on the leaf and rub over the leaf with a crayon. The impression or the 'autograph` of the leaf will appear on the paper.
   - Prepare such prints of different leaves.
   - The teacher may ask the students to collect different fallen leaves and stitch these onto the paper.

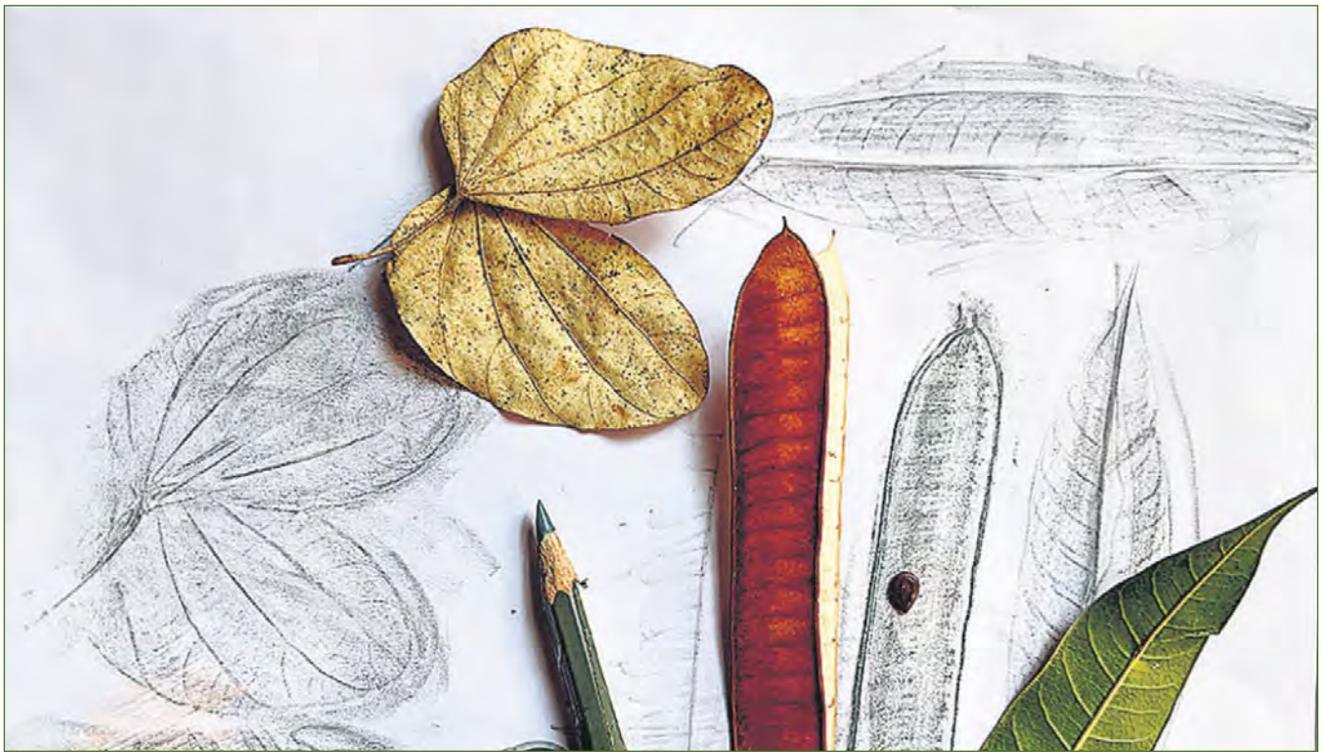
3. The teacher can tell them of another way of getting leaf impressions as follows:

   - Place the collected leaves on the paper.
   - Keep the water colour ready. Dip the tooth-brush in the colour and pass your thumb or a pencil over its bristles.
   - This way the colour will be sprayed on the paper, and the leaf outline can be clearly seen.

Types of tree leaves

LEARNING OUTCOMES:

Awareness on plants.



2 PLANT A FRIEND TO GROW WITH!

Level/ Class: 1

Curriculum links: Science

Activity duration: 30 minutes inside class and about 60 mins outdoors for students.

Activity timing: Ideally at the beginning of rainy season.

Materials needed:

For students: Digging tools to be used by elders in the family.

For teacher: Saplings to be gifted to students for planting, which can ideally be raised in school nursery by std.7/8th students as part of project, School Nursery and Plantation (included in part 2 of the MVA Activity booklet).

Approach: Field Visit/at home premise such as kitchen garden or road side.

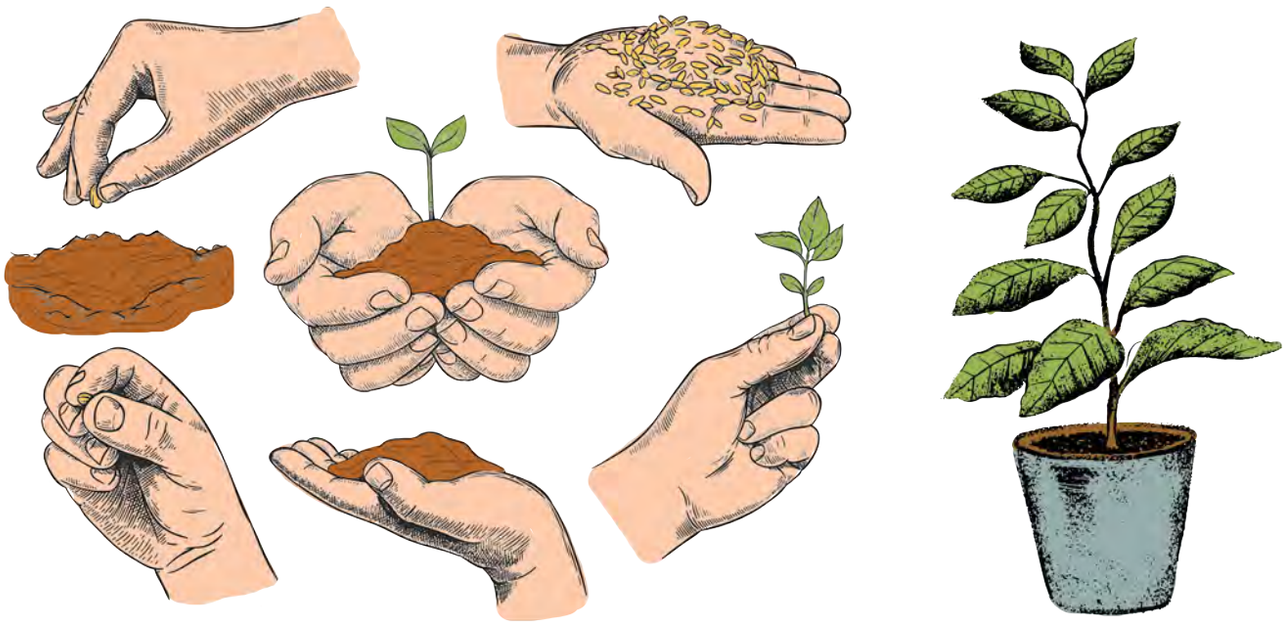
TOPIC:
Biodiversity

CONCEPT:
Action based learning and observations offer effective learning opportunities. It also provides an opportunity to develop compassion towards other life forms, which is a key to developing a sense of caring, protecting and to develop an emotional connection with nature.

AIMS:
To inculcate a sense of active caring and emotional connection for non-human life forms at a young stage.

KEY QUESTIONS TO ADDRESS:
- How plants look at sapling stage?
- What care needs to be taken for and after planting a tree?
- How to develop compassion for life forms?

PREPARATION:
- Make a calendar of students' birthdays to plan availability of sapling.
- Talk to the students and help them identify a suitable place to plant a tree, which will be accessible for the planter student to observe, water and care regularly in all the seasons. Ideally it should be near a student's home, but if protection, watering and importantly vacation time care is guaranteed, school premise/ any community space also can be considered as a possibility.
- Making available tree saplings of students' choice for gifting well in advance.
- Pit and soil preparation for planting.



METHOD/GUIDE:

1. Tell students any local stories from your own life or community, about life long association among humans and non-humans such as trees, buffaloes, bulls, dogs etc.

2. Tell students about the idea of planting a friend companion/brother/sister tree to grow with.

3. Take the students outdoors and make them feel rocks and soil and plants.

4. Ask students to choose their favourite tree. (from among a group of trees you will be able to make available)

5. Ask students to discuss the plan to plant that tree on their birthdays with their family and identify the right place and prepare in advance.

6. Orient the students on the care they need to take – watering, protection from grazers, wind protection and how they can come up with local, low-cost solutions such as using mulching, shed, vegetative tree guards etc.

7. Gift the plant either on birth day or before and ask the student to take a photo on his birthday with family, friends and planted companion to grow with. Ask students to take care of the plant through out year like their family member and take a photo every year on their birthdays which they can keep developing a collage on 'Growing with the Tree member of the Family'.

LEARNING OUTCOMES:

Active care and compassion for plants.

GREEN HABIT:

Awareness on plants.

Plant Sapling

3 " GO AND TOUCH...."

Level/ Class: 2

Curriculum links: Science

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed: None

Approach: Outdoor activity with whole class

TOPIC:
Biodiversity

CONCEPT:
Sensory Play is an important way to teach children about senses in early childhood development. Touch is one of the most used. It allows them to explore in a creative, imaginative, and adventurous way. Children immerse themselves in the environment and thus encourages children to listen to different sounds, to brainstorm what they can smell, to look around and write down what they see and finally – to think about what they can feel and what it feels like?

AIMS:
Make students aware of living things around us, their colours, and parts.

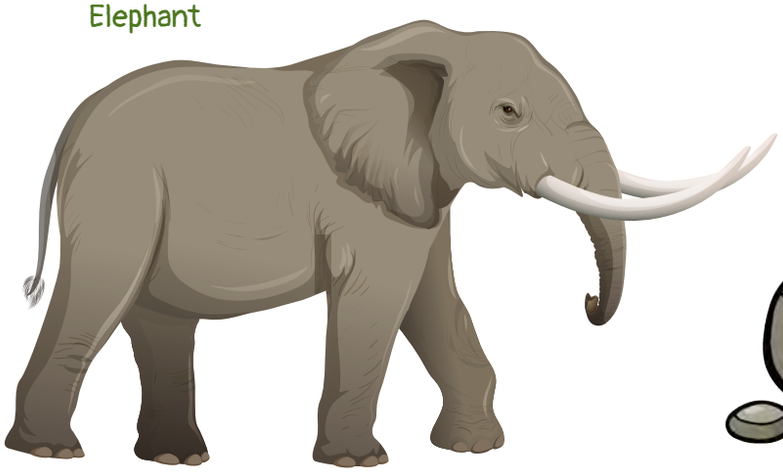
KEY QUESTIONS TO ADDRESS:
What are the different types of textures, colours, shapes and sounds around us?

PREPARATION:
Make sure the selected place is safe for playing the game.

Plant

Soil

Elephant



Flower

Rock

METHOD/GUIDE:

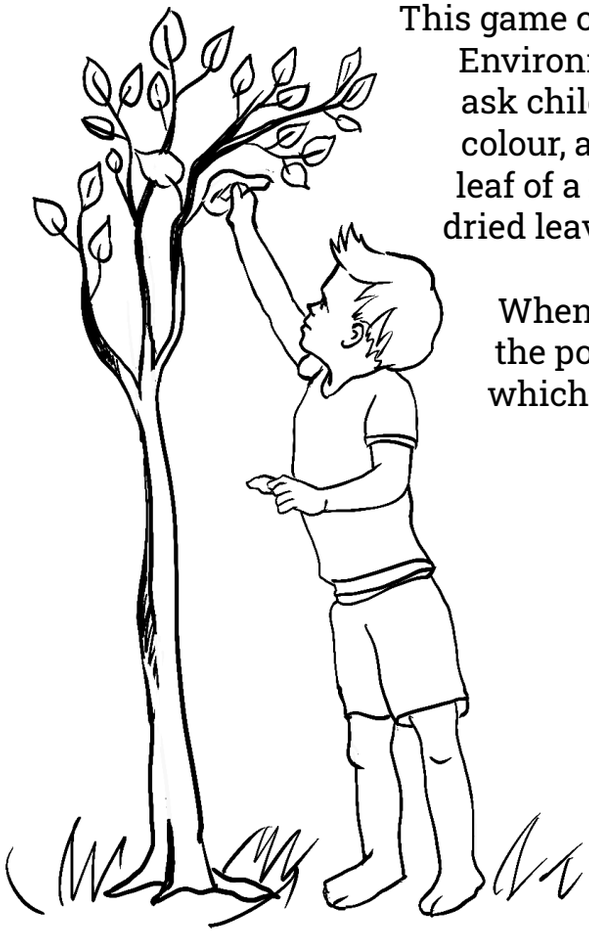
Tree

1. Form two or three teams of the students.

2. Ask each team to sit in a straight line. Each team should have a captain, who will maintain order in his team. The captain will also keep one member of his team ready to answer the call of the instructor.

3. You can explain to them that the game is to listen carefully to the instructor and when the instructor calls "GO AND TOUCH....'., one member from each team kept ready by the captain rushes out to touch the named object, and after touching, returns to his seat. Whichever member reaches his/her place first gets one point. The others do not get any point.

4. Members who have already gone and touched an article are asked to sit at the end of their line so that everyone in the team gets a chance to participate.



This game can be like any other game except to make it an Environment Education activity — the instructor should ask children to "GO AND TOUCH..." A living thing green in colour, a living thing red in colour, the bark of a tree, the leaf of a mango (or any other) tree, grass, water, stones, dried leaves, seeds, a newer, a plant, an animal, a fruit, food.

When every team member has participated, then the points won by each team should be totalled and whichever team has the highest score wins the game.

LEARNING OUTCOMES:

Students become more aware about their surroundings and develop keen observation skills.

GREEN HABIT:

Observing the natural world and diversity around us.

Std. 2

4 TREE OF LIFE

Level/ Class: 2

Curriculum links: Science, Maths

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed: Stationary

Approach: Classroom, Field Visit

TOPIC:

Biodiversity

CONCEPT:

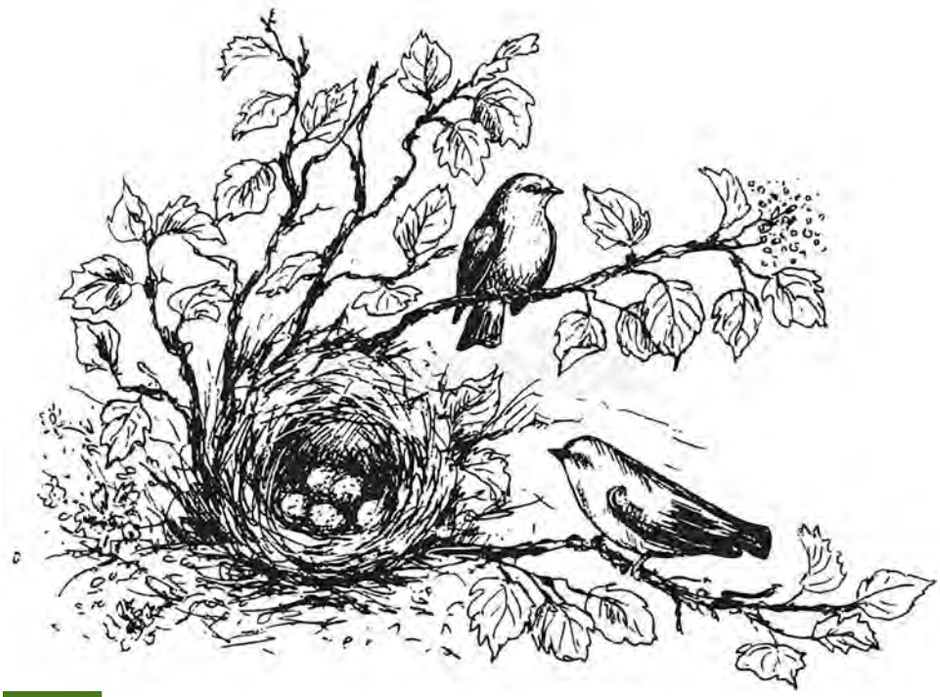
Trees are important for our survival as well as the ecosystem. Without trees, life would not have been possible. It is important to demonstrate the importance of trees and forests. This helps students recognize reasons why trees and forests are valued. Students will become aware that forests serve as habitat for a variety of living things and are important to human needs for recreation, for raw materials and for a life-supporting environment.

AIMS:

- To make students aware that trees harbor a rich and complex variety of life.
- Enhance observational skills.

KEY QUESTIONS TO ADDRESS:

- What are the types of creatures that can be found on trees?
- What do insects and birds do on trees?



PREPARATION:

Identification of the place where the activity will be conducted. Selected place should have plenty of trees with diversity.

METHOD/GUIDE:

1. Ask each student to select a tree for himself and observe it carefully.
2. The students should draw an outline of the shape of the tree to mark what they see on it.
3. What are the different parts of the tree?
4. What are the colours of the different parts of the tree?
5. What are the types of creatures that can be found on trees?
6. What do insects, spiders, birds and bats do on trees?

Importance of tree in life

LEARNING OUTCOMES:

Trees are an important part of the ecosystem as many animals solely depend on trees for food and shelter. Trees also provide us with resources, some of which are very important for our survival.

GREEN HABIT:

Observing the natural world, diversity and appreciating interdependence.

FAQS

Q- What are some of the creatures to be found on trees?

A- Ants, termites, beetles, butterflies, moths, and many other types of insects, spiders, lizards, squirrels, birds, bats are some common animals. Depending on the humidity of the region, trees may also harbour different types of plants like mosses, lichen as well as fungi, orchids.

5 LEAF FORMS

Level/ Class: 3

Curriculum links: Science

Activity duration: 30 minutes

Activity timing: Any time after rainy season

Materials needed: Leaves from different plants, old newspapers, hard paper, gum, pencil. – Teacher, Students

Approach: Field Visit

TOPIC:

Biodiversity

CONCEPT:

Plants grow in a variety of habitats. Among the different parts of a plant, the leaf is the most essential. Primarily, leaves have two functions: photosynthesis and transpiration. In some plants, it takes up the responsibility of reproduction also. Students learn to differentiate between types of leaves and understand the purpose served by the various modifications in leaves.

AIMS:

To observe plants and leaves and know more about their shapes and forms.

KEY QUESTIONS TO ADDRESS:

- What is photosynthesis and transpiration?
- What are the different functions of leaves?

PREPARATION:

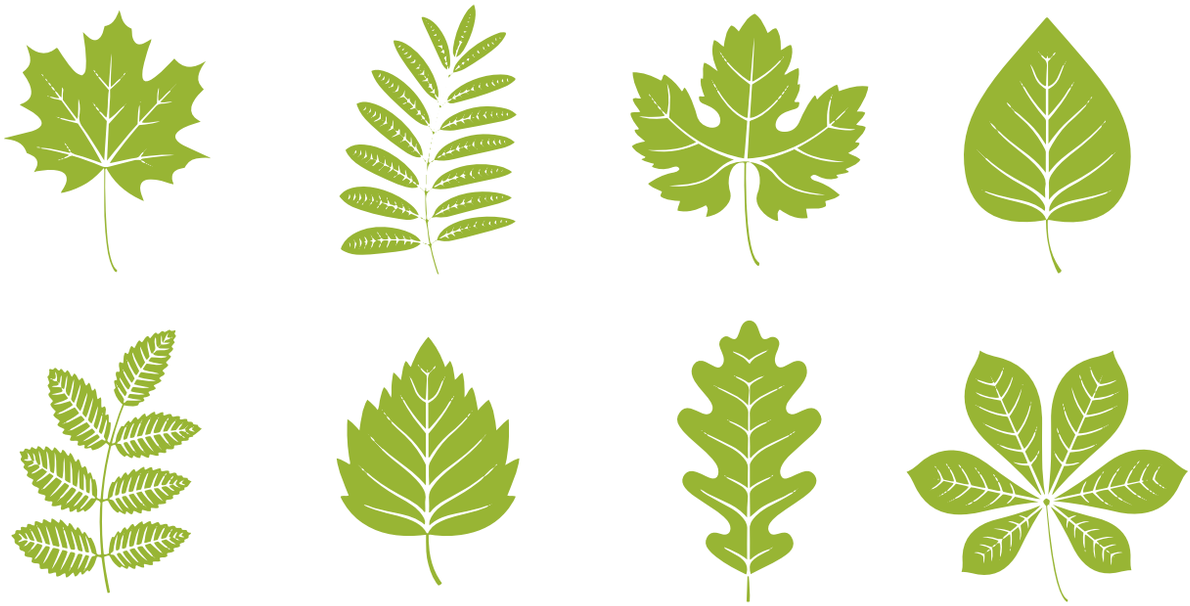
- Identification of the place where the activity will be conducted.
- Selected place should have plenty of trees with diversity.

METHOD/GUIDE:

There are different types of leaves may be rounded, oval, spear shaped, heart shaped, or triangular in shape. Some leaves look almost like fingers on a hand. Others are shaped like needles. Some leaves have smooth edges. Other leaves have tiny points, called teeth. Leaves may also have waxy or hairy coverings for protection.

- Ask students to collect leaves from their surroundings. They should take care to pick up dried leaves fallen on the ground. If a leaf has to be plucked then only one or two leaves may be taken for the whole class. Each student should not pluck fresh leaves from the plants.

- Let them group these leaves by the shape of the edges - Spiky edges: Wavy edges; Smooth edges, etc.



Types of leaves

LEARNING OUTCOMES:

Students learn about the diversity in plant life.

FAQS

Q- What are some of the typical shapes of leaves?

A- Some examples of leaves with different shapes and smooth and spiky edges leaf.

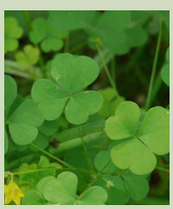
E.g. mango, amla, peepal, apta. Ambushi (Indian sorrel), castor, water lily.

Mango

Amla

Peepal

Apta



Ambushi

Castor

5 ANIMALS IN OUR LIVES

Level/ Class: 3

Curriculum links: Science

Activity duration: 20 minutes

Activity timing: Anytime

Materials needed

For teacher - A large display board.

For students - pencil, scissors, painting material.

Approach: Indoor activity with whole class.

TOPIC:

Biodiversity

CONCEPT:

Animals come in many shapes and sizes, inhabit different places, and live in different ways. Biodiversity is the term that describes the many different species sharing one habitat. Understanding what makes a species special and where and how it lives are important if people are to learn to conserve and co-exist with wildlife. Students need to learn the use and importance of animals in our life. Awareness of different products of daily use and knowing which product is acquired directly and which indirectly from animals is also important to create empathy towards the natural world.

AIMS:

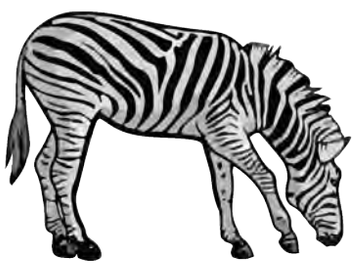
To make students aware of how animals contribute to our lives.

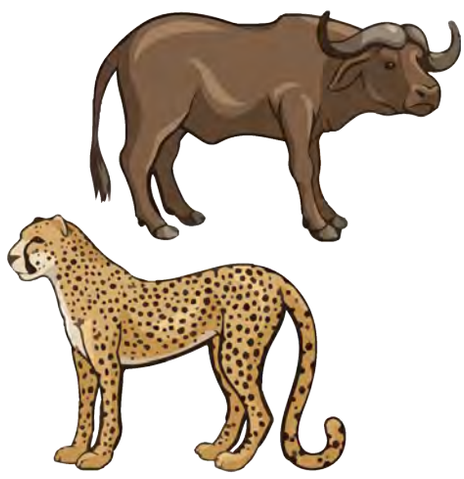
KEY QUESTIONS TO ADDRESS:

- How do we coexist with wildlife?
- In what ways are animals helpful for people?
- In what ways can people be helpful for animals?

PREPARATION:

Gather the materials needed: **For teacher** - A large display board; **For students** - pencil, scissors, painting material.





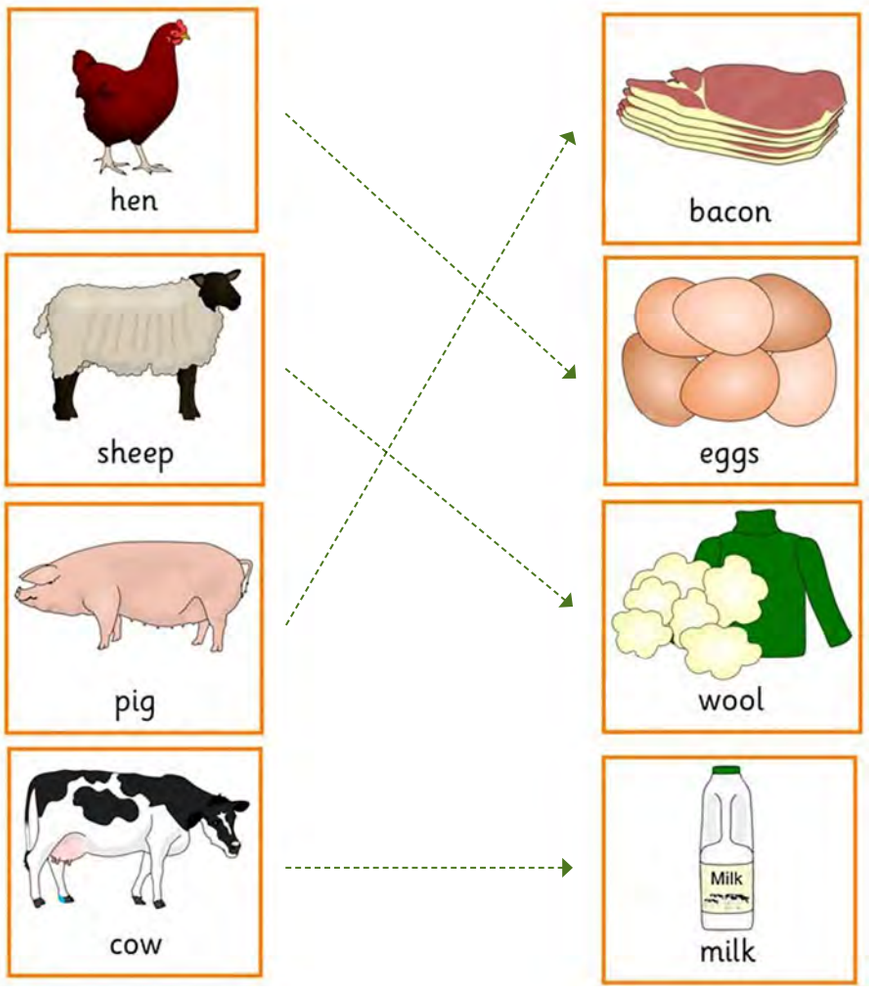
METHOD/GUIDE:

1. Ask students to make a list of the commodities and services which we get from animals. Divide the class into two groups.

2. Ask one group to draw pictures of the animals which are directly used by humans and the other group to illustrate the products and services they provide.

3. This should be placed on the display board and pictures of the animals should be matched with their products and services. For instance, the picture of a buffalo or a cow should be matched with the picture of milk and its derivatives, or sheep with wool and woollen clothing.

Having done this, students should be asked to go out and observe various domestic animals and make notes on what they eat, how they have to be looked after, etc. Concepts of proper management and care of these animals should be discussed and excursions to farms and dairies should be organised. Care should be taken to not to omit animals which are used as beasts of burden. A separate list should be prepared of various animals kept as pets.



LEARNING OUTCOMES:

The importance of animals in our life.

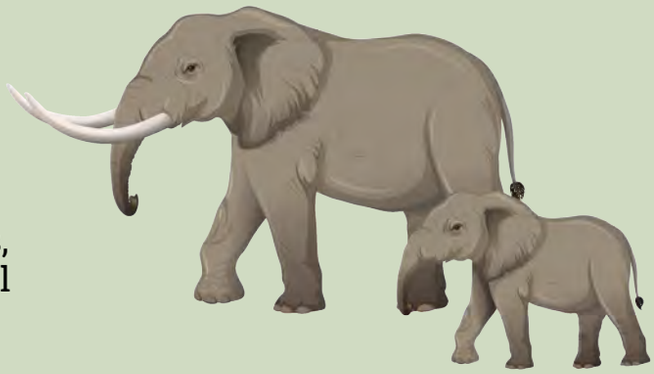
GREEN HABIT:

Caring for domestic animals which help us in different ways.

FAQS

Q- How do we coexist with wildlife?

A- Numerous small animals that are not domesticated, live in and around human homes and neighbourhoods, including birds, snakes and lizards, rodents, civets, monkeys etc. We should be careful about garbage so that items like sharp materials, plastic bags, and poisonous chemicals do not harm such creatures. Avoiding unnecessary lights, loud sounds and music, crackers in festivals like Diwali are some basic ways to not to disturb other species with whom we share our environment.



Std. 3

7 BIRDS AROUND US

Level/ Class: 3

Curriculum links: Science

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed

Bird Guide - Teacher

Notebook, Pen- Students

Approach: Field visit with whole class

Red Vented Bulbul

Black Drongo

TOPIC:

Biodiversity

CONCEPT:

Birds are beautiful, amazing creatures. They stop and feed in our backyards and fill the trees with song. With over 12,000 species of birds around the world, there's a wide variety of things to discover while studying them. Students need to be aware about birds around them. This also enhances their observation skills and helps students to identify different birds on the basis of their voice, colour and other features.

AIMS:

- To increase students' skills of observation.
- To enable them to learn the behavioural and feeding patterns of birds.

KEY QUESTIONS TO ADDRESS:

- How to observe birds?
- Which are the calls, colours, shapes and sizes of different birds?
- In what type of bird habitat is our human neighbourhood located?

PREPARATION:

Identification of a place where the activity will be conducted, where birds are likely to be seen. (e.g. near a flowering or fruiting tree, or close to a water body)

METHOD/GUIDE:

1. Take the students to a park or any secluded area where it is quiet, where trees and water are present.
2. Divide the class into groups of four or five and let them settle down at different places.

3. They should close their eyes and sit quietly for five minutes and concentrate on various bird sounds they may hear.

4. They should then attempt to trace each call to the bird making it and with the help of a bird guide, the bird should be identified.

Having located the birds and identified them, each group should then carefully observe the habits of one particular type of bird which should be assigned to the group by the teacher.

LEARNING OUTCOMES:

Identify different birds.

GREEN HABIT:

Appreciate importance of trees and green spaces.

FAQS

Q- What are some common birds in Maharashtra?

A- Some common birds are

Around houses

1. Common Myna
2. Indian Robin
3. Brahminy Sterling
4. Asian Koel
5. Red Vented Bulbul
6. Purple-rumped Sunbird

Common Myna

Garden with many trees

1. Common Iora
2. Rose ringed Parakeet
3. White-spotted Fantail
4. Oriental Magpie Robin
5. Coppersmith Barbet
6. Scaly-breasted Munia
7. Oriental White-eye

Oriental Magpie Robin

In farms and fields

1. Red-wattled Lapwing
2. Black Drongo
3. Green Bee-eater
4. Ashy Prinia
5. Tailor Bird
6. Plain Prinia
7. Indian Golden Oriole
8. Grey Tit
9. Indian Grey Hornbill
10. Pale-billed Flowerpecker (Also found in garden, around house)
11. Coppersmith Barbet
12. Silver billed Munia
13. Tri coloured Munia
14. Red Munia
15. Lark

Near water

1. White-throated Kingfisher
2. Common Kingfisher
3. Pond Heron
4. Small Pranticole

Common Kingfisher

Grey Tit

Birds of prey

6. Shikra
7. Black Kite
8. Black-winged Kite
9. Spotted Owlet

Shikra

You may like to join the Facebook group
Birds of Maharashtra महाराष्ट्रातील पक्षी

8 KNOW INSECTS AROUND US

Level/ Class: 3

Curriculum links: Science

Activity duration: 30 to 60 minutes

Activity timing: Anytime but best towards end of monsoon when there is water, greenery and crops everywhere.

Materials needed: None

Approach: Outdoor activity with whole class.

TOPIC:
Biodiversity

CONCEPT:
Insects can be found in every environment on Earth. The majority of insects are found in the warm and moist tropics. Insects have adapted to a broad range of habitats, successfully finding their own niche, because they will eat almost any substance that has nutritional value.

Insects are crucial components of many ecosystems, where they perform many important functions. They aerate the soil, pollinate blossoms, and control insect and plant pests.

Many insects, especially beetles, are scavengers, feeding on dead animals and fallen trees, thereby recycling nutrients back into the soil. As decomposers, insects help create the topsoil, which is the nutrient-rich layer of soil that helps plants grow. Burrowing bugs, such as ants and beetles, dig tunnels that provide channels for water, benefiting plants.

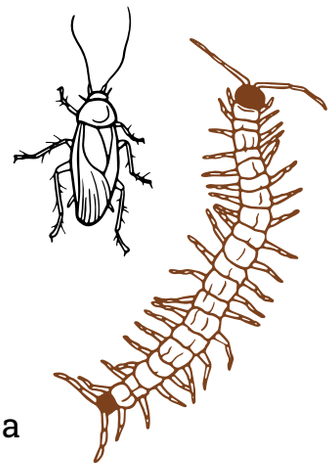
Bees, wasps, butterflies, and ants pollinate flowering plants. Finally, all insects fertilize the soil with the nutrients from their droppings.

Students will learn the definition of an insect, various features and likes and dislikes about them.

AIMS:
To get students to discuss insects and their likes and dislikes.

KEY QUESTIONS TO ADDRESS:

- How to identify insects?
- What is the importance of insects in the ecosystem?
- Name some insects around us.



PREPARATION:

Identify an appropriate place where students will be able to safely see insects for observation. Images of different types of insects such as house fly, dragon fly, butterfly, moth, honey bee, wasp, mosquito, dung beetle, lady bird etc.

METHOD/GUIDE:

1. Start by discussing insects with students. The students may be taken out to a garden, nearby wilderness spots such as ponds or a farm and asked to observe and identify some insects.

2. After this introduction, ask each student to think of an insect they observed or have prior experience about. Then ask each student to say why he likes or does not like the insect he has chosen. As an example, one student may say:

   a. "I do not like house flies because they are dirty." or

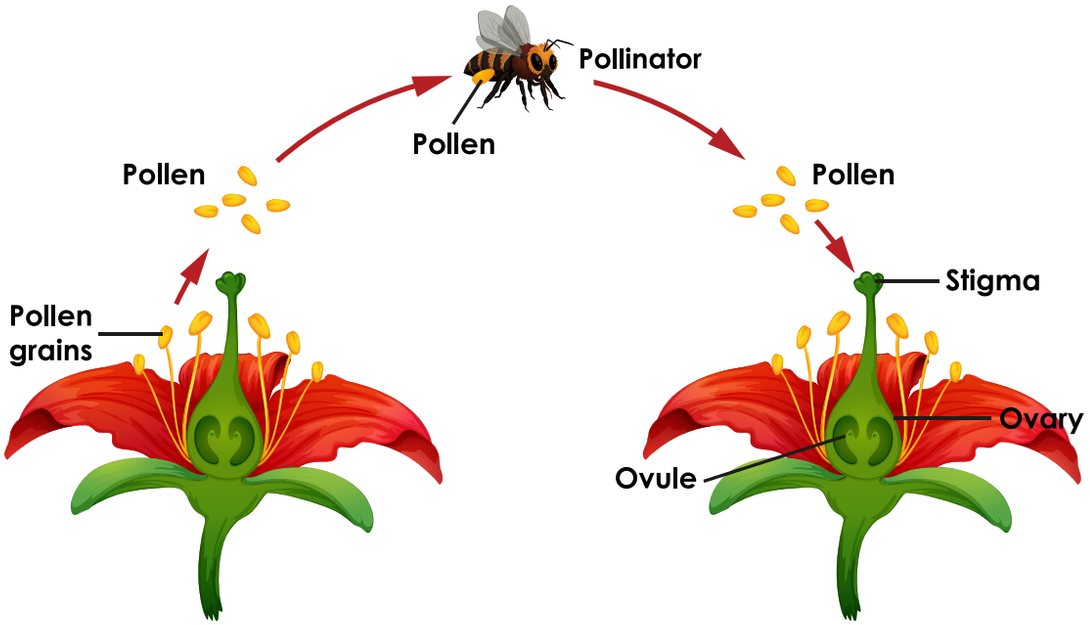
   b. "I do not like house flies because they sit in dirty places"

   c. Another student may say: "I like butterflies because they are pretty."

   d. Or a third: "I like honeybees because they make sweet honey."

3. The teacher now talks about the usefulness of insects and the harm some of them may cause. Some insects help in pollination, like bees, flies, butterflies, etc. Some like the praying mantis and the dragonfly feed on other insects and thus control the insect population. Many insects like butterflies are beautiful to look at. Insects like mosquitoes can cause illness.

4. As an extension of this activity students may be asked to choose their favourite insects and draw pictures and colour them.



Pollination Process

LEARNING OUTCOMES:

Insects around them and try to identify them by observing their different parts, colors, behavior, etc.

GREEN HABIT:

Value and care all life forms as they have their role to play in nature.

FAQS

Q- What will happen if all insects are killed?

A- No life will be possible, perhaps all humans might die! Most of our food can not be produced because there will be no pollination, there will not be any chocolates as well! Many bird species around us will vanish as they need insects as food. Even many humans especially living in forest areas like insects such as grasshoppers, insect larvae as tasty food!

Know More

https://www.nationalgeographic.com/animals/article/insect-bug-medicine-food-macneal

National Geographic - 25 Cool Things About Bugs!
https://www.natgeokids.com/uk/discover/animals/insects/15-facts-about-bugs/

Smithsonian Institution - Fun Facts About Bugs
https://www.si.edu/spotlight/buginfo/bugnos

Std. 3

9 OUR NATURAL HERITAGE

Level/ Class: 3 to 8

Curriculum links: Marathi Bal Bharati cover page has a picture of the state bird of Maharashtra

Activity duration: 45 minutes inside classroom and longer for various group projects and school exhibition

Activity timing: Any time, in case of exhibition preferably avoiding rainy season

Materials needed: Poster papers, pen, pencil, small storage boxes/pouches, any locally available exhibition set up

Approach: Classroom session, further built up with Field Visit and Exhibition

TOPIC:
Biodiversity

CONCEPT:
Heritage sites are generally understood as man made structures such as forts, old houses and temples or archaeological sites. Maharashtra has many such heritage sites such as Salher-Mulher forts in Nashik dist., Manikgad fort in Chandrapur dist., Ambabai temple in Kolhapur, Phule Wada in Pune, Ajanta and Verul Caves in Aurangabad dist., Prakashe archaeological site in Nandurbar dist. But heritage, which is something valuable that is inherited from generation to generation, also includes natural elements such as hills, rock formations, forests, sacred groves, waterbodies, a traditional variety of crop or animal breed and so on. Often this heritage is represented by various symbols such as State Tree, State Animal, State Butterfly and so on. Familiarizing about these state symbols and exploring local natural heritage and awareness of them can strengthen protection and conservation of it.

AIMS:
To appreciate natural heritage at various levels and encouraging its protection.

Shaniwar Wada, Pune

KEY QUESTIONS TO ADDRESS:

- What is natural heritage?
- How can we protect them?

PREPARATION:

- Decide the scope of the activity and accordingly discuss it with all the concerned teachers, head teacher about the plan.
- In case an exhibition is planned, then preparations would be needed for site, display, announcement to parents and local community and any guests to be invited; do invite local news reporters/media persons to cover the exhibition.

METHOD/GUIDE:

Level 1:

- Ask students if they know about State Flower, State Tree, State Animal, State Bird, State Butterfly of Maharashtra?
- Have they seen any of them? Do any of them exist in their neighbourhood?
- Show them posters like one below, and ask students to come up with unique features, significance behind choosing them as state symbols and list them on board.
- Now ask them to nominate such natural symbols to be elected for your school and reasons behind it.

Yellow-Footed Green Pigeon
(State Bird)

Giant Squirrel
(State Animal)

Blue Mormon
(State Butterfly)

Crape Myrtle
(State Flower)

Mango Tree
(State Tree)

- Conduct a poll to choose the School Tree, School Bird, School Butterfly, School Animal, School Pet and any other school mascot that students may come up with!
- This activity can be planned at class level to start with and in all classes to finalize School Symbols.
- This activity can be built up at Village, Taluka, District levels as well in a democratic way.

Indian Lotus
(National Flower)

Level 2:

- Form students' groups to do projects on following ideas in age-appropriate manner and following broad framework for study and presentation inclusive of:
  - » Heritage – location
  - » Key Significance
  - » Popular Stories associated with these heritages
  - » What are the threats and why to protect?
  - » How can we protect it/contribute to its protection?
- Students can make illustrations, paintings, take/use available photos for poster presentation on their project topics.
- Discuss with students about different methods to find information - from books, internet, talking to knowledgeable people.
- Discuss importance and ways of verifying information received from one source by cross checking with other sources or importance of asking logical questions.

Banyan Tree
(National Tree)

Indian Peacock
(National Bird)

Bengal Tiger
(National Animal)

Dolphin
(National aquatic animal)

Indian Elephant
(National Heritage Animal)

- **Project Topics**
  - » Sahyadri (Western Ghats) – A World Natural Heritage Site by UNESCO
  - » Sacred Groves
  - » Ramsar Sites in Maharashtra - Wetlands of Global Importance
  - » Fossil Sites in Maharashtra
  - » Plants, Animals, Trees, Food Recipes, Rocks-minerals which are either only found in Maharashtra or are a part of State's identity
  - » Neighbourhood Natural Heritage
    - Plants, Animals, Trees, Food Resources and Recipes, Rocks-minerals, fish, Varieties, water bodies in our village/neighbourhood. Ask students to collect display samples of some of these aspects such as local varieties of rice or Jowar or beans, rock and soil types, wild food plants and so on.

Level 3:

- Plan, design and organize an exhibition on the theme of 'Our Collective Natural Heritage' with sections on national, state level heritage as well as local heritage. Ensure that students are involved in all the stages of planning and execution and allocated various responsibilities.

- Ask students to prepare posters and display material and present it during the exhibition.

- You can also organize a heritage walk along with this exhibition.

GREEN HABIT:

Think before you decide to hurt any lifeform, all life forms are our natural heritage.

LEARNING OUTCOMES:

- Students learn about the natural heritage, significance and types.
- Students learn about how to communicate and organize exhibition.

FAQS

Q- What are Ramsar Sites in Maharashtra?

A- Lonar Crater and Nandur Madhyameshwar Bird Sanctuary are 2 Ramsar Sites in Maharashtra.

10 TREE SCRAP-BOOK

Level/ Class: 4

Curriculum links: Science, Craft

Activity duration: 30 minutes

Activity timing: Anytime or throughout different seasons

Materials needed

Old notebook (blank paper), pencil – Teacher

Old notebook (blank paper), pencil, colour box if available- Students

Approach: Field visit with whole class

TOPIC:

Biodiversity

CONCEPT:

Being our primary source of life sustaining compounds and materials, trees are pivotal to our existence on Earth. Students explore the trees around them, become aware about different kinds of trees and understand their importance. This also promotes observation-based drawing skills in students.

AIMS:

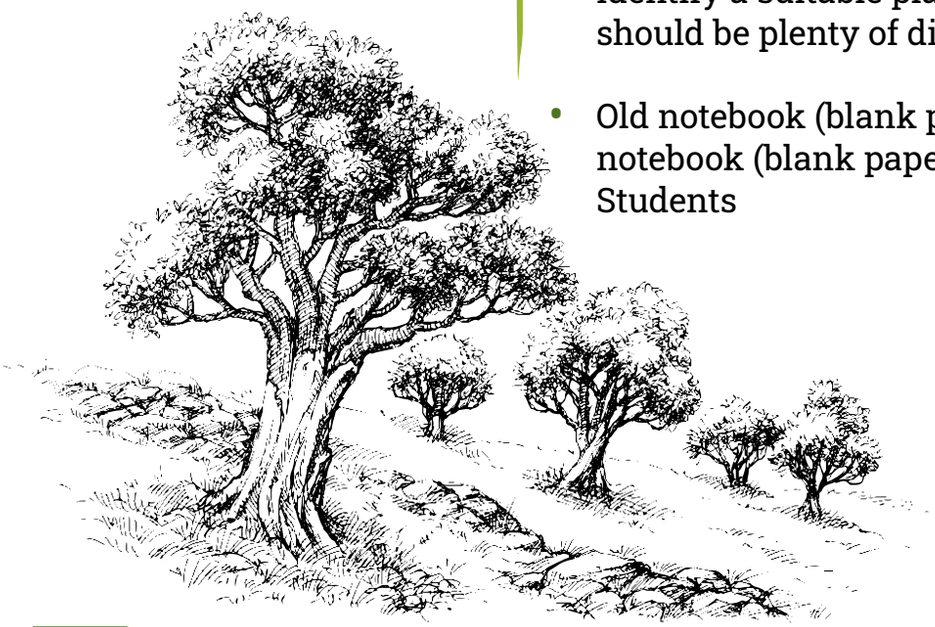
- Help students identify different parts of a tree, understand that the different parts of a tree contribute to its shape.
- Develop in students the skills of observation/recording and illustration.

KEY QUESTIONS TO ADDRESS:

- What are the different parts of a tree?
- How can we recognize different trees around us?

PREPARATION:

- Identify a suitable place to conduct the activity. There should be plenty of different types of trees.
- Old notebook (blank paper), pencil – Teacher; Old notebook (blank paper), pencil, colour box if available- Students



METHOD/GUIDE:

1. Let the students observe few trees and recognize the main parts of a tree.

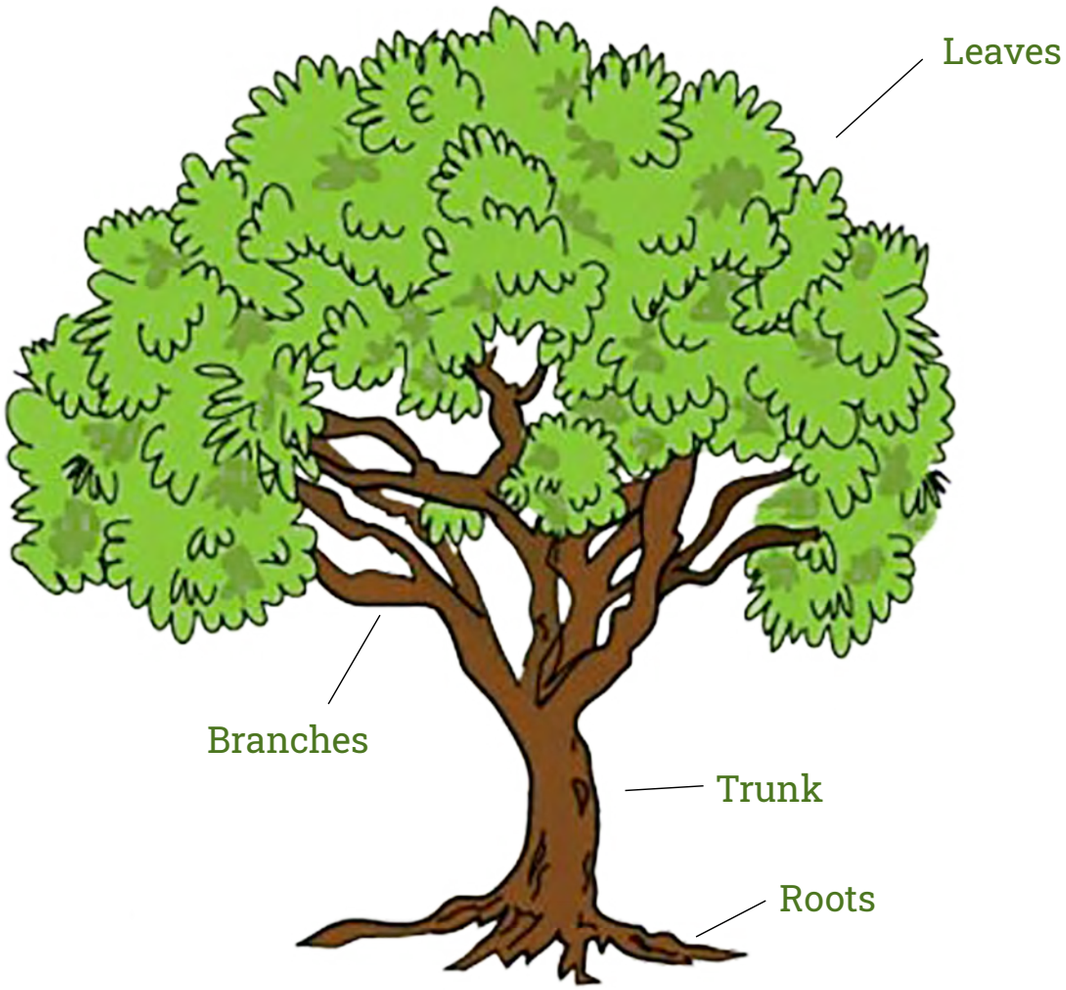
2. Let the students practice drawing/sketching main parts of a tree separately. After the students have finished drawing the main parts, let them look at different types of trees, e.g.

   a. Trees which are tall or short

   b. Trees with maximum and with minimum branches

   c. Trees with many leaves or few leaves

   d. Trees with large leaves or with small leaves etc. and observe the variations.



Parts of tree

LEARNING OUTCOMES:

Identify different trees based on their characteristics.

GREEN HABIT:

Observing plants in the neighbourhood.

FAQS

Q- What are the shapes of some common trees around us?

A- Tall Tree: Pimpal, Satparni, Bherli Maad (Fishtail palm)

Short Trees: Babhul, Tamhan/Jarul, Lemon, Hibiscus

Large Crown: Raintree, Mango, Vad/ Banyan tree, Chinch/Tamarind, Jackfruit

Small Crown: Palash, Ulta Ashok, Orange,

Maximum branches: Rain tree, Bahava

Minimum branches: Coconut, Fishtail palm, Shindi (wild date palm)

Many leaves: Mango, Mahua

Few leaves: White Chafa (temple tree)

Small leaves: Chinch/Tamarind, Tarwad, Babhul, Vilayati Chinch

Large leaves: Sagwan/Teak, Toddy palm,

Banyan tree

Coconut tree

White Chafa tree

Palash tree

11 POET IN EVERY CHILD

Level/ Class: 4

Curriculum links: Science, Arts

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed: Stationary

Approach: Classroom

TOPIC:
Biodiversity

CONCEPT:
Describing nature helps to focus attention, spur imagination and help develop awareness and emotion about nature around us. Cinquains are a simple form of verse, which can develop students' vocabulary and awareness about biodiversity. They are easy and fun to write and help teach grammar too.

AIMS:
Learn to observe and appreciate nature and express oneself.

KEY QUESTIONS TO ADDRESS:
What are your favourite living things? How would you describe them?

PREPARATION:
None

METHOD/GUIDE:
1. Ask each student to choose an object in nature (like Sun, soil, air, cloud, tree, grass, butterfly, sparrow, tiger, water, river, fish etc.) which he feels reflects his own personality or qualities.

2. Students may then be asked to speak on how the chosen object reflects their personality.

3. Let them then take up their papers and pencils and:

    - In the first line write the name of the object (subject/ noun).

    - In the second line write two words describing the qualities of the object (adjectives).

- In the third line write three words of action about the object (verbs).
- In the fourth line write four words describing how they feel about the object (phrase, sentence, expression).
- In the fifth and last line write one word to replace the title (synonym).
- Now let them read it like a poem. Here is an example:

Butterfly
Bright, Lovely
Falling, dancing, drifting
Joy, colour, visual poetry
Flutter by

LEARNING OUTCOMES:

Students learn to associate verbs, adjectives and phrases with nouns to create short, poems or structured descriptions of selected topics.

GREEN HABIT:

Nature as a life reality and subject of language and art.

FAQS

Q- Can we use Cinquain for any topic

A- Yes, this method may be used for developing the students vocabulary and grammar, as well as their imagination and thinking skills about any topics such as waste, water, nature, energy etc.

12 WEB OF LIFE

Level/ Class: 4

Curriculum links: Science, P.T.

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed:

Chart paper, colour pencils, scissors, a ball of string, safety pins – Teacher

Chart paper, colour pencils, scissors – Students

Approach: Outdoor activity with whole class

TOPIC:
Biodiversity

CONCEPT:
The web of life depicts the interconnectedness between living and non-living things in an ecosystem and humans as a part of this ecosystem depend on it for survival.

AIMS:
Demonstrate the interconnectedness of various elements in the environment.

KEY QUESTIONS TO ADDRESS:
How are living and non-living things interconnected in nature?

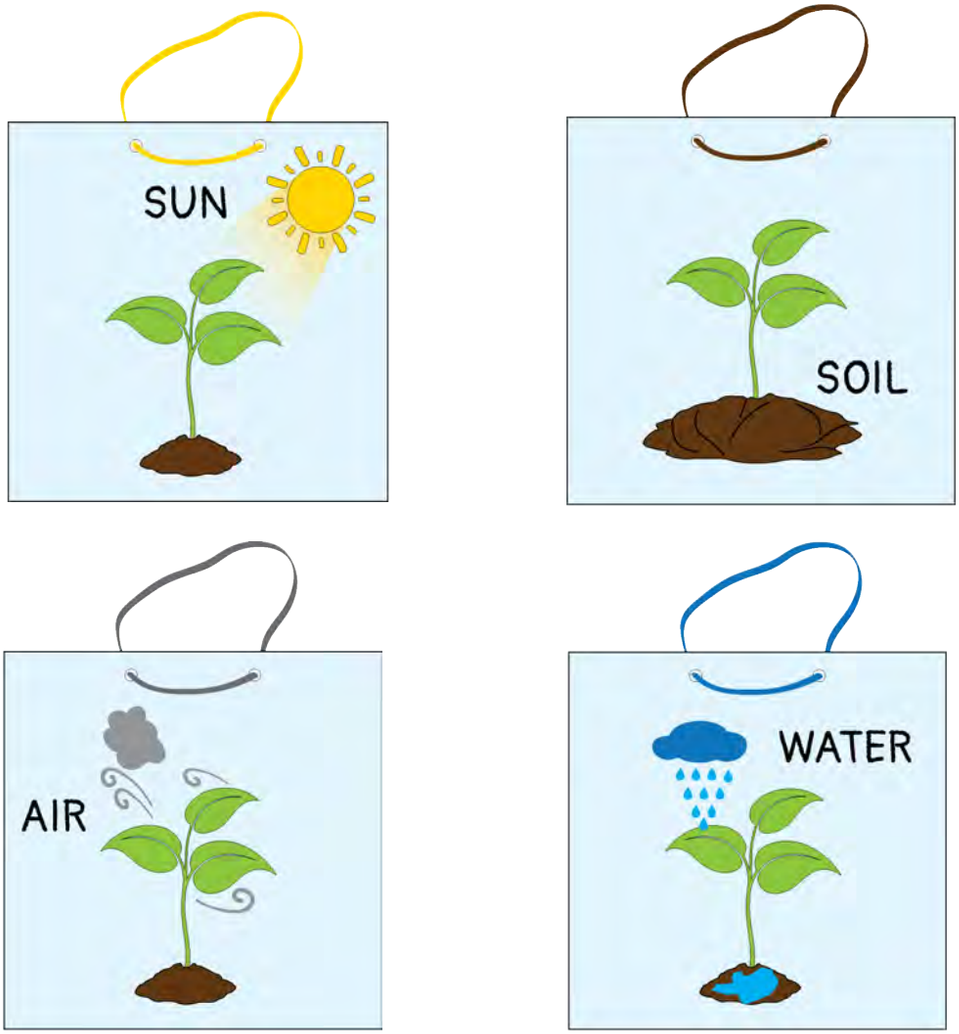
PREPARATION:
Before starting the game make sure you have prepared cards (as per given list) required for playing the game.

METHOD/GUIDE:
1. Based on the list provided at the end, make a set of cards with the names of the animal/bird /plant/ resource, etc.

2. The children can illustrate these cards. There should be as many cards as there are children. Cards can be made of chart paper cut into rectangular pieces of about 5 x 8 cm. A safety pin can be put through the top of each card.

3. Make students sit in a circle. Make sure to include and distribute cards depicting the four main elements of nature, 'Sun', 'Soil', 'Air' and 'Water'.

4. Take a ball of string about 250 m long and give it to the Sun. It is appropriate to begin with the Sun because all life is made possible by it. Let the Sun, wind one end of the string around her/his finger and throw the ball to any aspect of nature she/he feels is related to the sun. For



example, the 'Sun' may pass it on to 'Tree' because the 'Sun' gives energy to plants or trees. Let the student state the reason why she feels related to this element.

5. The 'Tree' then winds the string once or twice around his/her finger after ensuring that it is not loose between the 'Sun' and him/her. He/she then passes it to another aspect he/she feels related to, e.g., 'Fruit'.

6. So the line of relationships continues as the string unwinds and begins to form a pattern which the students hold together. The ball of string is thus completely used.

7. Ask the students to see the web-like effect of the string. Then ask them to raise the web chest high. Let them hold it tightly so that if the web is pressed down it does not sag and touch the ground. Ask the students to note this.

8. Ask the students what would happen if some of these elements were destroyed. Let the student representing these elements drop the string. Notice the visual effect. More elements may be dropped to dramatize the effect.

9. Now press the web down. It would probably touch the ground because it is loose.

10. Ask the students what would happen if the Sun or the other three major elements of nature were disturbed.

11. Conclude the game by explaining to the students how inter-relationships exist and why they are important.

1. Sun	2. Fruit	3. Turtle	4. Honey
5. Air	6. Parakeet	7. Insect	8. Honeybee
9. Water	10. Algae	11. Frog	12. Squirrel
13. Soil	14. Fish	15. Mosquito	16. Moss
17. Tree	18. Eagle	19. Lizard	20. Grasshopper
21. Leaf	22. Rat	23. Butterfly	24. Plastic bag
25. Ant	26. Student	27. Grass	28. Dead wood
29. Dead leaf	30. Earthworm	31. Root	32. Paper
33. Shrub	34. Seed	35. Fungus	36. Crocodile
37. Dragonfly	38. Monkey	39. Spider	40. Buffalo
41. Snake	42. Mongoose	43. Kingfisher	44. Woodcutter
45. Washer man	46. Honey collector	47. Fisherman	48. Farmer

LEARNING OUTCOMES:

The roles of plants and animals and ability to describe the living and non-living components of an ecosystem.

GREEN HABIT:

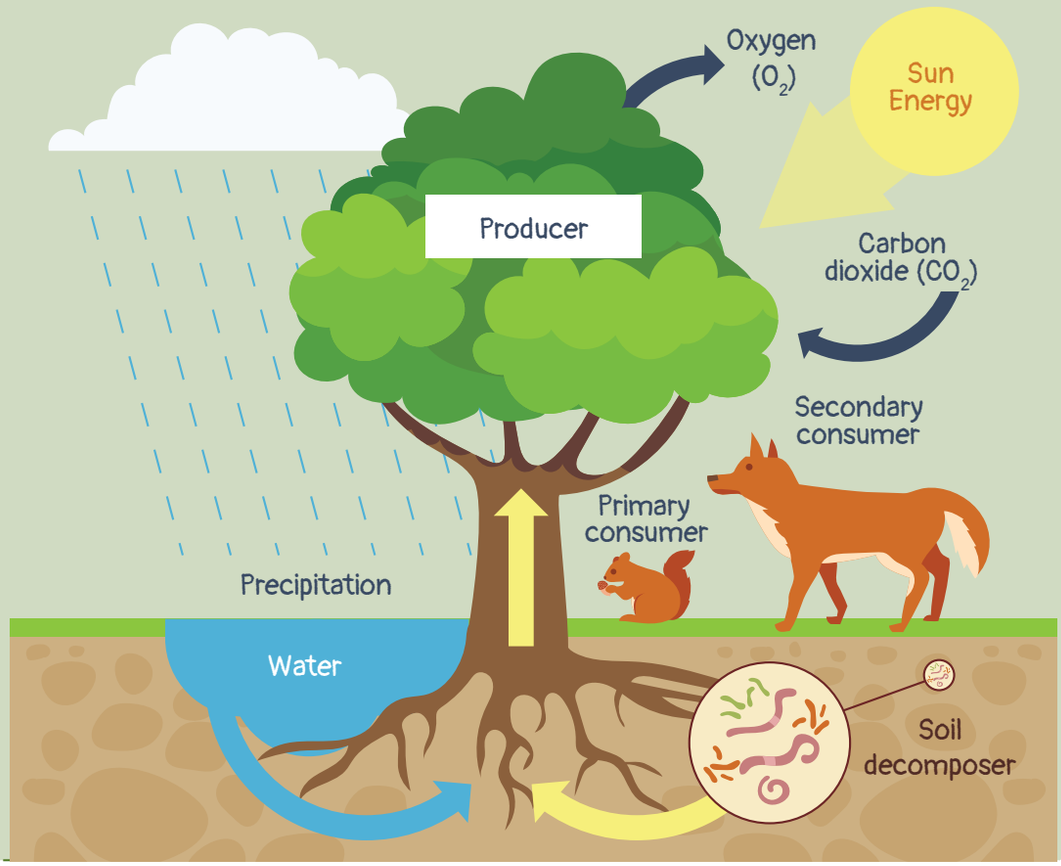
Know and make others as well aware that we all are interconnected and interdependent.

FAQ

Q- Can we make Web of Life cards for specific ecosystems?

A- Web of Life can be useful to help students understand interrelationships within specific ecosystems. Cards with ecosystem specific elements need to be prepared. Components for a pond ecosystem are given in the table below.

Web of Life can help students to understand interconnections between different elements in an ecosystem, or a social-ecological system.



Abiotic components	Sun, temperature, humidity, water, oxygen, carbon dioxide, nitrogen, phosphorous, sulphur, soil, minerals	
	Producers	Phytoplankton, algae, Diatoms, azolla, spirogyra, pistia, typha, grasses, reeds, lotus, lily, hyacinth
	Consumers	Zooplankton (Cyclops, Daphnia) Shrimp, molluscs, fish, water beetle, dragonfly, tadpole, water snake Kingfisher, heron, duck, fresh water turtle, Humans
	Decomposers	Bacteria, fungi

13 JOBS IN THE BIOTIC COMMUNITY

Level/ Class: 4

Curriculum links:
Science

Activity duration:

Classroom Session 1: 15 minutes in the classroom to introduce the concept

Group Assignment: 30 minutes at the outdoor site

Classroom Session 2: 15 minutes to wrap up

Activity timing:
Anytime

Materials needed:

Boundary markers, such as rope or landscape flags

Copies of "Community Services" student page (In annexure)

Copies of "Community Census" student page (In annexure)

Magnifying lens for each pair of students (optional)

Approach: Field visit with whole class

TOPIC:
Biodiversity

CONCEPT:
A biotic (or natural) community is made up of the various organisms that live and interact with one another in a particular environment. Every living thing is interdependent on other living things in its community. In human communities, people have different jobs that help the community as a whole thrive. In biotic communities, organisms have different roles or niches that enable each individual species to survive and the entire community to persist, as is in a human community, its members have different roles and depend on each other for survival. In this activity, students examine a study area to find out what organisms live there and the ecological jobs or niches they fill.

KEY QUESTIONS TO ADDRESS:
Different organisms and the ecological roles or niches they fill.

AIMS:
Students take a census of an outdoor site, and look for organisms that perform different "jobs" in the biotic community.

PREPARATION:
Boundary markers, such as rope or landscape flags, Magnifying lens for each pair of students (optional), Find a suitable outdoor site with ample vegetation and enough space for students to work, Copies of "Community Services" student page and "Community Census" student page (In annexure), Mark boundaries of the site with ropes or flags.

METHOD/GUIDE:

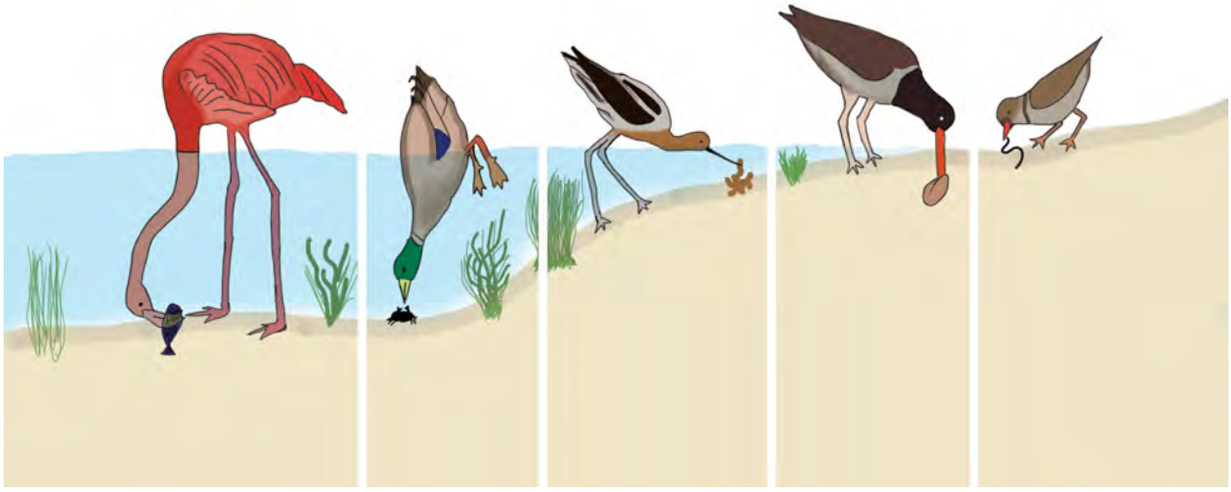
Classroom Session 1

A niche is the ecological role of a species in a community. For example, fungi act as soil producers by breaking down rock and organic material to form soil. Sow bugs act as recyclers by decomposing dead plants and animals, and returning the organic material to the soil for reuse. Birds act as transporters by moving seeds and other objects from place to place in their beaks or stomachs. Bees act as pollinators by carrying pollen from one flower to another. And, all plants and animals can serve as food for other organisms.

1. Ask students to name jobs in their community that are necessary for the community to survive, listing their suggestions on the board. Introduce the idea that other organisms also have roles or jobs in their community.

2. Distribute copies of the "Community Services" student page and ask students to match services in nature with the ones found in their community.

3. Introduce the term "niche" as an organism's role in a biotic community.



Niche- Each member of community gathers food in a unique way

4. Ask students if they have ever heard the word "census" before. If they don't know, explain that it is a survey of people who live in a region or country. A census often includes details like age and type of work, and census takers are people who collect the data by going to individual homes.

Group Assignment

1. Explain to students that they will be census takers in a biotic community. Their job will be to tally the members in the community, and to try to determine what their jobs (niches) are. Point out that if they do not know a community member's job, they can try to figure out how it affects the other community members and make up a name for that job.

2. Divide the class into pairs and give each pair a copy of the "Community Census" student page. Help students understand the different jobs listed, introducing any new words. Ask students if they can think of other jobs that animals or plants in a community might perform. Invite them to add these to the list at the bottom.

3. Ask students what organisms they might expect to find at the study site and list them.

4. Point out the boundaries at the site.

5. (Optional) Distribute magnifiers. Explain that students may use these to get a closer look at the organisms in the community.

6. Make sure students understand that they must be careful not to hurt or remove any plants or animals.

7. Direct students to list and tally all of the different organisms they find at the site. (If they don't know the precise name of one, they can give it a descriptive name or draw a picture.) For each different organism, have them try to identify its job in the community.

8. If students need help coming up with additional jobs, point out that besides being "food producers," plants provide places and materials for shelter, shade, nests, or hiding. Also, most living things provide food for other organisms by getting eaten.

Classroom Session 2

Lead a discussion about students' findings:

1. How does the list of organisms we expected to see compare to those we did see?

2. What biotic community members did you find and what are their jobs?

3. Are there any organisms whose job you didn't know? How could we learn more about their niche?

4. Are there any organisms that "moonlight" (have more than one job)?

5. Are there any organisms that seem to have no job?

6. What would happen if one member of the community wasn't there? For example, imagine that a drought killed all the trees: how would that affect the community?

7. Looking at the "Community Services" student page, what additional services could we add to the Services in Nature column? What human community service might correspond to?

8. Invite pairs to choose a plant or animal they observed and do an Internet search about its role in the biotic community. You may have them write a paragraph on what they learned and share it with the class.

LEARNING OUTCOMES:

Awareness on beneficial roles in the environment.

GREEN HABIT:

Appreciate the different ways in which members of any community help each other.

SUPPORT MATERIAL:

"Community Services" student page (Worksheets 1 and 2)

WORKSHEET 1 (Jobs in a Biotic Community)

Name:- _____

Community Services

- Can you match the services in your community with the services found in nature?
- Draw a line to show the matching services.

Human Community Services	Services In Nature
A. Farmer	1. A river cleans the water that moves through its system.
B. Power company	2. Rain puts out wildfires.
C. Garbage collection	3. The wind spreads seeds.
D. Fire station	4. The sun gives plants energy that helps them grow.
E. Construction company	5. Butterflies lay their eggs on certain plants to prevent disease.
F. Grocery store	6. Monkeys groom each other to keep clean.
G. Beauty parlor	7. Worms eat dead plant and animal matter.
H. Sewage treatment plant	8. Wasps gather mud to make nests for their young.
I. Health care center	9. Plants provide food for many animals.

(ANSWER KEY TO "COMMUNITY SERVICES" STUDENT PAGE -
A-3, B-4, C-7, D-2, E-8, F-9, G-6, H-I, I-5

WORKSHEET 2 (Jobs in a Biotic Community)

Community Census

- Record either the name or a description of each community member you find.
- Tally the number you see by counting or estimating.
- Write down its job in the community using the list below or your own idea.

Community Member	How Many Found? (Tally) Job	Sample Jobs

- **Soil Loosener:** Turns and loosens the soil so that plants can grow more easily. Examples: earthworm, mole.
- **Garbage Collector:** Eats dead plants and animals. Examples: ant, termite, vulture, pigeon, crow.
- **Food Producer:** Uses the sun's energy to make food. Examples: all green plants.
- **Mover:** Moves things, like seeds, from one part of the community to another part. Examples: bird, squirrel, dog, cat.
- **Population Controller:** Eats animals and keeps the community from getting too crowded. Examples: cat, snake, spider, lizard, frog, hawk, robin.
- **Fertilizer:** Fertilizes the soil by adding waste such as fallen leaves, or dead plant parts. Examples: all animals and plants.

Earthworm

Vulture

Bird

Animal Word Puzzle

Across

3. Goose
6. Turtle

Down

1. Frog
2. Donkey
4. Eagle
5. Ant

SECTION 2:

Solid Waste Management and Personal and Community Health

2.1. INTRODUCTION

2.1.1. OVERVIEW

Our health and well-being is dependent on the environment to a very great extent.

The quality of the environment is in turn dependent on the individual and collective behaviour of people in the neighbourhood, village, town or city.

For example, if our surroundings are highly polluted, then we may not be able to lead healthy lives. If we do not manage waste and waste water properly, then we create unhygienic and polluted conditions, which in turn impact human health.

Pollution and waste also affect other living things and ecosystems, as well as contribute to global climate change.

2.1.2. RATIONALE AND EXPECTED LEARNING OUTCOMES

The activities and projects included in this section of the resource book primarily focus on personal and community hygiene and solid waste management. The aim is to help students understand the basic concepts of the theme, and acquire positive attitudes and values towards addressing the issues related to the theme.

The link of Solid Waste management to Biodiversity, and to Climate Change is discussed in some of the activities. We hope this will establish the importance of learning about these themes in a focused manner, as well as in an integrative manner

TOPICS

1. How to maintain personal health and hygiene?
2. Covid appropriate behaviour.
3. What is waste?
4. Avoiding and managing litter.
5. Source segregation of waste at home.
6. Biodegradation and natural cycling of nutrients.
7. Non-biodegradable materials and need for recycling.
8. Adverse impact of improper waste management on humans and the environment.

2.1.3. ACTIVITY FRAMEWORK

Curriculum-mapped Activity and Project Plan for Personal & Community Hygiene, and Solid Waste Management

SN	Topics and subtopics	Presence in textbooks	Concepts	Activities / Projects
1	Litter and cleanliness	Standard 2nd - English Standard 7nd - Marathi, Hindi Standard 8th – Science	• Developing positive attitudes about cleanliness and sanitation at an early age	Std 1 • Bin it • Classroom Clean-Up!
2	Personal cleanliness and hygiene	Standard 1st& 2nd - English Standard 3rd - English Standard 2nd& 4th - English Standard 8th - Science	• Learning basic personal hygiene and grooming practices at an early age • Knowledge of daily use items and their use for sanitation and hygiene	Std 1 • Sneezing Song • Self-grooming practices • Colour me – body parts • Let's count - daily hygiene items • My cleanliness regime Std 2 • Clean and Healthy
3	Importance of handwashing	Standard 1st - Math Standard 2nd - English, Math Standard 4th& 5th - EVS Standard 6th, 7th - Science	• Washing hands with soap helps to keep their hands clean • Handwashing keeps them healthy • Monitoring of Handwashing	Std 1 • Pass the soap • Handwashing song • WASH storytelling Std 2 • Hand wash time table • Let's Wash Hands Std 4 • Bittu says, "Wash your hands"
4	Waste Management at the School & Home	Standard 1st – Marathi, English Standard 8th - Science	• To develop a sense of ownership and pride in the school campus, home and maintain it neat and clean.	Std 2 • Litter bins • School clean-up

SN	Topics and subtopics	Presence in textbooks	Concepts	Activities / Projects
5	Segregation	Standard 3rd - Marathi Standard 8th - Science	• Understanding about waste types and segregation	Std 1 • Segregation game Std 3 • Talking dust bins Std 4 • Waste bin observation
6	Recycling	Standard 3 - Marathi Standard 2 - Marathi Standard 8 – Science	• Use of waste materials to create useful items	Std 3 and above • New from old
7	Handling drinking water	Standard 3 – Marathi Standard 4th, 5th - EVS Standard 8th - Science	• Appropriate methods of handling drinking water	Std 3 • Handle with Care
8	Unhygienic foods	Standard 1st – English Standard 5th - EVS lesson Standard 7th - Science	• Eating unhygienic foods often lead to various food-borne diseases	Std 4 • Dodge Ball
9	Germs	Standard 2nd - English Standard 4th, 5th - EVS Standard 6th, 8th - Science	• Germs are everywhere, and understand how easily germs can spread from people to people	Std 4 • Germs are invisible • Role play – Tale of Germs

2.2. ACTIVITIES/PROJECTS

1 BIN IT

Level/ Class: 1

Curriculum links: Images/words specifying use of bins have not been featured for Standard 1. This activity formally introduces the use of dustbins.

Activity duration: 15 minutes

Activity Timing: Anytime

Materials needed: Cartons or bins to store paper, plastic, wood shavings etc

Approach: Indoor activity with whole class

TOPIC:
Solid Waste Management – Litter and cleanliness

CONCEPT:
Students should develop positive attitude about cleanliness and sanitation at an early age.

AIMS:
Students

- Understand the concept of litter.
- Understand they should pick up litter and put it into dust bins.

KEY QUESTIONS TO ADDRESS:

- What is Waste?
- What is the use of dustbin?
- How can we maintain cleanliness?

PREPARATION:
None

METHOD:
Teachers should begin by asking students 'what is waste?.

Basic waste materials (appropriate for this level of students) may be introduced: waste paper, pencil shavings, wrappers and packaging material, leftover food, dust, leaves. Ask students where these materials come from. Explain that these wastes should not be thrown in the classroom or school compound as they make the place untidy.

Waste materials are things we don't need and which can be put to other uses. Such materials should not be left lying around in the classroom, but should be carefully put into the designated boxes or bins. If they don't immediately see a dustbin, they can still pick up the litter and look around for a dustbin to put it in later.

Explain that waste paper and plastic wrappers can be placed in a carton or dust bin. Dust and leaves can be collected in the dust pan or dustbin and put outside into the school ground. Small quantities of leftover food, pencil shavings and dried leaves can be mixed with the soil around plants. (If larger quantities of leftover food are generated regularly, then the school should consider preparing a compost pit as a project with older students).

Teach them a simple rhyme on litter or waste. For example:

Bits of Paper,
Bits of Paper,
Lying on the floor,
Lying on the floor,
Make the place untidy,
Make the place untidy,
Pick them up, Pick them up.

LEARNING OUTCOMES:

Students learn about litter and understand that they are not expected to litter, and if they see litter, they should pick it up and put it in the dustbin.

GREEN HABIT:

Pick up litter and put it in the dustbin.

FAQS

Q- What if there is no waste bin in the classroom?

A- Teacher should look for some suitable large-sized cartons / old tins / baskets / sacks which may be used as dustbins and bring them to the classroom for usage.

2 CLASSROOM CLEAN-UP!

Level/ Class: 1

Curriculum links: One image of action for clean surroundings is included in Standard 1. This activity introduces classroom cleanliness as part of good habits.

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed:

Dustbin and broom in the classroom

Approach: Classroom activity

TOPIC:

Solid Waste Management – Cleaning up Litter

CONCEPT:

Help students develop positive attitude about cleanliness and sanitation at an early age.

AIMS:

- Help students form a positive attitude to maintain clean environment.
- Help students understand the concept of litter, and how to manage it.
- Help students develop motor skills to use a broom.

KEY QUESTIONS TO ADDRESS:

- What is litter?
- How can we manage it?

PREPARATION:

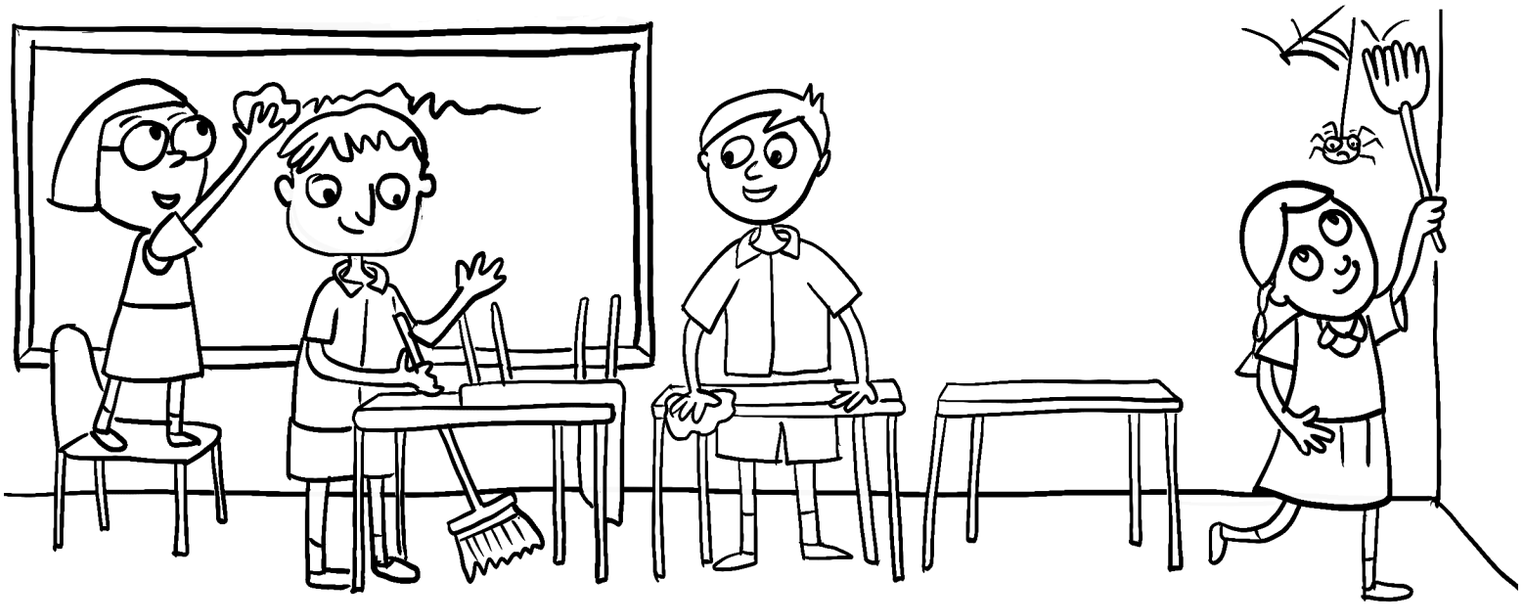
- Make sure your classroom has a separate dustbin and a broom with a proper place to keep.
- If needed, take an approval of the school management and parents to involve students in classroom clean-up.

METHOD/GUIDE:

- The teacher should participate in the clean-up classroom.
- Before cleaning up, check for any waste material lying in the classroom and ask students to identify the source. Ask students if they see any waste material in the classroom who can collect and put it in the bin fast (it can be a fun activity). Ask students how to keep the classroom neat & clean. Where does litter and dust come from? Introduce

the broom as a very useful object that helps to keep our surroundings neat and clean. Show children how to use and store the broom. Show how litter is to be put in the waste bin.

- Make sure students pick up only litter.
- Make sure all students wash their hands after the clean-up.
- You can teach a clean-up song while doing the clean up.
- Make sure students don't become too noisy and do not disturb other classes.
- Let all students appreciate each other by giving a clap at the end of the clean up.



LEARNING OUTCOMES:

Students learn the concept of litter and understand their role in keeping their classroom and school campus free of litter.

GREEN HABIT:

Keep classroom and school campus free of litter.

FAQS

Q- What if parents object?

A- School and teachers may inform parents and guardians that the school will be taking a special drive to inculcate the values of cleanliness, and personal and community hygiene. For this, all students will be involved in waste related surveys and responsible practices frequently as part of their school learning.

3 SNEEZING SONG

Level/ Class: 1, 2, 3, 4

Curriculum links: Standard 1, 2 English textbooks include images of handkerchief use as good habits. This activity reinforces the habit of covering mouth and nose while sneezing and coughing, and may be conducted during Marathi language class.

Activity duration: 20 minutes

Activity timing: Preferably at the start of the academic year and repeated from time to time

Approach: Indoor activity with whole class

TOPIC:
Personal & Community Hygiene – Cover your mouth and nose

CONCEPT:
Students should learn to cover mouth and nose while coughing, sneezing.

AIMS:
Students learn to cover their mouth and nose to cough or sneeze.

KEY QUESTIONS TO ADDRESS:
Why should we cover our mouth and nose to cough or sneeze?

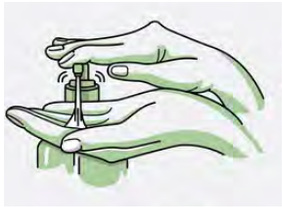
METHOD/GUIDE:

- Ask children to sit or stand in a large circle facing each other.
- Children sing the rhyme:

एक दोन तीन चार,
साबण मास्क जिगरी यार

पाच सहा सात आठ,
मास्क अप करू कोविड सपाट

नऊ दहा अकरा बारा,
हाथ धुवून कोविड मारा



तेरा चौदा पंधरा सोळा,
नाकी रुमाल खोकल्याच्या वेळा

सतरा अठरा एकोणीस वीस,
स्वस्थ राहू करू निरोगी वर्ष २०२१

LEARNING OUTCOMES:

Students understand the importance of hand wash, mask usage and hygiene practice.

GREEN HABIT:

Cover your mouth face while sneezing.

FAQS

Q- Is this activity relevant to Covid 19?

A- This activity and the hygiene practices it promotes are important not only for avoiding spread of Covid 19 but other similar diseases too. Students and adults should practice these whenever one sneezes or coughs.

4 SELF-GROOMING PRACTICES

Level/ Class: 1

Curriculum links: English Standard 1 introduces brushing and handwashing through song and images. Standard 2 has images of Dos and Don'ts. Standard 3 has an image on hand washing Standard 7 has an activity of making charts on good health.

Activity duration: 20 minutes

Activity timing: Preferably at the start of the academic year and every day

Approach: Indoor activity with whole class

TOPIC:
Personal & Community Hygiene – Personal hygiene habits

CONCEPT:
Students need to learn basic personal hygiene and grooming practices at an early age.

AIMS:
Help students learn the necessary practices for self-grooming.

KEY QUESTIONS TO ADDRESS:
- What does self-grooming mean?
- What are the hygiene practices to be adopted and practiced every day?

PREPARATION:
None

METHOD/GUIDE:
Ask children to sit or stand in a large circle facing each other.

Children sing the rhyme:

"One Two Three Four
Use these as part of your daily chore

Splash your eyes, Brush your teeth,
Every morning, Every morning

Wash your hair, Cut your nails,
Every week, Every week

Wash your hands, Before eating and After toilet,
Every time, Every time."

Ask the children to sing the self-grooming practice rhyme. Invite a child to come forward and demonstrate steps mentioned in the rhyme.

LEARNING OUTCOMES:

Students learn about self-grooming and personal hygiene practices to be adopted and practiced everyday.

FAQS

Q- What does self-grooming mean?

A- Self-grooming means hygiene and care taken by a person to be clean and neat, so as to be healthy.

Q- What are the hygiene practices to be adopted and practiced every day?

A- Here are some hygiene practices that students should practice every day:

- Wash you face and eyes.
- Brush your teeth every morning and evening.
- Wash your hair, cut your nails, every week, every week.
- Wash your hands, before eating and after toilet, every time.






5 COLOUR ME- BODY PARTS

Level/ Class: 1

Curriculum links: English textbook for class 3 introduces body parts by using colored images.

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed: Colours, Copies of the colouring template - one for each student

Approach: Indoor activity with whole class

TOPIC:
Personal & Community Hygiene – Parts of my body

CONCEPT:
Colouring inspires creativity in children. It provides an opportunity to practice and develop many skills such as concentration, fine motor and coordination for early writing skills and correct finger grip. Being creative allows a child to build their self-confidence in other areas, especially handwriting and pencil tasks.

Identifying body parts and being intentional about using them is a cognitive, physical, and language-enriching process. Use of art to know and understand body parts is a fun way to engage students.

AIMS:
To help students learn about their body.

KEY QUESTIONS TO ADDRESS:
What are the different parts of the body?

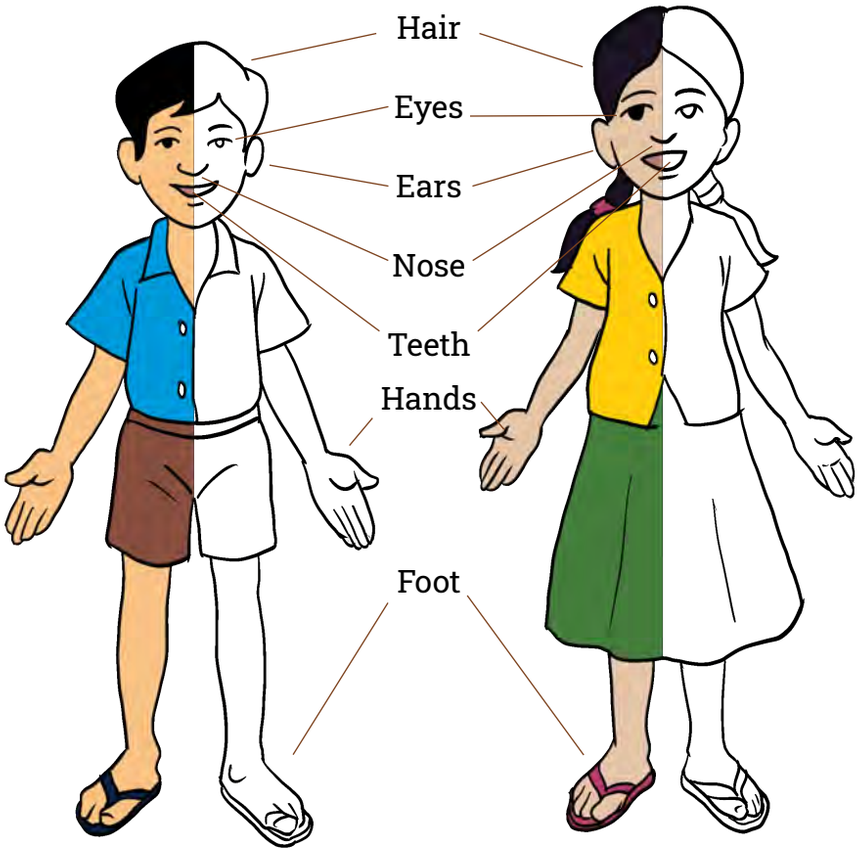
PREPARATION:
None

METHOD/GUIDE:
1. Distribute the colouring template to all students.
2. Ask students to point to their different body parts as labelled in the template.
3. Let them colour the template.





Colour Me



LEARNING OUTCOMES:

Students are able to identify and name their body parts.

FAQS

Q- What if the teacher cannot make photocopies?

A- Draw very simple figures on the blackboard and ask students to copy it on their slate or notebook.

5 LET'S COUNT - DAILY HYGIENE ITEMS

Level/ Class: 1

Curriculum links: Items of daily personal hygiene and cleanliness do not feature in any textbook. This activity helps in introducing these items and reinforce their use

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed: Colours, Template

Approach: Indoor activity with whole class

TOPIC:

Personal & Community Hygiene – Personal hygiene items

CONCEPT:

Teaching the basics of proper personal hygiene is important for keeping students healthy and clean. Having the knowledge of daily use items and their use for sanitation and hygiene is also important in developing a habit of self-grooming.

AIMS:

To help students acquire numeracy skill, and become familiar with various daily items used for cleanliness and hygiene.

KEY QUESTIONS TO ADDRESS:

What are the daily use items aiding in hygiene and sanitation?

PREPARATION:

None

METHOD/GUIDE:

Display the poster in the class.

Ask the students to name the objects in the poster and count them.

Students may not be familiar with all the objects. In that case, name each object, describe its function and how using the objects helps us be clean and healthy.

Lets Count

1

2

LEARNING OUTCOMES:

Students become familiar with items of daily use, needed for personal hygiene and cleanliness.

FAQS

Q- What if I cannot get a photocopier?

A- You may easily draw it yourself on a chart and display it.

7 SEGREGATION GAME

Level/ Class: Standard 1 (may be repeated in later classes)

Curriculum links: Waste segregation is included in Standard 2 as an image of wet and dry waste bins and as a lesson in Standard 3. This activity helps enhance understanding about waste types and segregation.

Activity duration: 30 minutes

Activity timing: Anytime

Approach: Indoor activity for whole class

TOPIC
Waste segregation

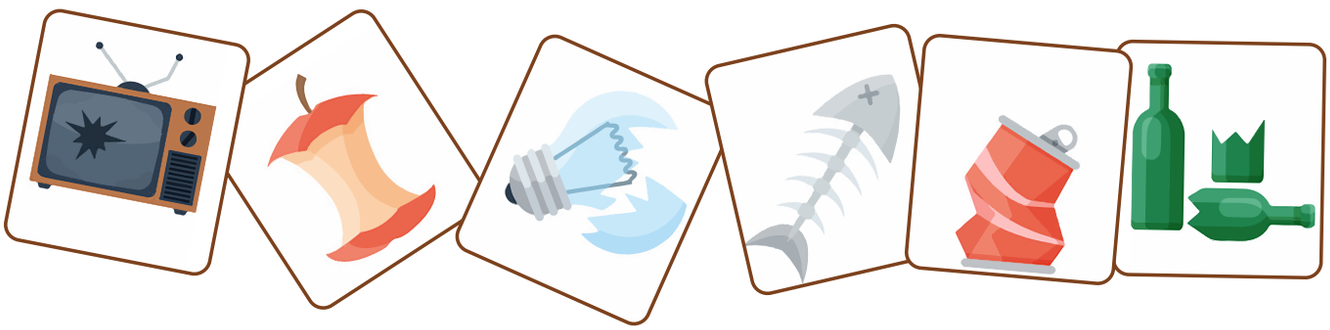
CONCEPT:
Waste materials include biodegradable materials such as food items, leaf litter, hair, paper as well as non-biodegradable materials such as plastic, metal, and glass. Some items can be recycled and are as well as biodegradable.

The aim of the game is to enable the students to decide whether each article is biodegradable or otherwise and put it accordingly in the appropriate bin.

AIMS:
Learn segregation at source

KEY QUESTIONS TO ADDRESS:
- What is waste segregation?
- What is meant by biodegradable and non-biodegradable waste?
- What is the role of waste segregation in waste management?

MATERIALS NEEDED
- Several cards with pictures of waste items, such as fruit or vegetable peels, egg shells, dried leaves, nirmalaya flowers, insect, and similar organic kitchen and garden wastes, and some clean waste paper, cardboard, plastic bags, wrappers or boxes, tin, aluminium, metal, packaging material, and items made of cloth, jute, etc. You may keep multiple samples of the materials.



- **List of items to create cards, or collect as actual items**

» Banana skin
» Thermocol cup
» Handkerchief
» Plastic bag
» Paper
» Empty fruit juice pack
» Dry leaves
» Toothpaste tube
» Dead insect
» Broken plastic toy
» Leather belt
» Flowers
» Plastic bangle
» Wooden ladle
» Plastic spoon
» Potato
» Plastic pencil box
» Rag doll
» Plastic doll

PREPARATION:

Teacher can ask students to prepare cards.

METHOD/GUIDE:

- Make a pile of different waste items and organic waste cards on a table in the classroom.
- Keep four containers at a distance of 5 meters (15 feet) from the pile, two on either side.
- One of the containers on each side must be marked 'biodegradable' and the other should be marked 'non-biodegradable'.
- Next, form 2 groups with approximately equal numbers of students, with girls and boys distributed evenly. Ask the students to name their group.
- One student from each group comes forward and chooses 2 objects and drops it in the appropriate container. Each student gets 10 seconds.
- The group with the maximum number of correct items in the appropriate container wins.

LEARNING OUTCOMES:

Students learn that different items are made of different types of materials and learn how to keep waste materials segregated.

FAQS

Q- Is paper a biodegradable or recyclable item?

A- It is both, biodegradable and recyclable.

8 MY CLEANLINESS REGIME

Level/ Class: 1

Curriculum links: Dos and Don'ts are introduced in English Standard 2 with images. English Standard 4 has images on daily habits. Science Standard 8 has an activity on personal hygiene and 'clean hands drive'.

Activity duration: 30 minutes.

Activity timing: Preferably at the start of the academic year.

Materials needed: Chart

Approach: Indoor activity with whole class.

TOPIC:

Personal & Community Hygiene – Personal hygiene habits

CONCEPT:

Good personal hygiene is important for both health and social reasons. Personal hygiene benefits our own health and impacts the lives of those around us. Maintaining hygiene practices reduce the spread of illness. It also increases self-confidence and positively impacts personal relationships. Teaching children about hygiene and creating a personal hygiene routine for them early on is important as they are more susceptible to infections.

AIMS:

To help students learn about and adopt personal cleanliness and hygiene practices and schedule.

KEY QUESTIONS TO ADDRESS:

What should be the personal hygiene regime?

PREPARATION:

None

METHOD/GUIDE:

Display the poster. Ask students to describe the activity in each image.

LEARNING OUTCOMES:

Students learn about self-grooming and personal hygiene practices to be adopted and practice these every day.

FAQS

Q- What if I cannot photocopy the chart?

A- Teachers may try to draw these activities and make her own chart.

9 PASS THE SOAP

Level/ Class: 1, 2

Curriculum links: English Standard 2 textbook introduces use of soap, Science Standard 7 has an activity on soap making

Activity duration: 40 minutes

Activity timing: Anytime

Materials needed: Soap

Approach: Indoor activity with whole class

TOPIC:
Personal & Community Hygiene – Washing hands with soap

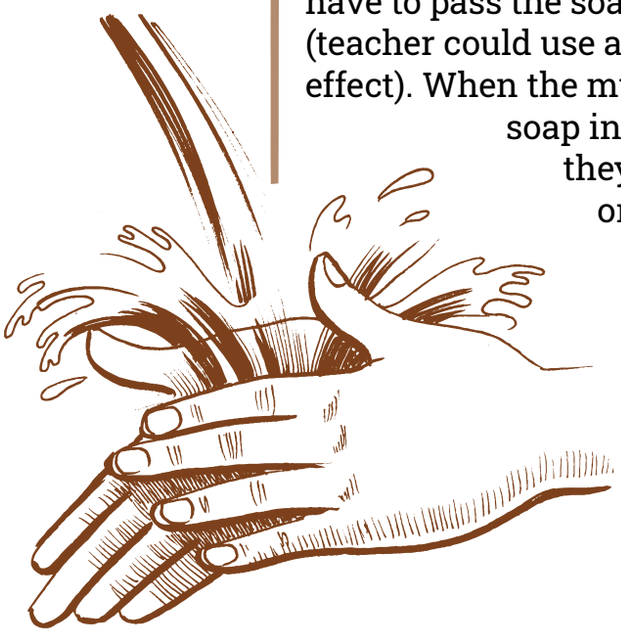
CONCEPT:
Students need to learn to appreciate cleanliness and personal hygiene. They learn that washing hands with soap helps to keep their hands clean.

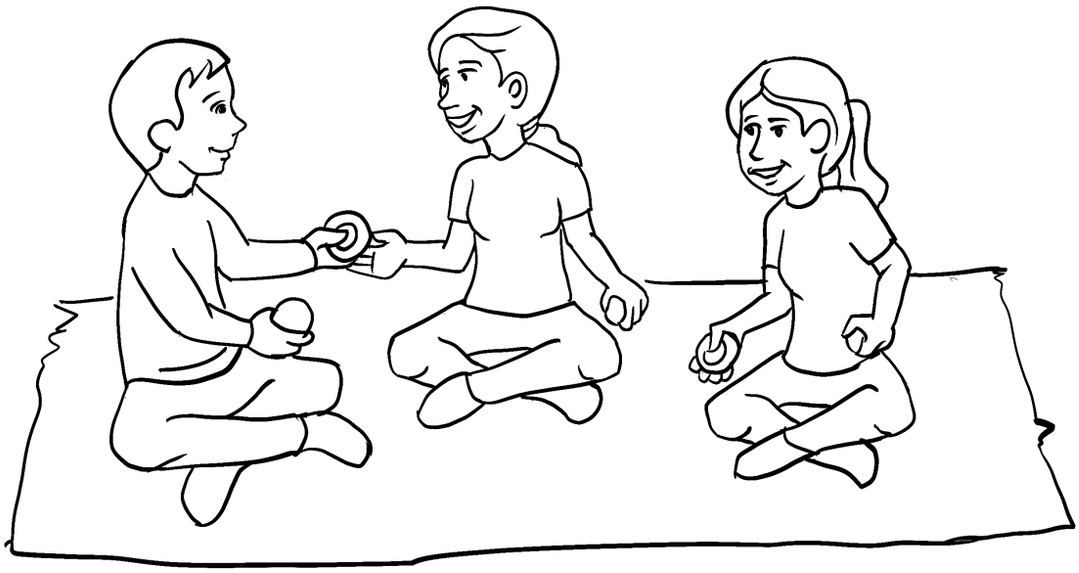
AIMS:
To introduce students to the benefits of using soap during hand washing.

KEY QUESTIONS TO ADDRESS:
- What are hygiene practices and why are they important?
- Why is washing with soap important?

PREPARATION:
None

METHOD/GUIDE:
All children sit in a circle and a soap is given. Students have to pass the soap around when the music begins (teacher could use a plate and a spoon to create music like effect). When the music stops, the student who has the soap in his/her hand will talk about one thing they like to do. If it is an activity before or after which students should wash their hands, then the teacher should talk about it. For example, students may mention that they like to eat sweets, or play, or draw.





The student also gets to ask a question to the group with the help of the facilitator. If the students are not able to answer any question, announce the right answer. Most importantly, supplement the answer provided by the student with additional information on the topic. Reward those who answer correctly.

Question bank: (It is suggested that these questions are to be further broken down)

1. What are the steps of hand washing with soap?
    - Wet hands with water
    - Apply enough soap to cover the entire surface of the hands
    - Rub hands palm-to-palm
    - Right palm on left with interlaced fingers and vice versa
    - Palm to palm with fingers interlaced. Rubbing, backwards and forwards with clasped fingers of right hands in left and vice versa
    - Rubbing of left thumbs clasped in right hand and vice versa
    - Rinse hands with water and dry in the air

2. Which are the critical times for hand washing?

    Before eating, before cooking, before feeding the baby, before handling water, after defecation, after handling child excreta, after playing.

3. What things are required to wash hands?

    Water and soap are required to wash hands.

4. Name two diseases caused if hands are not washed with soap?

5. What are germs?

6. How do germs get on our hands?

7. How do germs get into our food and then our stomach?

8. How do germs from our hands affect others?

LEARNING OUTCOMES:

Children learn the importance of using a soap to wash hands; and the correct way to wash hands.

GREEN HABIT:

Wash your hands with soap.

FAQS

Q- Are germs visible?

A- Germs are not visible to us directly. We need to use an advanced microscope to see germs.

10 HANDWASHING SONG

Level/ Class: 1, 2

Curriculum links: Handwashing is introduced in Standard 1 in Math with images. Standard 2, 3 also have hand wash images.

Activity duration: 40 minutes

Activity timing: Anytime

Materials needed: Ball, Soap, Water [mug, bucket/Handwashing Station]; Clean towel/ handkerchief

Approach: Indoor, group song with actions, and discussion

TOPIC:

Personal & Community Hygiene–Importance of washing hands with soap

CONCEPT:

Hands are the main pathways of germ transmission during health care. Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs and prevent health care-associated infections. Students need to learn that handwashing keeps them healthy and important times to wash their hands.

AIMS:

To help students understand and practice the five steps of hand washing.

KEY QUESTIONS TO ADDRESS:

- Why is handwashing important?
- Why is washing with soap important?

PREPARATION:

None

METHOD/GUIDE:

Classroom Session 1

Ask the children how they ensure that their hands are clean. Explain that they will be playing a game that involves washing their hands. Make the children sit in a large circle facing each other. Teach them the hand washing song with the right movement of five steps of hand washing.

Children sing the hand washing song:

"First of all you should... wet your hands,

Then on your hands... the soap does a dance,

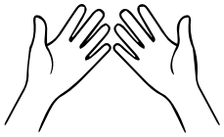
One hand then ....meets the other,

The hand then does... a front- back number,

Then it's time to play ... in between the fingers,

And make the nails ...move around in circles

Then the water splashes on your hands,



'Cause clean hands are strong hands."

Ask the children to sing the hand washing song while throwing the ball randomly to other children sitting in the circle. Invite the child holding the ball when song ends to come forward and demonstrate steps of hand washing using water and soap. Use a tub/bucket to collect water and for disposing it later at an appropriate place.

Ask other children to sing and make hand washing movements showing the steps of hand washing as observed in demonstration. Ask the children to use their own hankies/ napkins to dry their hands or wave hands in the air to dry them.

Continue the game until all the children in the group have had a chance to wash their hands.

They could be asked a few questions, such as

- Do you like the hand wash song? Why?
- What is the message given in this song?
- What will happen, if we don't wash hands with soap?

LEARNING OUTCOMES:

Students learn how to wash hands in a proper manner.

GREEN HABIT:

Wash your hands with soap.

FAQS

Q- What will happen, if we don't wash hands with soap?

A- Germs (that is viruses and bacteria) remain on our hands and can cause diseases.

11 WASH STORYTELLING

Level/ Class: 1

Curriculum links: Math Standard 1 introduces handwashing with images. Standard 2, 3 also have hand washing images. Standard 7 has an activity of making charts on good health

Activity duration: 40 minutes

Activity timing: Anytime

Materials needed: Picture card

Approach: Outdoor activity with whole class

TOPIC:

Personal & Community Hygiene – Importance of washing hands at critical times

CONCEPT:

Hands can pick up germs from other people or from objects that are touched by others. When hands come in contact with nose, mouth or eyes, germs can enter the body to cause illness. Handwashing is the best way to stop the spread of infections. Children need to learn the steps of proper hand washing because poor hand washing technique does not remove germs. Children also need to know the most important times to wash their hands so handwashing becomes routine.

AIMS:

- Impart the importance of hand washing practices at critical times.
- Understand the harmful effects of unhygienic practices on health and education.

KEY QUESTIONS TO ADDRESS:

- What are hygiene practices and why are they important?
- What are the ill effects of not following hygiene practices?

PREPARATION:

Copy of the story for the teacher, if needed.

METHOD/GUIDE:

Classroom Session 1

Narrate this story

Raju, a very clever boy who always achieved good marks, was worried about his young brother, Sanju. Sanju was not a regular student in school. Coincidently, since the last three days Raju was also absent in school. When he returned after those three days, the teacher asked Raju

Teacher: Why were you absent for three days?

Raju: I was with Sanju

Teacher asked Raju: - What? Where is Sanju?

“He is sick and hospitalized,” Raju replied.

“You gave the same reason last month as well. Tell the truth” – Teacher

“Sorry teacher, but it is the truth”- Raju

Teacher: What has happened to him?

Raju: I don’t know teacher, but doctor uncle says it is Diarrhoea *

Diarrhoea = Stomach pain + loose motions.

Teacher: Diarrhoea? Oho, this means many of us are not practicing appropriate hygiene practices!

Raju: What is that teacher?

The teacher’s expression was serious and started explaining to his students including Raju:

Dear students, Diarrhoea is one of the most dangerous diseases in the world that is responsible for killing mostly young boys and girls. It is a disease caused due to unhygienic practices. It reduces the water level in our body and if not attended properly may result in death many times. The good news is that we can prevent this disease by adopting simple hygienic practices in our daily lives. Proper hand washing with soap at critical times can reduce 45% diarrhoeal deaths.

Raju asked: Teacher, what are the critical times and what is proper hand washing?

Teacher: Before that, let's talk about when do we all use our hands? We use our hands while playing in mud, muck and dirt, with the ball; we use hands after defecation. We are doing all tasks with hands. Most importantly, we also use these same hands for eating.

Listen carefully; when we use our hands for various tasks, invisible germs stick to our hands. If we do not wash our hands with soap, these invisible germs on our hands enter our body and attack us and make us fall ill, very ill. These germs can be destroyed only with the use of soap.

That's why we MUST wash our hands with soap and at critical times. Now let's hear which are the critical times?

They are - after defecation, before eating, before cooking, before feeding our younger ones, before handling drinking water, after disposal of child excreta. These are critical times and we should wash our hands not only with water, but always with soap and water. Remember, hand washing with water only is not proper hand washing.

Raju: Teacher, I now clearly understand. I also recollect that Sanju has been avoiding washing hands with soap most times.

Teacher: Unfortunately, you and Sanju too are missing out on school and your studies because of Sanju's illness. It is necessary that not only Sanju but we all must adopt good hand washing practice if we want to be able to be healthy and to study properly.

Next time when you meet him, please encourage him to wash his hands with soap regularly. You can also do this in his presence so that he is reminded often and develops the habit.

Raju: Yes teacher, I will do so. It will benefit Sanju.

Children could be asked the following questions to check if they have paid careful attention to the story.

- What is diarrhoea? (Explain what happens when a person has Diarrhoea)
- How can diarrhoea be prevented?
- Which are the critical times to wash hands with soap?
- Should we wash hands only with water? Why?
- What are the different tasks that we do with our hands?
- What will happen if we do not wash hands at critical times?

LEARNING OUTCOMES:

Students learn to wash hands at critical times.

GREEN HABIT:

Share your knowledge – tell your friends to wash their hands.

FAQS

Q- What are hygiene practices and why are they important?

A- Hygiene are those practices that prevent the spread of disease-causing organisms, commonly known as germs. Handwashing helps to remove disease causing germs (as well as other germs), mud.

Q- What are the ill effects of not following hygiene practices?

A- You can fall ill if the germs go into your body through your mouth, eyes, skin etc.

12 LITTER BINS

Level/ Class: 2

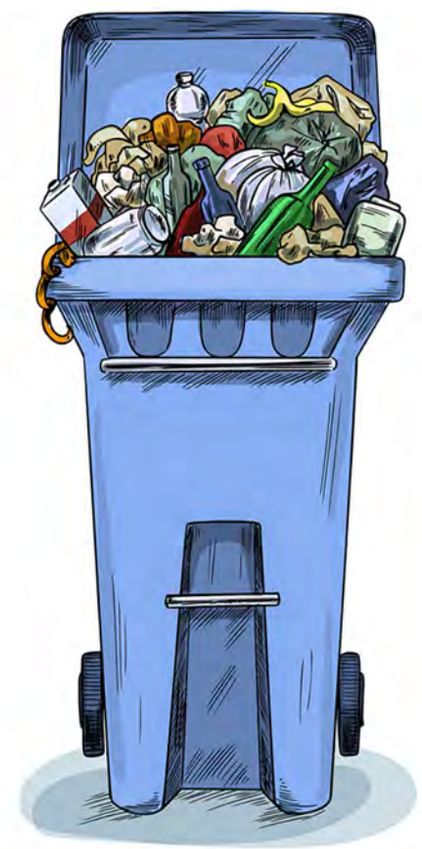
Curriculum links: School and campus cleanliness are mentioned in Standard 2 and 6. This activity introduces the importance of using dustbins and the habit of not littering.

Activity duration: 30 minutes

Activity timing: Anytime

Materials needed: None

Approach: Guided walk about the school



TOPIC:
Solid Waste Management – Managing litter in the school

CONCEPT:
Students develop an understanding of the waste management system at the school. Having enough visible, accessible bins in the school campus helps students develop good habits of using them. Students should be able to locate the bins and also understand what goes where.

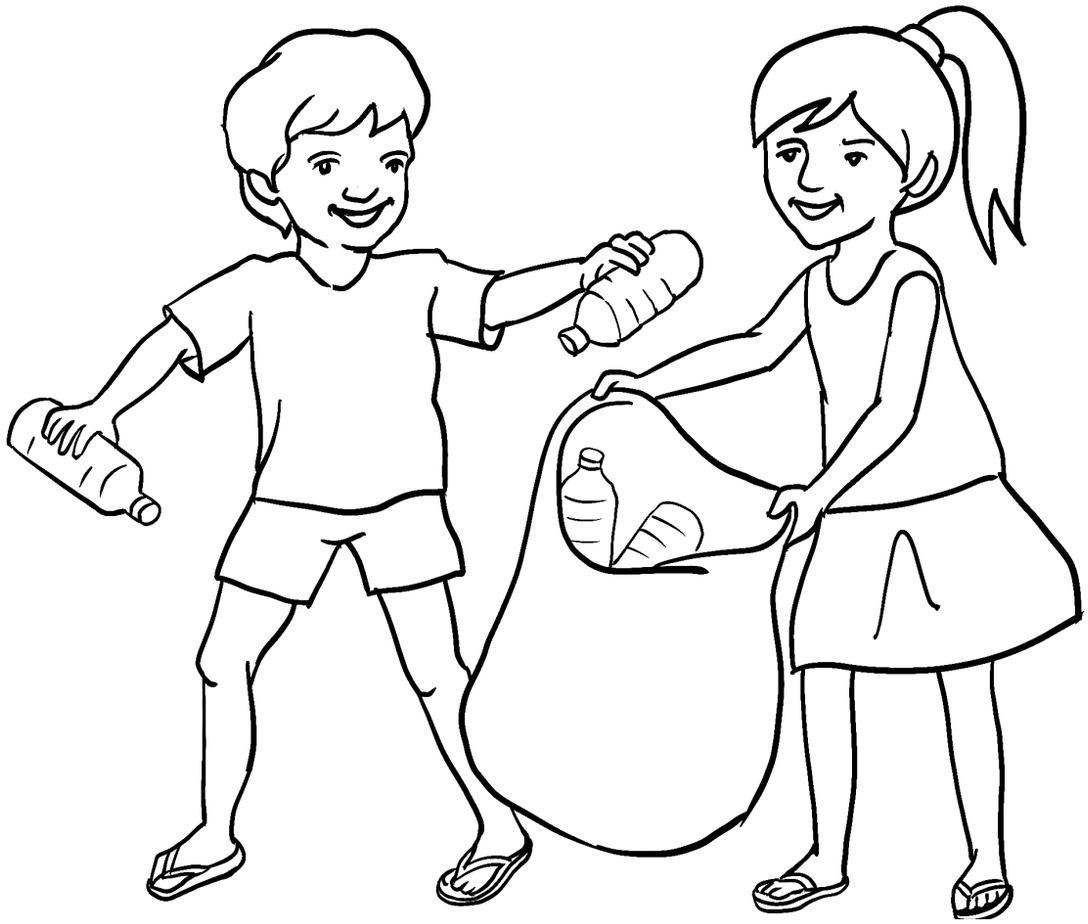
AIMS:
- Understand the type of litter found at school, most littered places, litter 'worry spots'.
- Develop observation skills and express their observations.

KEY QUESTIONS TO ADDRESS:
- What is Waste Management?
- What is meant by good waste management habits?

PREPARATION:
None

METHOD/GUIDE
Initiate a discussion in the classroom on having a pleasant and neat school environment. Ask students if they have seen any litter lying around the school and if so where. Ask what they generally do when they find litter in the school compound. Ask whether they have also seen any waste bins in the school campus.

Take students for a walk around the school pointing out what is where and different dustbins in the campus. Especially show them dustbins in the areas they generally use. If any litter is seen, encourage students to pick it up and put it in the dustbins.



LEARNING OUTCOMES:

Students understand the importance of cleanliness and not littering, and develop positive attitude towards maintaining cleanliness.

GREEN HABIT:

Keep classroom and school campus free of litter.

FAQS

Q- Is paper dry waste or wet waste?

A- Though paper is made of wood pulp and organic material, and can be composted, it is also recyclable and included in dry waste.

13 SCHOOL CLEAN-UP

Level/ Class: 2

Curriculum links:
Clean surroundings are included in class 2 as an image and a song. The importance of campus cleanliness is enhanced using this activity.

Activity timing:
Anytime

Materials needed:

- Dustbins to place at appropriate locations in the school campus
- Brooms and sacks to pick up litter in the school campus as per requirement

Approach:

- School campus activity
- Students can do the same activity in the school campus, home, out of school, their residential society, school events, garden, hills, public place.

TOPIC:

Waste Management in School

CONCEPT:

A school is where students spend most of their time. Students should feel comfortable, have a sense of ownership and pride in the school campus and maintain it neat and clean. The school clean up activity may be carried out as often as needed, with students of multiple standards participating on different days in turn. In the second or third standard, students can be given orientation on placement of dustbins and brooms.

AIMS:

- Identify litter and litter hotspots in the school campus.
- Know where brooms and dust bins are placed in the school campus.
- Develop positive attitude towards cleanliness and keeping the school campus neat & tidy.

KEY QUESTIONS TO ADDRESS:

- What is waste?
- How is waste managed in the school campus?
- What is our role in keeping the campus neat?

ACTIVITY DURATION:

- It is a school campus activity and could be taken in any season.
- It may be conducted in the afternoon when students are finished with their classwork.
- 10 minutes for the teacher to initiate discussion and talk about the litter, classroom, roles, and responsibilities of students and teachers (can be one or two times).

- 10 minutes for the students to identified litter items and put them in the dustbin (can be done continuously, before five minutes or after five minutes of any class).

- 10 minutes for the teacher to debrief and to talk on the impacts and to motivate students adopt good daily habits (can be one or two times).

PREPARATION:

- Make sure the campus has required number of dustbins and brooms with a proper place to keep; if not then get these items in adequate number.

- Please set clean-up time with the students before you start clean up.

- Please do take permission of school management, from parents as you are going to involve the student in classroom clean-up drive.

METHOD/GUIDE:

- Teachers and other stakeholders should participate in clean-up in the school campus.

- Play a clean-up song or a drum beat to help students get into an enthusiastic attitude for the clean-up.
- Make sure students pick up only litter.
- Make sure students do not disturb other surrounding classes or the school campus.
- Appreciate each other by clapping at the end of the activity.
- Remind students to wash their hands after the classroom clean-up.

LEARNING OUTCOMES:

Students understand the arrangements at the school for day to day cleanliness, learn personal habits and team work for cleanliness.

GREEN HABIT:

Keep the classrooms and school campus free of litter.

FAQS

Q- What if we cannot buy dustbins?

A- Talk to some nearby shops and request them to provide any spare cartons or sacks.

14 CLEAN AND HEALTHY

Level/ Class: 2

Curriculum links: Good habits are introduced with images in class 1, 2, 4

Activity duration: 40 minutes

Activity timing: Anytime

Materials needed: Poster with Daily hygiene practices showing Water, soap, toothbrush, nail cutter, comb, and toothpaste (copy from UNICEF booklet)

Approach: Outdoor activity with whole class

TOPIC:

Personal & Community Hygiene – Personal hygiene habits

CONCEPT:

Washing oneself and staying clean can kill germs, remove illness-causing bacteria from body and lowering the risk of disease. Good hygiene is a key to prevent infection. Keeping the body clean is an important part of keeping oneself healthy and to feel good about oneself. Caring about the way we look is important for our self-esteem.

AIMS:

To help students understand good grooming, and describe and demonstrate how to wash/ clean different part of their body.

KEY QUESTIONS TO ADDRESS:

What are hygiene practices?

PREPARATION:

None

METHOD/GUIDE:

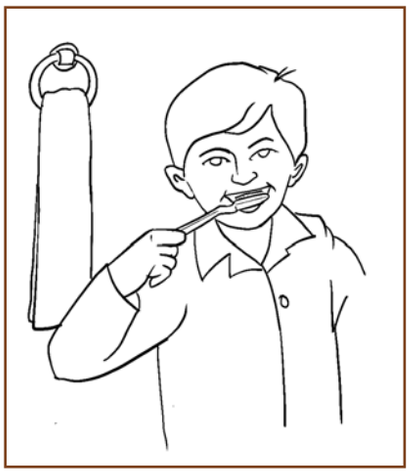
Classroom Session 1

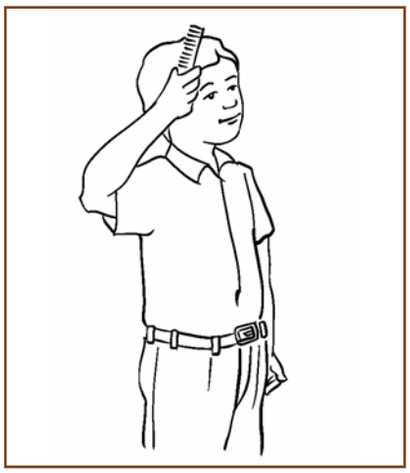
Prepare a song for young children that allows them to mime specific habits of personal hygiene. For example-

"This is the way we wash our face....
we wash our face....we wash our face.

This is the way we wash our face...
early in the morning.

This is the way we comb our hair...
Brush our teeth ...Cut our nails, etc.





The song could be extended to all personal hygiene activities. Encourage children to describe their personal hygiene habits. Encourage them to come up with their own examples of hygiene.

Teach the children to sing the song. Invite children one by one to sing and mime what they have done before coming to school or sing about and mime one habit with them and then ask them to suggest the next habit. After singing, stimulate a group discussion, for example, why each habit is important; what you need for it; how will they implement the practices they have learnt about; what will they do to spread the knowledge gained to a friend and family member?

LEARNING OUTCOMES:

Students are able to recite the hand wash song and recollect critical times to wash hands.

FAQS

Q- What if I cannot photocopy the poster?

A- Teacher may show actual objects to the students. Similar images are present in textbooks as well.

15 LET'S WASH HANDS

Level/ Class: 2, 3

Curriculum links: Handwashing gets introduced in class 1 in Math textbook with 'before' and 'after' action images, followed by handwashing images in class 2 and 3. Class 7 has an activity on making charts about maintaining good health.

Activity duration: 40 minutes

Activity timing:

Materials needed: 2 picture cards (copy from UNICEF booklet), Chalk and board

Approach: Outdoor activity with whole class

TOPIC:

Personal & Community Hygiene – Hand washing at critical times

CONCEPT:

Having and encouraging good hygiene practices in early childhood is essential for reducing the risk of cross infection. Helping children to develop appropriate personal hygiene habits will become embedded as they grow and develop.

AIMS:

To help students understand when to wash hands (Critical times of handwashing with soap)

KEY QUESTIONS TO ADDRESS:

- What are hygiene practices?
- Which are the critical times when hand washing is essential?

PREPARATION:

None

METHOD/GUIDE:

Classroom Session 1

The students can be shown the picture cards and the occasions can be discussed as follows:

Washing hands with soap after -

- Handling faeces
- Defecation
- Washing a child
- Disposing child's faeces

Washing hands with soap before -

- Handling food
- Eating
- Cooking food
- Serving food
- Feeding a child

Other key times -

- after playing outside
- after playing with pets
- after handling waste/cleaning up
- after one has sneezed or coughed

LEARNING OUTCOMES:

Students learn that hand washing with soap after defecation and before handling food or eating will improve everyone's health.

FAQS

Q- What if soap is not available?

A- Where soap is not available or difficult to obtain for handwashing, soapy water is an effective low-cost alternative. Other cleansing agents like ash can also help remove bacteria from hands. Even thoroughly washing hands with water alone can help to reduce Diarrhea, though using soap is much more effective in removing germs.

(From https://globalhandwashing.org/about-handwashing/faqs/#access)

15 HAND WASH TIME TABLE

Level/ Class: 2

Curriculum links: Handwashing is introduced in Math Standard 1 with 'before' and 'after' images, and images in Standards 2 and 3. Standard 7 has an activity on making charts on maintaining good health.

Activity duration: 20 minutes

Activity timing: Every day during lunchtime for a few days; repeat after a few weeks

Materials needed: Time table format, Chalk and board

Approach: Indoor activity with whole class

TOPIC:

Personal & Community Hygiene – Critical times of hand washing

CONCEPT:

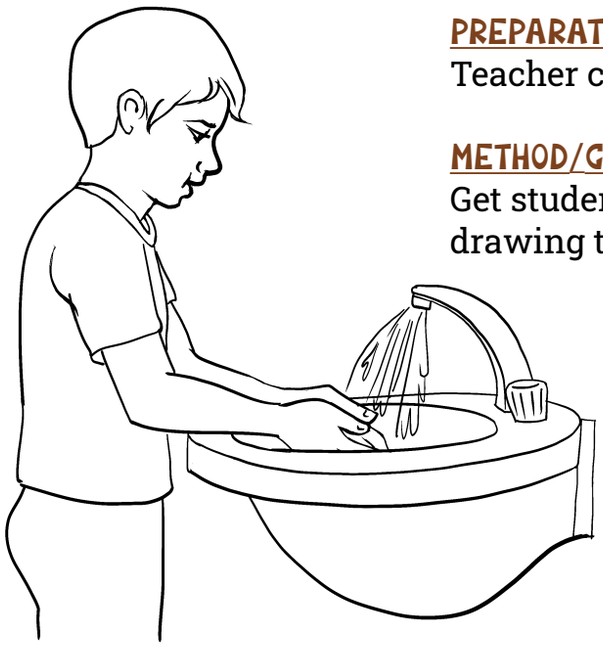
Hand Washing helps prevent us from getting sick and making other people sick. Children need to learn the steps of proper hand washing because poor hand washing technique does not remove germs. Children need to know the important times to wash their hands and follow simple hygiene rules by incorporating good hygiene methods so handwashing becomes routine. Monitoring the critical times of handwashing in school could check the spread of germs and keep the premise safe and hygienic.

AIMS:

To help students understand when to wash hands. (Critical times of handwashing)

KEY QUESTIONS TO ADDRESS:

- Why is it important to wash hands?
- Why is it important to monitor our daily routine of self-hygiene?



PREPARATION:

Teacher can involve students in the monitoring process.

METHOD/GUIDE:

Get students to draw the table in their notebooks by drawing the table on the black board.

Week	Before eating/ touching food	After using toilet	After playing outside playing with pets	After sneezing/ coughing	Before touching babies	Before handling drinking water
Mon	N	Y	N	Y	Y	N
Tue	Y	N	Y	N	N	N
Wed						
Thur						
Fri						
Sat						
Sun						

LEARNING OUTCOMES:

Students monitor their own behavior and learn to self-correct, and wash their hands at critical times.

GREEN HABIT:

Make sure you and your friends wash your hands regularly at school and at home.

FAQS

Q- Why is it important to monitor our daily routine of self-hygiene?

A- By making children monitor their own behavior, we encourage them to become more observant and develop their sense of self-care and responsibility towards themselves.

11 NEW FROM OLD

Level/ Class: 3 and above

Curriculum links: Recycling waste has been included in class 2 and 7 as best out of waste activity. This activity helps build awareness about recycling as a means of reducing wastage.

Activity timing: It is best to carry out papier mache making activity in the summer months. Avoid monsoons.

Approach: Indoor activity for the whole class

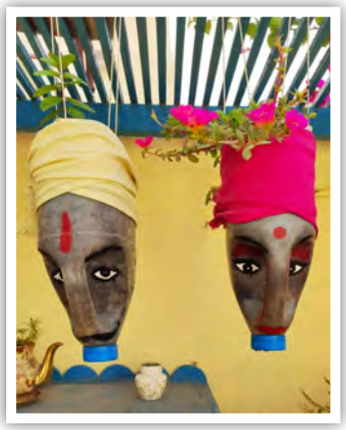
TOPIC:
Recycling

CONCEPT:

Encourage students to use waste materials to create useful items such as pen stands, boxes, baskets, waste paper baskets. Newspaper sheets with attractive pictures can be used to cover books. Plastic bottles, paper plates or papier mache can be used to make toys, masks, and/or even handkerchiefs, masks and bags can be made using pieces of colourful old clothes. Activities around the theme of recycling and reusing can be continued throughout primary and middle school levels.

In this activity, a demonstration is done of how to make papier mache, as well as recycle old paper to make new paper.

It is believed that off all the paper produced in developing countries, only a third is made from wood-fibre. Another third comes from non-wood fibres such as straw, bamboo and sugarcane bagasse. The final third comes from recycling waste paper. This emphasis on recycling has economic and environmental benefits. It helps to conserve both material and finances.



Paper can be made from waste paper. Nearly 2000 years ago, T'salLun, Minister of Agriculture in China, discovered how to make paper from a variety of substances ranging from the bark of mulberry trees to old fishing nets and waste hemp.

The process of making paper involves making pulp. When you tear a piece of paper, at the torn edge you can see

fine, thread-like wisps. These are fibres. Paper fibres consist of cellulose – the material that constitutes plants and trees such as wheat, rice and sugarcane. The materials can be used to make paper by breaking the fibres loose and free from the substances that bind them. This process is called pulping and the mass of fibres suspended in water ready to be made into paper is called pulp. A paper making machine was the first device that could produce a paper in a continuous roll rather than in single sheets. Nicholas Louis Robert invented the machine in 1798.

Nicholas Louis Robert

AIMS:

- Understand the 3Rs.
- Identify items that can be reused and recycled.
- Foster the ability of students to be creative and innovative to think of new uses of products and materials and try their hand at recycling.

KEY QUESTIONS TO ADDRESS:

- What is the 3R concept?
- What are the economic and environmental benefits of recycling?
- How recycling helps to conserve both material and finances?

ACTIVITY DURATION:

- Classroom Session 1: 30 minutes to soak paper to prepare papier mache.
- Classroom Session 2, after 3 to 4 days: 30minutes to prepare papier mache, 60 minutes to make creative crafts.
- Classroom Session 3, after a day or two: 60 minutes to paint and decorate papier mache objects.

MATERIALS NEEDED:

- Old clothes, strips of cloth, etc.
- Old paper/newspaper/cardboard
- Container
- Water
- Corn starch (optional)

- Haldi, kumkum or water colour to add colour to papier mache pulp and to paint or decorate it once it is dry.

PREPARATION:

None

METHOD/GUIDE:

Ask students what they know about the terms “reuse” and “recycle”. Facilitate a discussion about ‘What students do at home or school to reuse or recycle?’ You can share some examples of items that can be reused or recycled.

The simple process can be done in class or at home and the children can be encouraged to make paper out of waste material.

Making the pulp

1. Remove any kind of staples or pins in the paper and tear the paper into small pieces (may be two square cms). Place these scraps of paper in a container.

2. Pour water (hot water, if possible) in the container such that the water stands about 1 cm above the paper layer. Let it soak for 3-4 days. Stir the mixture every day to help break the paper fibres down.

3. Add haldi, kumkum or water colour. Let it soak for 3 to 4 days.

4. When the paper gets a clay-like consistency, use a hand blender or electric mixer to churn it into a smooth consistency.

5. When the shredded paper suspended in the water looks like a thick soup, it is ready for use.

6. Corn starch may be added to the mixture for smoothness and stability.

To prepare papier mache objects

1. Drain excess water and give the papier mache paste the desired shape. The blended paste could be used to make moulded articles such as a small container or a doll.

2. To make a container, the paste can be shaped around a clean steel, glass or plastic utensil coated with talcum powder.

3. Spread the pulp out as evenly as possible.

4. Place a sheet of paper/cloth, over the pulp on the sieve and press out as much water as you can.

To make paper

1. Pour pulp on a flat sieve with a fine mesh and spread the pulp evenly.

2. Place a clean cloth, over the pulp on sieve and press out as much water as possible.

3. Turn the sieve upside down and lift it slowly.

4. Dry the sheet of handmade paper in the sun and use for drawing or making greeting cards.

1. Shred paper and add water

2. Soak for 3-4 days

3. Pour pulp into sieve

4. Press out water using a sheet of paper

5. Dry sheet for 2 days

6. Peel off paper from block

Use the recycled paper for painting or drawing with charcoal pencil or ink. How is this paper different from other writing or drawing paper?

LEARNING OUTCOMES:

Paper can be recycled. Recycling can save the use of new natural resources to some extent.

GREEN HABIT:

Make sure you and your friends wash your hands regularly at school and at home.

FAQS

Q- What is the 3R concept?

A- The 3 Rs stand for: Reducing waste, Reusing and Recycling resources and products.

- To Reduce means to buy or use only things that are necessary, and to avoid products and materials that generate more waste.
- Reusing means to use some items or parts of items that continue to be usable, instead of buying new things in their place.
- Recycling means to change the physical or chemical form of an to make a new product.

Q- What are the economic and environmental benefits of recycling?

A- Recycling means that materials that are in use or have been in use in the past, are used to prepare new products. This reduces the pressure on natural resources. Transport and processing costs are less.

Std. 3

18 TALKING DUST BINS

Level/ Class: 3

Curriculum links: Waste segregation is featured in Standard 2 as an image. This activity helps to enhance the understanding of types of waste and its segregation.

Activity duration:

- Classroom Session 1: 15 minutes for presenting a scenario
- Class Assignment: 30 mins for students for story writing
- Classroom Session 2: 15 mins for waste segregation activity

Activity timing: Anytime or during annual day celebration

Materials needed: Stationary

Approach: Indoor activity with whole class

TOPIC:

What happens to waste materials

CONCEPT:

What would the school bin say if it could talk? What would individual waste items say about their journey through the world?

AIMS:

- Understand waste segregation
- Think about what happens to waste materials

KEY QUESTIONS TO ADDRESS:

- Why should dustbins specifically be red or green?

PREPARATION:

None

METHOD/GUIDE:

Teacher can begin by stating the conversation between two dustbins:

Dustbin 1: You know, there are two of us, to receive separated waste, but no one bothers. They just put all kinds of waste in both of us. I am really fed up saying through my green colour that I am meant for food waste, yet everything lands up in me. Same is the case with my friend here.

Dustbin 2: It's true. If only paper, plastic, cardboard etc. were put in me, it would be ready to go for recycling, and the green waste could go for composting.

Dustbin 1: And let's not talk about how students enjoy practicing aiming at the bin and end up littering around us. We are always present at all places, yet are blamed for being dirty.

Students now can be asked to look for more information on separation of waste in the school library and online. Then the students are given 30 minutes to write or compose their essay or story about the talking School Waste Bins, or individual items such as a paper bag, a plastic bag, a banana peel etc.

Instead of writing essays, a 'relay story' game can also be played. Ask students to sit in a circle. One student is asked to start off a story of an individual item in the waste bin. The next student adds one sentence linking to the story so far. The story can be continued till it retains the students' interest, or ask that the story has to end after 6 students speak, and a new story of another item can be taken up.

LEARNING OUTCOMES:

Students reflect on their waste habits and develop positive attitudes towards waste segregation and management.

GREEN HABIT:

Segregate your waste.

FAQS

Q- Why should the colour of dustbins be red or green?

A- These codes are specified in the Municipal Solid Waste Management Rules 2016 and are to be followed all over the country.

Green colour: wet waste (kitchen waste, peels, egg shells etc.)

Blue colour: dry recyclable waste (plastic, aluminium foil, bottles, cans etc.)

Red colour: reject waste (bio-waste like diapers, bandages, sanitary napkins)

19 HANDLE WITH CARE

Level/ Class: 3

Curriculum links: EVS Standard 4 and 5 EVS lessons on safe handling of water, presence of microbes in water, spread of disease via water. Standard 8 Science activity on boiling water to kill microbes. This activity reinforces the concept of safe drinking water and handling of drinking water.

Activity duration: 40 minutes

Activity timing: Anytime

Approach: Indoor activity with whole class

TOPIC:

Personal & Community Hygiene – safe handling of drinking water

CONCEPT:

Safe and readily available water is important for public health. Contaminated water and poor sanitation are linked to transmission of diseases. Even when water is safe at the source, it may get contaminated during transportation and storage. When thirsty, adults and children dip a cup in water and may then touch water with soiled hands. Young children should be educated on safe handling of drinking water, at home and at school.

AIMS:

To help students learn appropriate methods of handling drinking water.

KEY QUESTIONS TO ADDRESS:

- Why is it important to keep drinking water free from pathogens?
- How to safely transport and store drinking water?

PREPARATION:

None

METHOD/GUIDE:

Ask students to form a circle and two students will volunteer. Now the students inside the circle are asked to imagine the circle/classroom setting as their home. Now ask one student to act as host and another as a guest. Both are asked to start the act by the host serving water to the guest and others students are asked to observe the actions carefully. After a while, ask students to share their observations. Initiate a discussion on the hygiene practices done or not done by both the volunteers.

Note: The correct method during the act should be as follows –

- Host asks guest to come inside.
- Guest should remove shoes outside.
- Host welcomes guest and offers water so that guest could wash hands and feet and then offers water to drink.
- Host washes his/hands, uses a clean glass to fill water. If the water is stored in a container without tap (earthen pot), then uses ladle to draw water.
- Host should be careful not to dip fingers into the glass or hold the glass by its rim.
- After guest leaves, the host pours out the excess water, if any, into the garden or potted plant and cleans the glass.

LEARNING OUTCOMES:

Students learn about appropriate methods of handling drinking water and the incorrect practices.

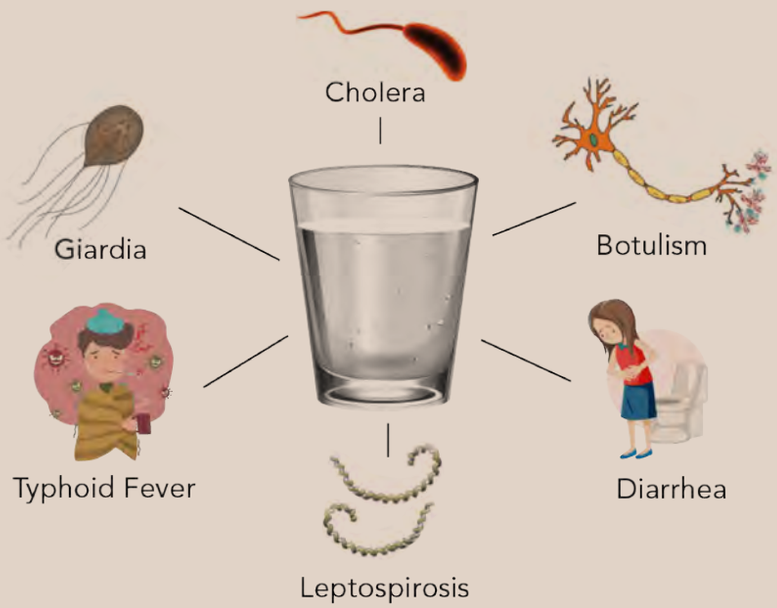
GREEN HABIT:

Uses a clean glass to drink water.

FAQS

Q- Why is it important to keep drinking water free from pathogens?

A- Water is easily contaminated with germs if we are not careful how we store and use water. Germs also multiply easily in water. Water can transmit diseases such as diarrhoea, cholera.



20 WASTE BIN OBSERVATION

Level/ Class: 4

Curriculum links: Standard 8 mentions types of waste. This activity strengthens knowledge on types and quantities of waste and how to manage waste appropriately.

Activity duration:

- Classroom Session 1: 30 Minutes for pre-audit briefing session
- Group Assignment: 1 hour for each group
- Classroom Session 2: 30 mins to present their findings

Activity timing: Anytime

Materials needed: Worksheet, Stationary

Approach: Outdoor Activity, 3-4 students each in 5 groups, depending on the number of students

TOPIC:

Solid Waste Management – Litter survey in school

CONCEPT:

Brief students about the activity and understand how the road gets dirty. The teacher should divide the class into groups and help them select a garbage bin(s) close to the school or home. The students then observe the bin/ location for a period of 1 hour. They have to note who dumps garbage in the garbage bin and make a list of the houses, stores or institutions which contribute to the garbage bin. They should also notice who comes to throw the garbage and observe whether the person throws the garbage inside the bin or outside.

AIMS:

- Understand where garbage comes from.
- Become aware of the littering behaviour of people.

KEY QUESTIONS TO ADDRESS:

- What is littering behaviour?
- How to record observations?
- How can people change littering behaviour?

PREPARATION:

None

METHOD/GUIDE:

Group Assignment

Ask the students to note their observations in the worksheet.

In the student column, the student must enter her/his name. The time and the date when the student collected the information, e.g. 7.30 a.m. to 8.30 a.m. may be entered in the time and date columns. The 'location' column should

indicate where the garbage bin is located; home/society, clinic, school, shop, college, office, any other (specify). In the 'who throws' column, the person who throws the garbage, e.g. servant, gardener, peon, watchman, person of the house needs to be recorded. In the 'throws' column, whether the person throws it inside the bin or outside it should be recorded in the table as shown below.

Worksheet

Student Name	Date	Time	Location of the bin	Who Throws	Throws	
					Inside	Outside
Shruti	15.3.98	7.30 a.m.	House	Servant	X	
	15.3.98	7.40 a.m.	House	Servant		X
	15.3.98	7.45 a.m.	Shop	Boy		X
	15.3.98	8.00 a.m.	Hotel	Man	X	

After the recordings are done, each group has to collate the data and present the same in the class. Students could talk about how many persons throw the waste outside the bin as compared to those who throw inside it? Who throws the garbage from the house, whether it is the lady of the house or man? Is there a correlation between the time and number of people throwing the garbage or between type of waste and location of the bin?

LEARNING OUTCOMES:

Students try to build their understanding about littering behavior of people and the type of waste generated.

GREEN HABIT:

Support community cleanliness programme and give feedback.

FAQS

Q- What is littering behaviour?

A- Discarding or throwing waste materials in public spaces, other than dustbins.

Q- How can people change littering behaviour?

A- People may change their behaviour when they know what is segregation, why it is to be done, and have the means to change.

21 DODGE BALL

Level/ Class: 4

Curriculum links: Standard 1 English has images of covered food. Standard 5 EVS lesson on microbes and spread of disease via food. Standard 7 Science has a lesson on food safety, health impacts of food adulteration and mishandling, and an activity on food safety measures.

Activity duration: 20 minutes

Activity timing: Anytime

Materials needed: Ball with a picture of a fly painted on it

Approach: Outdoor activity with whole class

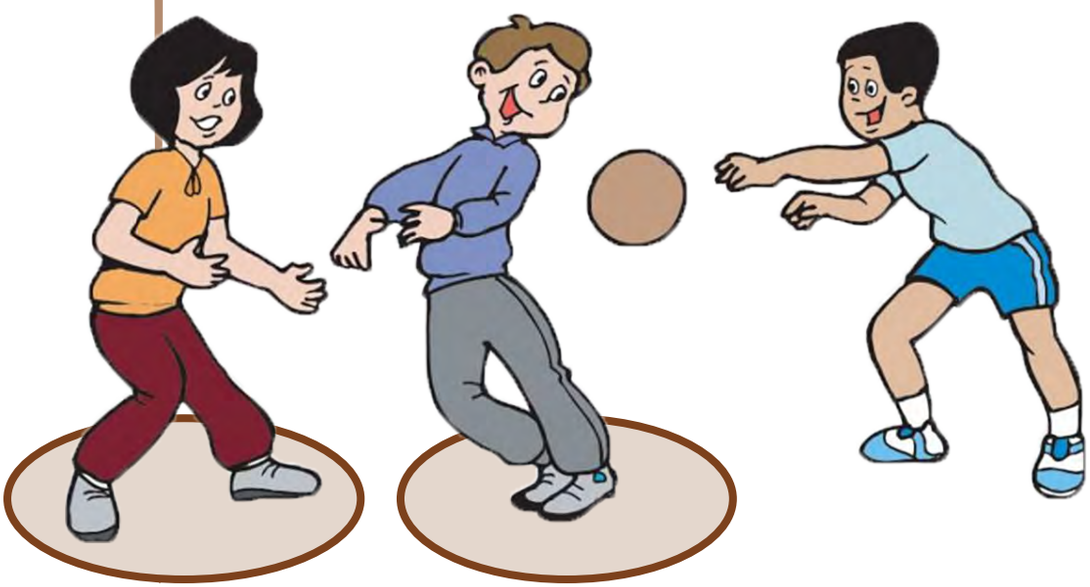
TOPIC:
Personal & Community Hygiene – Spread of diseases

CONCEPT:
Eating unhygienic food often leads to various food-borne diseases. The cut and uncovered food is easily attacked by microorganisms or insects that can spread germs. If we eat such contaminated food, it can cause diseases. In order to avoid this, we must eat healthy and hygienic food.

AIMS:
To help students understand the ways in which diseases spread and reasons to avoid uncovered/ street food.

KEY QUESTIONS TO ADDRESS:
- Why to avoid uncovered food?
- What are the harmful effects of consuming uncovered food?

METHOD/GUIDE:
Ask students to stand in a circle. Ask two-thirds of the students to stand inside the circle and throw a ball at them. The students inside the circle will have to try and dodge the ball. If the ball touches the player, he is out of the game.



After all the students are out, explain to them that the players inside the circle represent uncovered food, while the ball is the fly trying to sit on that food and contaminate it, and the students, getting out of the game, are falling sick after consuming uncovered/street food.

LEARNING OUTCOMES:

Students learn that uncovered food might get contaminated by germs passed on by flies and other insects and thus eating such food might cause illness.

GREEN HABIT:

Keep food covered.

FAQS

Q- Why to avoid uncovered food?

A- Uncovered food may be contaminated by germs.

Q- What are the harmful effects of consuming uncovered food?

A- Food that has been kept uncovered may be contaminated, and can cause illnesses.

22 GERMS ARE INVISIBLE

Level/ Class: 4

Curriculum links: EVS Standard 4, 5 have images, lessons on microbes in water and food. Science Standard 6, 8 mentions useful & harmful living things, disease, spread, symptoms, cures.

Activity duration: 45 minutes

Activity timing: Anytime

Materials needed: Ball (plastic/paper/ thermocline); Glitters/ turmeric powder; Vaseline; Bowl/paper, soap, handwashing station/Bucket-Mug, Prepare the ball: Dip the Vaseline covered ball into a bowl filled with glitter (or turmeric powder)

Approach: Outdoor activity with whole class

TOPIC:

Personal & Community Hygiene – Importance of washing hands with soap

CONCEPT:

Show the participants the glitter OR turmeric powder. Explain that the glitter will serve as germs. They are going to see whether or not germs spread. Germs spread from people to people and if someone is sick or sneezes on their hands they could spread germs around to everyone in the class, even if they don't touch every single person. The class shares pencils, pens, and other supplies. We all touch each other's desks. All of these surfaces are places for germs to live and spread.

AIMS:

- To help students understand the importance of washing hands with soap.
- To help students learn that germs are invisible, but that they can spread easily and quickly through our hands.

KEY QUESTIONS TO ADDRESS:

- What are germs and how they affect us?
- Why is washing with soap important?

PREPARATION:

None

METHOD/GUIDE:

Prepare the ball - Dip the Vaseline covered ball into a bowl filled with glitter (or turmeric powder)

Now ask one of the students to act as if he/she is going to the toilet. The student then directly takes the ball to play, passes it to another student. Teacher asks to pass the ball to a few other students, reapplying the turmeric/glitter as necessary.

Alternatively, pretend to sneeze on their hands (without actually sneezing) and pick up the Glitter ball. The sneezy germs are now on the ball and then pass on the ball.

Ask a few students to touch other surfaces in the classroom, leaving a trail of turmeric/glitter. Also ask a few students to shake each other's hands. Now, identify two volunteers, ask one volunteer to wash hands only with water and the other to use water and soap with correct steps.

The following questions could be asked while the game is on -

- What has happened to our hands and our friends' hands as we pass on the ball to them, shake hands as well?
- Where else do you see the turmeric/ glitter?
- If the turmeric/ glitter were faeces or disease germs, how fast do you think contamination can occur? How about in a school where there are many people close together?
- Explain ways how germs can pass onto others.
- What happens when we wash hands with only water?
- What happens when we wash hands with water and soap in the correct manner/steps?
- What might happen if you eat food without washing germ covered hands with soap?

Extension:

Divide students into smaller groups.

Give each group a different colour glitter.

After each group has completed spreading the germs (glitter) within their group, allow them to find students to rub hands with from other groups. After allowing students to float around rubbing hands with students from other groups have them look at their hands and see how many colours of glitter they can see. Each colour represents germs that they have picked up from another group.

Furthermore ask students to do these actions:

Imagine you were about to sit down and enjoy a meal. Just before you started to eat, you noticed your hands were covered with turmeric/glitter. The turmeric / glitter represents just a fraction of the germs from faeces present on our hands. Imagine that we could see our hands covered with millions of faeces germs. Would you want to eat food with those hands? Would you continue eating? What would you do? (Make Actions while saying this or ask children to enact).

Alternatively, identify two volunteers, ask one volunteer to wash hands only with water and the other to use water and soap with correct steps. Allow students to wash hands at sink or in prearranged water, buckets and soap.

Ask:

- What happens when we wash hands with only water?
- What happens when we wash hands with water and soap in the correct manner/steps?
- What might happen if you eat food without washing germ covered hands with soap?

LEARNING OUTCOMES:

Students learn that person to person contact spreads germs. Germs clinging on unclean hands can easily get in food and from food into mouths. Visibly clean looking hands are not necessarily free from germs that are invisible.

GREEN HABIT:

Wear a mask.

FAQS

Q- What is the importance of washing hands with soap?

A- It is important to wash hands with soap as our hands may touch many different objects which may carry germs of diseases. These germs get transferred onto hands, and then through our mouth, into us.

23 BITTU SAYS, "WASH YOUR HANDS"

Level/ Class: 3, 4

Curriculum links: Handwashing is introduced in Math Standard 1 with before and after images, and images in class 2 and 3. Standard 7 has an activity on making charts on maintaining good health.

Activity duration: 30 minutes

Activity timing: Anytime

Approach: Outdoor activity for group of 7-10 students

TOPIC:
Personal & Community Hygiene – When we should wash our hands

CONCEPT:
Having and encouraging good hygiene practices in early childhood is essential for reducing the risk of cross infection. Helping children to develop appropriate personal hygiene habits will become embedded as they grow and develop.

AIMS:
To reinforce the message of washing your hands during critical times without forgetting.

KEY QUESTIONS TO ADDRESS:
What are hygiene practices and why are they important?

PREPARATION:
None

METHOD/GUIDE:
Teacher asks a student to volunteer and explains him/her that they are playing a game to become a leader and the leader should be healthy.

Other students as participants are asked to follow Bittu's order. Bittu faces a group of students about 15 feet away. Bittu says various commands:

- **Cut vegetables-** Participants respond by doing the action of washing their hands with soap and water, then washing the vegetable and cutting it in small pieces.

- **Eat Mid-day meal-** Participants show that first students go to the handwashing station to wash their hands with soap and water, then proceed to get their tiffin to eat midday meals and after eating they again wash their hands again using soap and water.

- **Sneeze or cough in your hand**
- **Play with dog/cat/in the mud**
- **Go to the toilet-** Participants respond by “squatting down.” And then doing the motion of hand washing.

Each student who does both actions for each command and in the right order gets to advance one step. Each student who fails to do both actions or does them in the wrong order stays in the same place. Some students will forget to “Wash their hands” and some students will forget to wash before food and after the toilet, which adds fun to it. The student who tags Bittu and shouts, “Clean hands!” first, gets to be Bittu for the next round.

LEARNING OUTCOMES:

Students learn to follow commands in the right way and to convey this message to family and friends. They understand the need to keep practicing the habit of handwashing at critical times.

FAQS

Q- What are hygiene practices and why are they important?

A- Hygiene refers to a person’s behaviour for personal cleanliness and health. If we do not follow proper hygiene, we may get infections and fall ill.

24 ROLE PLAY -TALE OF GERMS

Level/ Class: 4

Curriculum links: EVS Standard 5 has content on infections, diseases and how to prevent them; Science Standard 8 has content on spread of infections, types of diseases, causes, symptoms, treatment etc. This activity introduces concept of infection and spread at a younger class via a role-play

Activity duration: 45 minutes

Activity timing: Anytime or during annual gathering

Materials needed: Colored chart paper; Scissors, tape, etc. to make props, costumes for the role play

Approach: Indoor activity with whole class

TOPIC:

Personal & Community Hygiene – Spread of germs

CONCEPT:

It's hard for children to understand that something they can't see can actually make them sick. Even though they can't see germs, children need to know how to protect themselves from these germs by using healthy habits. Role plays on topics related to behaviours, habits, etc, help develop sensitivity and awareness among students.

AIMS:

To help students understand that germs are everywhere, and understand how easily germs can spread.

KEY QUESTIONS TO ADDRESS:

What are germs and how do they spread?

PREPARATION:

None

METHOD/GUIDE:

Role play of the following story by a few selected volunteers who need to be briefed and then given props, costumes accordingly.

Once upon a time there was a king and a queen who lived on the hilltop. They had a very big palace with 10 doors to enter their house. The palace was filled with their families and relatives from faraway lands. There lived Princess Keya and Prince Bhunar. They used to play inside the palace. They had 4 horses and 2 big elephants. Inside the palace there was a beautiful garden where Keya and Bhunar played with the birds. They often lied down under the big Neem Tree and drank from River Swaasti which flowed inside the palace boundaries. One day when Keya and Bhunar went outside to meet their friend, who lived in the nearby farm, Jontu, a monster, saw them crossing the road. He wanted to hurt Keya and Bhunar. But both of

them were very brave. They asked Jontu what they want and Jontu replied that he will beat Keya and Bhunar so that they can never come out to play. Keya was shocked and she stood still. Bhunar told Jontu that their father was a king and he will never spare Jontu for this atrocity. He said their mother was the queen of magic and she will be very angry to hear this. But Jontu was completely out of his senses. He only had bad thoughts. He laughed at them and said that let's see how they escape him. Once he told this, Jontu started growing in height till he became a huge giant. Keya and Bhunar knew that they would be killed if Jontu attacked them. Keya and Bhunar started running towards their palace screaming out for the King and the Queen.

The King and the queen were having tea in the balcony when they saw their little Princess and Prince running towards the palace. Then they saw that Jontu is chasing them and he has transformed himself into a monstrous giant. The king called the guards in a thunderous voice and asked them to quickly close all the doors. The queen panicked and she thought that Keya and Bhunar would not be able to escape inside the palace. So she did a spell and gave Jontu a curse of "Adrishyatam", As soon as she spelled it out Jontu turned into small Jontus in innumerable numbers. It was like stream of ants and then finally it disappeared. The king was shocked to see what his wife had done. Meanwhile Keya and Bhunar entered the palace and ran towards the balcony where the queen and the king were standing. The King asked in shock to the queen that how could she do this as now Jontu will be not seen with bare eyes and will try to attack Keya and Bhunar. The queen was horrified as she understood her mistake and she fell down. Keya quickly held up her mother and made her seat while Bhunar clutched his father's hand in horror.

The King then called all the people from the village, the soldiers and the merchants from all over the world and told them that Jontu is an Invisible Monster who wants to harm humans especially the children. He asked everyone to stay cautious as Jontu can be anywhere and no one will be able to see it.

Meanwhile Jontu found his body so small that he couldn't do much alone. So he called all the other parts of his body which looked similar to Jontu. Jontu was very angry and he couldn't think straight. He screamed and jumped around wanting to take revenge. Slowly after that Jontu started plotting how he will harm Keya and Bhunar again. That's how Jontu was there everywhere, making more Jontus and plotting the final attack.

After the story ask the class:

- What they thought about Keya and Bhunar?
- Who is Jontu?
- Was Jontu right?
- What do they think of Jontu?
- What will happen to Keya and Bhunar?
- Do we know of Jontu in our everyday life? Who does Jontu depict in our daily lives?

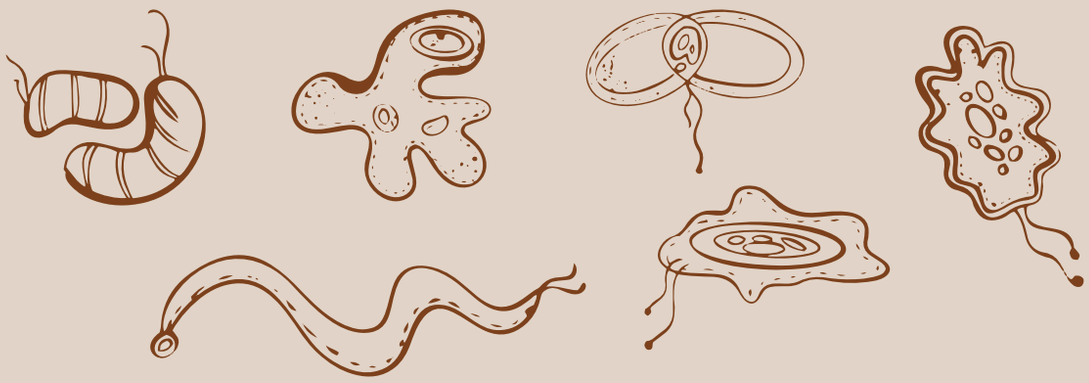
LEARNING OUTCOMES:

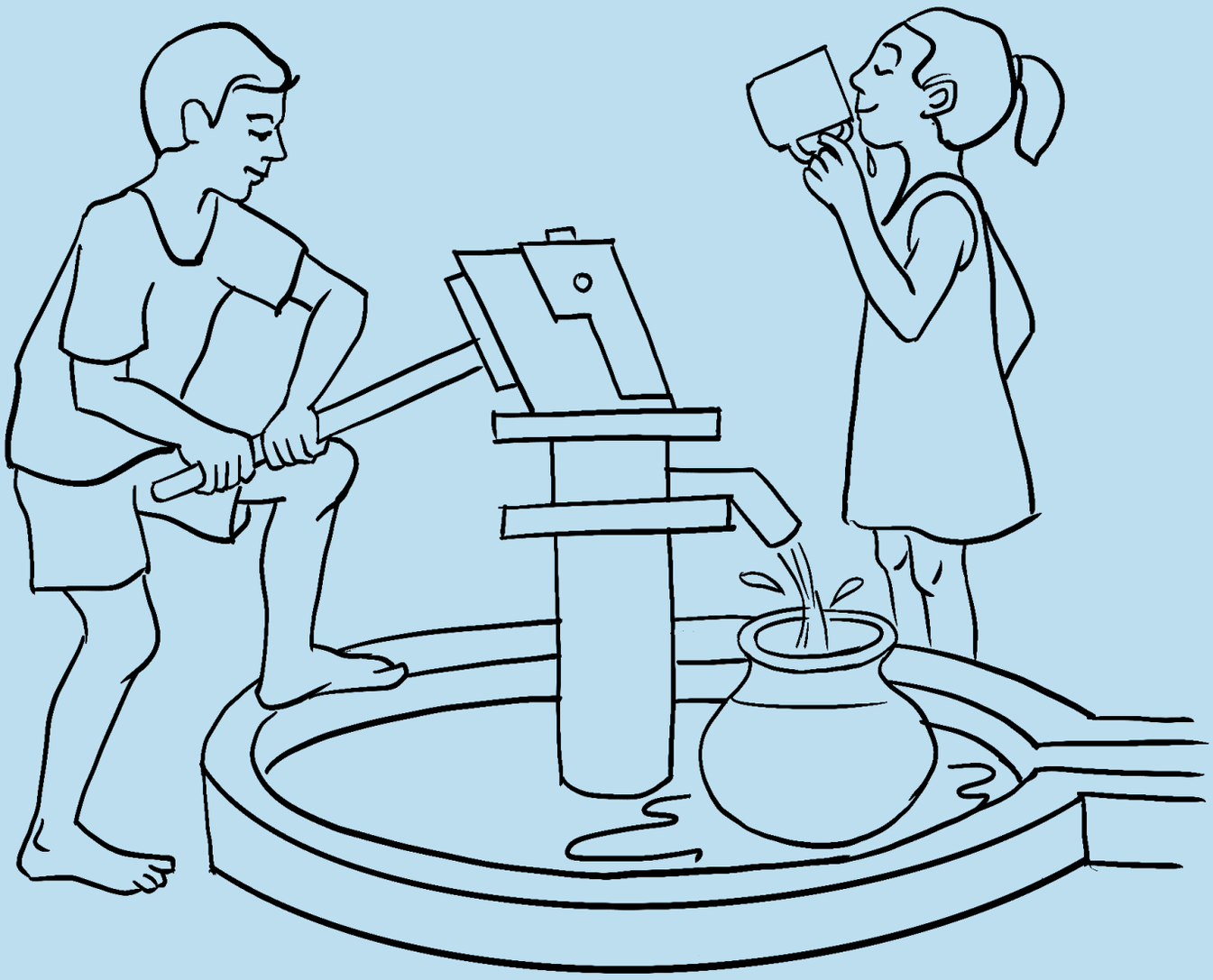
Students learn that invisible germs may affect our health.

FAQS

Q- What are germs?

A- "Germs" refers to very tiny living organisms such as bacteria, viruses, fungi, and protozoa. Different types of germs live in the soil, air, water, and even on and in our bodies. Some of them cause diseases.





SECTION 3:

Water Management

3.1. INTRODUCTION

3.1.1. OVERVIEW OF THE THEME

Water is one of the most important substances on earth. Water is life. All plants and animals require water to survive. If there is no water, there would be no life on earth. As of today Water is God's gift. Rainfall is the only source of water. Surface water and groundwater are two interchangeable phases of water. Hence, their availability and use have to be managed together.

Apart from drinking it to survive, people have many other uses for water. Water is the most important resource of development. In this theme, we have introduced basic concepts of water, it's importance & properties, Water Quality and Water as a life skill for healthy life of human beings.

Water is a subject which need to be understood in phased manner. The students from 1st to 4th standards will learn about the basics, need, use & importance of clean and pure water in day today life. The students from 5th to 8th standards will learn about the important source of water i.e., rainfall & its measurement, traditional methods and measures for water storage and their use for various purposes. As they advance in the standards they will learn in depth about various components of hydrological cycle, the rocks where groundwater occur & their types, use of groundwater, importance of water quality & its monitoring, water safety and security planning etc. These are integral part of the SDG6 (Sustainable Development Goal), GoI and GoM's flagship programs.

3.1.2. RATIONALE AND EXPECTED LEARNING OUTCOMES

The theme seeks to help the students understand human life experiences related to water. The students need to be informed about the Safe Drinking Water right of every human being. This will help the students to make aware of values of water, judicious use of Water. Reading about the ill effects of drinking of bad quality water can be an eye opening to the students who have never had to experience the water borne diseases. This will help them to know the factors (natural and manmade) responsible for the deterioration of water quality. The activities and projects will help the students to get a real life feel of what exactly is the situation and what happens if the water is not saved. To capture the student's attention poems, short films, real life activities have been proposed. These will certainly help in making them a water sensible citizen of India. By inculcating the life skills related to water we hope the children to become the water warriors. The students should learn saving of water resource is nothing but increasing the resource.

SUMMARY OF CURRICULUM ANALYSIS

Active Learning pedagogy states that any subject should be introduced in graded manner and child should acquire this knowledge, with his/her experience. In MSCRT syllabus, the water is introduced in third standard in Environment Science subject. To fill this gap, linguistic games, poems and simple experiments are introduced in standard 1 and 2. From these activities, child can understand vocabulary around the word Water, what is its importance and build green habits about its usage. From standard 3 onwards, concept of ground water, water quality and what a child with the help of family can do at an individual level are introduced. The simple techniques such as SODIS for good quality of water, field visit to have a look of Water Distribution System will enhance their world of wisdom. The focus is existing curriculum and lesson plans provided in book should go in hand in hand and information can be converted into knowledge.

3.1.3. ACTIVITY FRAMEWORK

Std	Topics and subtopics	Presence in textbooks	Concepts	Activities / Projects
1	Water		• First step to know water • Relation between different entities which are using water. • Some substances dissolve in Water & some are not. • Basics of the Water cycle with the help of song.	• "W" for water • Mind Map of Water • What will dissolve in Water? • Song of Water Cycle
2	Water		• Prepare mind map to know who all have dependency on water. • Know the use of water in our daily life. • Properties of water – color, odor & taste	• Do you need Water? • Where do we use Water? • Let us understand Water properties using experiments
3	Water	Environmental Studies Chapter 8- Our Need of Water Chapter 9- Where does Water come from? Chapter 10- More about Water Chapter- Our Body	• Household level methods of water purification. • Know the amount of water required in day to day life in litres. • Understand the important property i.e. density of water.	• Let us clean Water through experiment • What is your daily use of Water? • What will float and What will sink?

Std	Topics and subtopics	Presence in textbooks	Concepts	Activities / Projects
4	Water	Environmental Studies Chapter 3- Storage of Water Chapter 4 - Water Safe for Drinking Chapter 5 - Water for Every Household Chapter 6 - Variety in Food Chapter 15 - My District, My State Chapter 24 - Are We endangering our environment?	• Various processes involved in the Water Cycle. • Methods of Water storages • How water reaches to our homes	• Create Rain in the Classroom • Water Storage • How does Water come to your place?

Std.	Related subject and topics in MSCERT curriculum for relevant standard; key gaps addressed	Learning outcomes Knowledge, skills, values expected to be developed for the topic	Pedagogy/ Activities & projects in brief (use templates below for details)	Sustainable Development Competences (see Box on Pg 4)	What is to be assessed, and methods of assessment	Teachers' ESD Competences	Backward/ forward links with other activities/ projects, if relevant
1	W for?	Awareness about importance of Water since day one of the school	First step towards Water is an alphabet.	Self-Awareness Competency	Understanding about W for water		
1	Mind Map of Water	With the help of a mind map, students can understand the relation between different entities which are using water.	Mind mapping helps you think, collect knowledge, remember and create ideas.	Systems Thinking Competency	General Knowledge about water Judgemental Method		
1	What will dissolve in Water?	Students will understand some substances dissolve in Water.	Kitchen method	Collaboration Competency	Basic know how about solubility of water Judgemental Method		
1	Song of Water Cycle	Students will understand the basics of the Water cycle with the help of song.	Collectively Sing Poetry on water cycle		Create interest about water cycle		

2	Do you need Water?	Students will understand who all have dependency on water.	Preparing mind map	Systems Thinking Competency	Concepts about water dependency		
2	Where do we use Water?	Students will understand the use of water in our daily life.	Through games	Systems Thinking Competency			
2	Let us understand Water	Students will understand pure water is colourless, odourless and tasteless.	Conducting some experiments with the help of students	Systems Thinking Competency	How to know properties of water		
3	Let us clean Water	Students will understand home remedies for water purification.	Conducting an experiment using household level methods	Self-Awareness Competency	How to check the purity of water		
3	What is your daily use of Water?	Students will understand the amount of water required in litre.	By self-experimentation	Self-Awareness Competency	Concept about Measurement of water With the help of the results of each group		Standard 2: Where do We use Water?
3	What will float and What will sink?	Students will be introduced to the density property of water.	By self-experimentation	Systems Thinking Competency	Knowledge to be judged from the results of group experiment		Standard 2: Let us understand Water

4	Rain in the Classroom	Students will be introduced to various processes involved in the Water Cycle such as Evaporation, Condensation.	By self-experimentation	Systems Thinking Competency	Knowledge to be judged from the results of group experiment		Standard 1: Introduction to Water Cycle with the help of poem
4	Water Storage	Students will understand the need of Water storage and how changes are affecting the traditional methods.	Through discussions with parents	Systems Thinking Competency	Based on the time lines prepared by each one of them		
4	How does Water come to your place?	Students will understand the journey of water.	With the help of questionnaire	Systems Thinking Competency	Based on the charts prepared by students		

3.1.4. ACTIVITY PLANS

1) STANDARD 1:

i. W for Water
ii. Mind map of Water
iii. What will dissolve in Water?
iv. Song of Water Cycle

2) STANDARD 2:

i. Where do we use Water?
ii. Do you need Water?
iii. Let us Understand Water

3) STANDARD 3:

i. Let us Clean Water
ii. What is your daily use of Water?
iii. What will float and what will sink?

4) STANDARD 4:

i. Rain in the classroom
ii. Water Storage
iii. How does water to come your place?

3.2. ACTIVITIES/PROJECTS

1 W FOR?

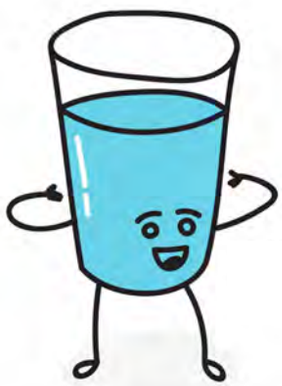
Level/ Class: Standard 1

Curriculum links: Language in Barakhadi

Activity duration: 30 min

Materials needed: Chalk, Board

Approach: Classroom activity



TOPIC:
Water Management

CONCEPT:
Water is life, so we will introduce the word Water for W in the alphabet.

AIMS:
To Emphasis on word "W for Water"

KEY QUESTIONS TO ADDRESS:
NA

PREPARATION:
NA

METHOD/GUIDE:

1. Ask children, what we drink when we are thirsty?
2. Teacher can ask the similar question for crow, dog. Children may know the story of Thirsty Crow.
3. What trees will do when they are thirsty?
4. Teacher can establish a chain of water which emphasizes the importance of water.
5. Thus, teacher will introduce W for Water in English and **प पाण्याचा** in Marathi.

FAQS:

Q- Why W for water?

A- Water is life for all living things.

Q- What do mean by thirsty?

A- Thirsty means wanting or needing a drink & mostly it is water which satisfies the thirst.

Q- What do you mean by importance of water?

A- Without water living beings cannot survive.

LEARNING OUTCOMES/ GREEN HABIT:

Understand importance of Water in our life.

Additional Resources:

- **Story: Use of Water-** https://storyweaver.org.in/stories/6100-bath-time-for-chunnu-and-munnu
- **Story: Bubbles in Water-** https://storyweaver.org.in/stories/37257-the-bubble-mystery

2 MIND MAP OF WATER

Level/ Class: Standard 1

Curriculum links: Day to day life

Activity duration: 30 min

Materials needed: Card sheet, marker pen, Sketch Pen

Approach: Classroom activity

Preparation: NA

TOPIC:
Water Management

CONCEPT
Children should be made aware that Water is an integral component of our life.

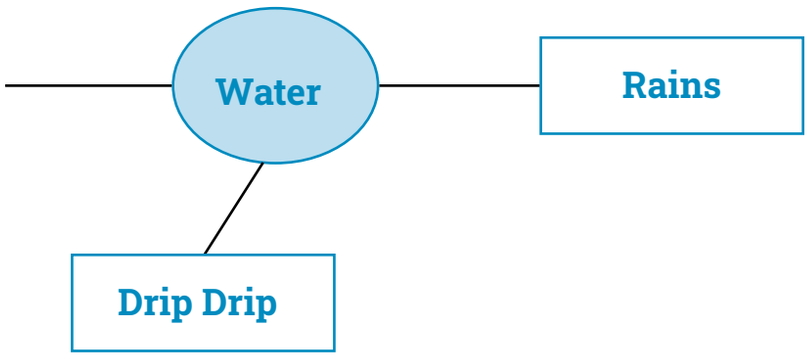
AIMS
To emphasize dependency on Water.

KEY QUESTIONS TO ADDRESS:
NA

METHOD/GUIDE:
1. Ask children to tell the teacher, what they first recollect when they listen the word Water.

2. Based on the answers given by the children please prepare the mind map using card sheet.

3.



4. Guide the students about their experience or memory about Water.

FAQS:

Q- What is mind map of water?

A- Consolidation of immediate words strike your mind in relation to water. Maybe it could be related to its properties, usage, quality, etc.

Q- What do you mean by integral component of the body?

A- Integral means necessary to complete. Water is necessary component of our body and occupies 71% of our body.

LEARNING OUTCOMES/ GREEN HABIT:

Understand all things that depend on Water.

Additional Resources:

Story: Raincoat https://storyweaver.org.in/stories/369-the-red-raincoat

3 WHAT WILL DISSOLVE IN WATER?

Level/ Class: Standard 1

Curriculum links: Day to day life

Activity duration: 45 min

Materials needed: 1 big vessel, 4 lemons, sugar, salt, spoon and water

Approach: Classroom activity or Kitchen room of school

TOPIC:
Water Management

CONCEPT:
Introduction to simple properties of water.

AIMS:
To make them aware that some substances dissolve in water with the help of a simple cooking recipe.

KEY QUESTIONS TO ADDRESS:
Water Properties

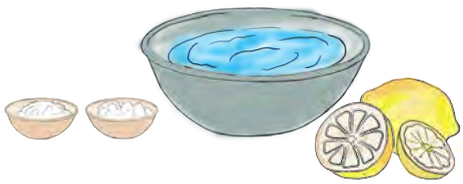
PREPARATION:
Classroom or kitchen room should be arranged in such a way that children can sit in a circular manner and everybody can see.

METHOD/GUIDE:
1. In the beginning, show all the material and ask students what we are up to.

2. Accept all answers and keep them guessing.

3. Take water in glass and ask one of the children to taste it. Discuss what water tastes like.

4. In a big vessel, take appropriate amount of water enough for all the class.



5. Cut the lemon and ask one of the children to squeeze the lemon.

6. Ask one of them to stir the mixture.

7. Then add salt and sugar as per taste and ask one of the children to stir the mixture.

8. After some time, sugar and salt will disappear. Discuss where is sugar and salt now.

9. Let them drink Sharbat. Ask them what the taste of water is?

10. Some substances dissolve in water and they change the taste, colour and smell of water. Emphasis on this point.

FAQS:

Q- What do you mean by dissolve?

A- Any substance when added to water becomes liquid i.e., changes its form. e.g. sugar

Q- What is taste and how it is to be recognised?

A- Taste means the ability to recognize the flavour of food or drink. To recognize the taste, we have to put it on tongue.

Q- What do mean by tasteless?

A- The taste, which is beyond six primary tastes like sweet, sour, salty, bitter, astringent, pungent.

Q- What is do you mean by Syup or sharbat?

A- A thick sweet liquid often made by adding sugar, salt and fruits like lemon, mango etc.

LEARNING OUTCOMES/ GREEN HABIT:

Understand simple properties of Water.

4 WATER GETS HEATED DUE TO HEAT FROM THE SUN

Level/ Class: Standard 1

Curriculum links: Language

Activity duration: 30 min

Materials needed: सूर्यामुळे पाणी तापते song written on card sheet

Approach: Classroom activity

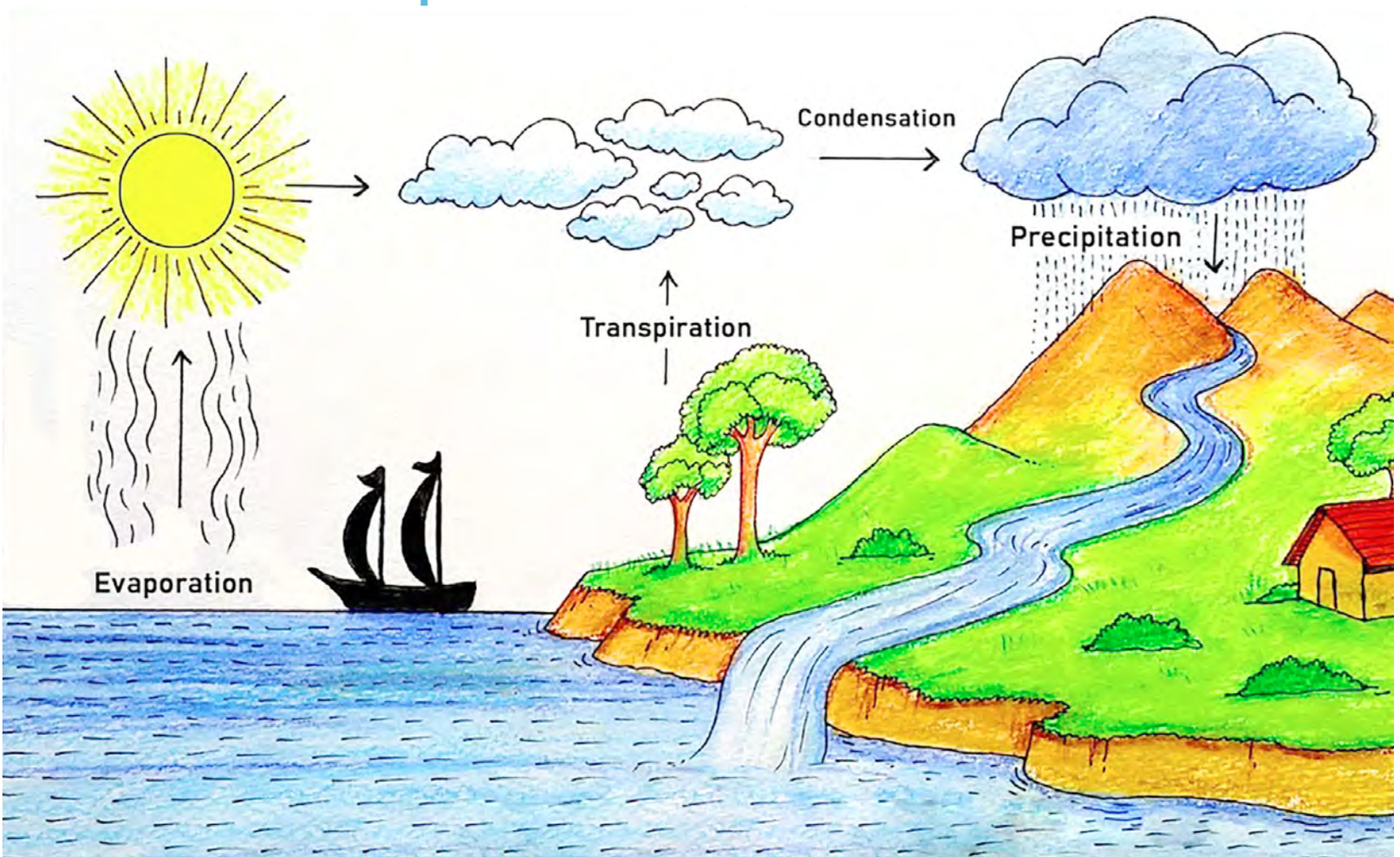
TOPIC:
Water Management

CONCEPT:
Introduction to water cycle.

AIMS:
To make them aware of the water cycle with the help of song.

KEY QUESTIONS TO ADDRESS:
How does it rain?

PREPARATION:
Card sheet should be displayed in class so that children can read the song.



METHOD/GUIDE:

1. Recite the song with children and introduce them to the world of rain.

2. Have a nice chat about rain and their memories about rain.

The Sun heats Water
सूर्यामुळे पाणी तापते

The Sun heats Water
सूर्यामुळे पाणी तापते

Water becomes vapour
पाण्याची मग वाफ बनते

Vapour becomes cloud
वाफेचे मग ढग बनतात

Clouds go up & up
उंच उंच वर जातात

There they feel cold
तेथे त्यांना थंडी वाजते

They fight for the sheets
चादरीसाठी भांडण होते

Lightning didi scolds them
वीजताई त्यांना रागावतात

Clouds starts crying
ढग आपले रडू लागतात

Rain falls loudly
पाऊस पडतो जोरजोरात

Children dance happily
मुले नाचतात आनंदात

FAQS:

Q- What is water cycle?

A- Evaporated water goes up in the sky and forms clouds. The clouds after condensation precipitates in the form of rainfall. The rainfall when falls some part flows over the surface and some part goes under ground. When it gets saturated, part of it again comes over the surface through the springs.

Q- What is evaporation?

A- When water is heated it gets converted from liquid to vapour state. This is evaporation. The vapour being light goes up in the sky.

LEARNING OUTCOMES/ GREEN HABIT:

Simple introduction to different processes involved in Water Cycle.

5 WHERE DO WE USE WATER?

Level/ Class: Standard 2

Curriculum links: Environmental Science

Activity duration: 30 min

Materials needed: Mind map prepared with the help of children

Approach: Classroom activity

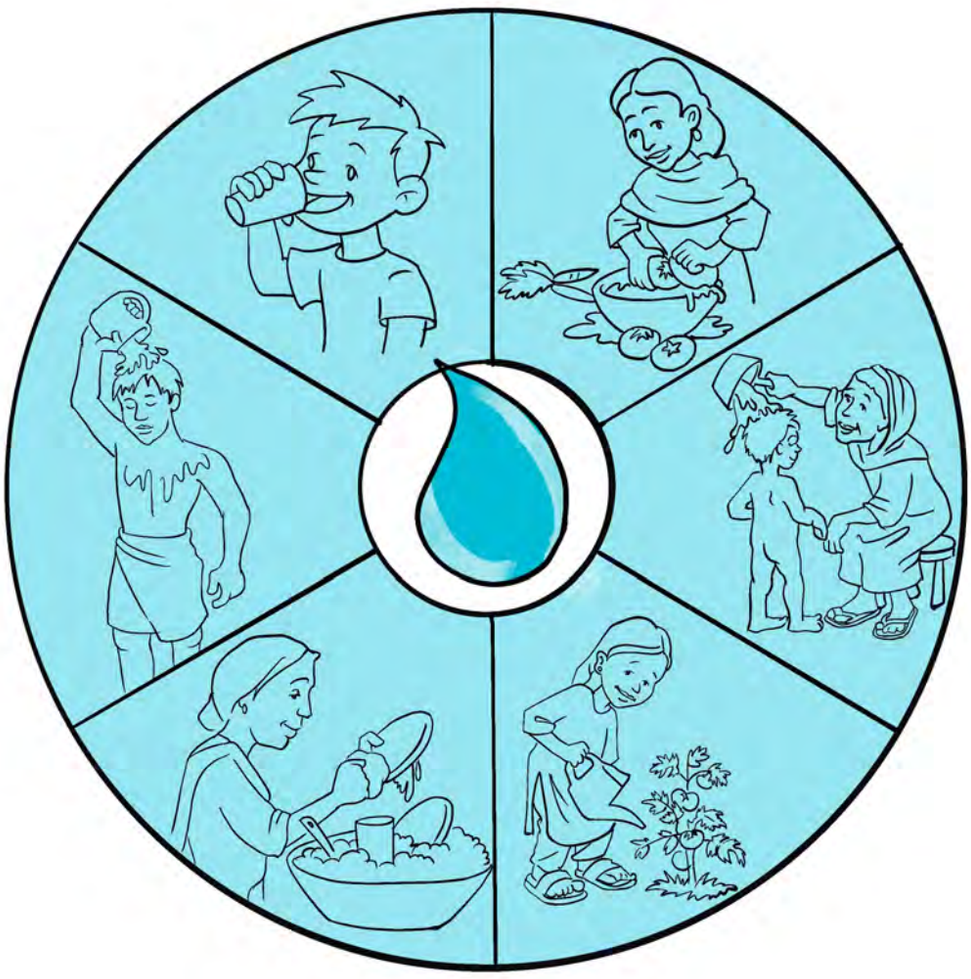
TOPIC:
Water Management

CONCEPT:
To make children aware that Water is the most critical element of our life.

AIMS:
Uses of Water

KEY QUESTIONS TO ADDRESS:
In our day-to-day life, where do we use water?

PREPARATION:
NA



METHOD/GUIDE:

1. Read aloud a mind map with the help of children, revise the last lecture's discussion.

2. With the help of a mind map, ask the children where do you need water from waking up in the morning to sleeping at night? Try to remember all activities.

3. Note down all the answers on the black board and classify in morning, noon and night.

4. Try to emphasize, lots of our work is dependent on water. We should use water carefully.

5. Discuss what they can do at their level for careful and judicious use of water.

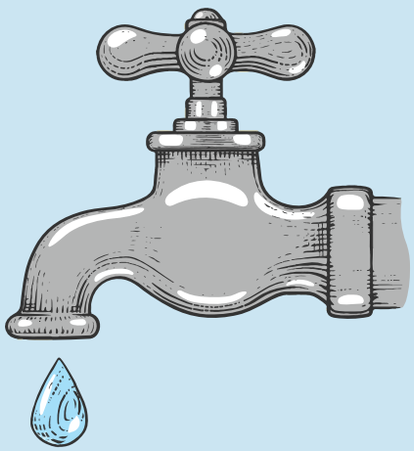
FAQS:

Q- What is judicious use of water?

A- In simple words, sensible or careful use of water in day today life. It is expected that there is no wastage of water.

Q- What do you mean by most critical element?

A- Most critical means without water no living being can survive.



LEARNING OUTCOMES/ GREEN HABIT:

Child will understand avoiding all possible habits leading to water wastage.

5 DO YOU NEED WATER?

Level/ Class: Standard 2

Curriculum links: Environmental Science

Activity duration: 30 min

Materials needed: Mind map prepared with the help of children

Pictures of various trees, fish, animals, small creatures

Chalk, Stone, fruits, plant, seeds, flash cards

Approach: Classroom activity

TOPIC:
Water Management

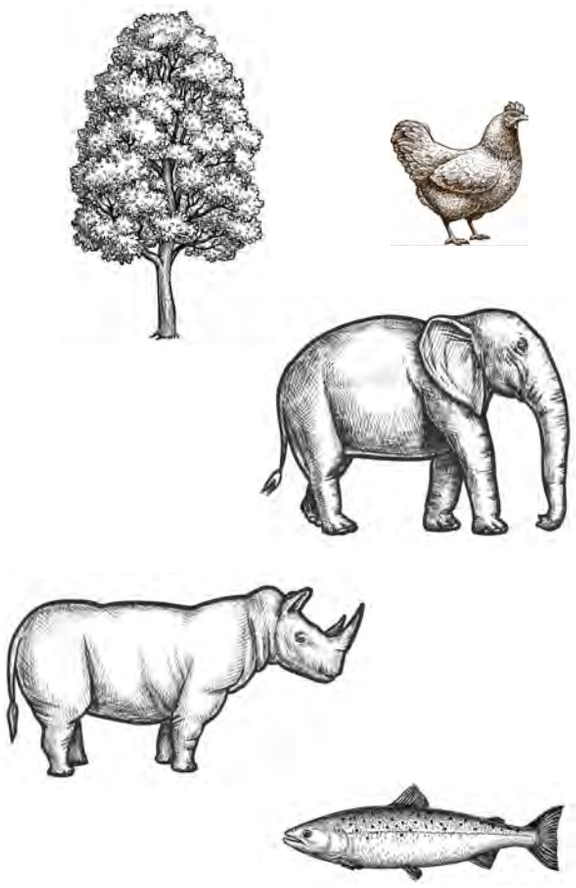
CONCEPT:
Water is an indivisible element of everybody's life.

AIMS:
To make aware that Water is a need and right of every living element.

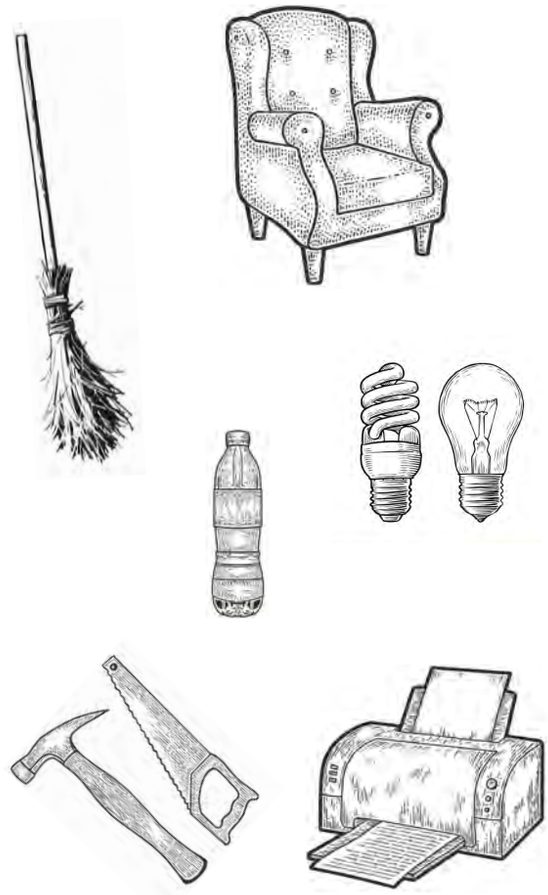
KEY QUESTIONS TO ADDRESS:
Water is right and the need of every living thing.

PREPARATION:
Make two groups on blackboard named "Needs Water" and "Doesn't need Water"

METHOD/GUIDE:
1. In the beginning, create two groups of the children.
2. Make them understand the rules of the games.
3. Teacher will show a picture or an object.
4. The group will clap and will tell a picture or an object needs water.
5. If the answer is correct, the group will get one point.
6. Teacher will write down the name of the respective group on the board.
7. Once the teacher will announce the winner of the game, teacher will discuss that all living things need water to survive.



Living Things



Non-Living Things

FAQS:

Q- What do you mean by living things and non-living things?

A- The things which are live now or once were alive are called as living. A non-living thing is anything that was never alive.

Q- Why is water called an indivisible element of life?

A- Without water the life cannot survive. Water cannot be separated from the human body.

LEARNING OUTCOMES/ GREEN HABIT:

Child will understand who all are dependent on water.

1 LET US UNDERSTAND WATER

Level/ Class: Standard 2

Curriculum links: Environmental Science

Activity duration: 45 min

Materials needed: Salt, Soil, Transparent Glass, Sugar, Perfume, Fragrant flowers, Ink, any water color, any fruit, spoon, Potable water

Approach: Classroom activity

TOPIC:
Water Management

CONCEPT:
- To make them aware of properties of water
- What is meant by Pure Water?

AIMS:
To make aware Pure water is tasteless, colourless and odourless.

KEY QUESTIONS TO ADDRESS:
What are the basic properties of Water?

PREPARATION:
Make three groups on the blackboard. Name them Colour, Taste and Smell.

METHOD/GUIDE:
1. In the beginning create three groups of the children. Name them Colour, Taste and Smell.
2. Mark similar groups on the black board as well.
3. Give one object to one of the children from each group. Ask the child, does the object have smell, colour or taste?
4. For e.g., Salt- Colour: White, Taste: Salty and Smell: Not prominent.
5. Ink – Colour: Blue/Black, Taste: No, Smell: Yes
6. Lastly, ask whether water has colour, taste and smell.
7. Add ink or watercolor in the water and show changed colour.
8. Add sugar or salt in water and observe change in the taste.

9. Add perfume in water and observe the change in smell.

10. Pure water is tasteless, colourless and odourless. Discuss about this.

11. Have you observed the water you drink? Does water from your bottle has:

    a. Colour?

    b. Taste?

    c. Smell?

12. In the rainy season, sometimes we observe muddy water as soil, stones, leaves get mixed in water.

13. Sometimes water has a foul smell. If we drink such water, we may get sick. We should boil or treat such water.

14. Emphasise that Pure water is tasteless, colourless and odourless.

FAQS:

Q- What do you mean by properties of water?

A- Properties means inherent capabilities. There are several properties of water like tasteless, colourless & odourless, universal solvent, etc.

LEARNING OUTCOMES/ GREEN HABIT:

Children will understand that they should not put solid waste into the water bodies.

8 LET US CLEAN WATER

Level/ Class: Standard 3

Curriculum links: Environmental Science

Activity duration: 45 min

Materials needed: Transparent Glass, Alum, Soil, Potassium Permanganate

Plastic bottle having PET mark, Water

Approach: Classroom activity or Laboratory

TOPIC:
Water Management

CONCEPT:
To introduce home remedies for water purification

AIM:
Importance of Water Quality

KEY QUESTIONS TO ADDRESS:
How to clean Water?

PREPARATION:
NA

METHOD/GUIDE:

1. Discuss with the children about properties of pure water.
2. Pure Water is colourless, tasteless and odourless.
3. If some substances get mixed with water such as soil, sand; water becomes muddy. By filtering, boiling or with the help of alum we can clean this water.
4. Take a glass of water. Add soil, small stones and sand. Stir the mixture with a spoon, so that water will be muddy.

5. Take a small piece of alum and stir it in the mixture.
6. Due to alum, the coagulation process takes place.
7. Coagulation is the process by which dirt and other suspended solid particles chemically "stick together" into clumps of alum and sediment, so they can easily be removed from water.

8. We can use crystals of Potassium Permanganate as well to disinfect water. Water will become purple in colour.

9. SODIS: Sunlight is also used to improve the quality of Water. SODIS is a simple technology to improve the quality of drinking water. It uses solar radiation to inactivate and destroy organic pollutants present in the water.

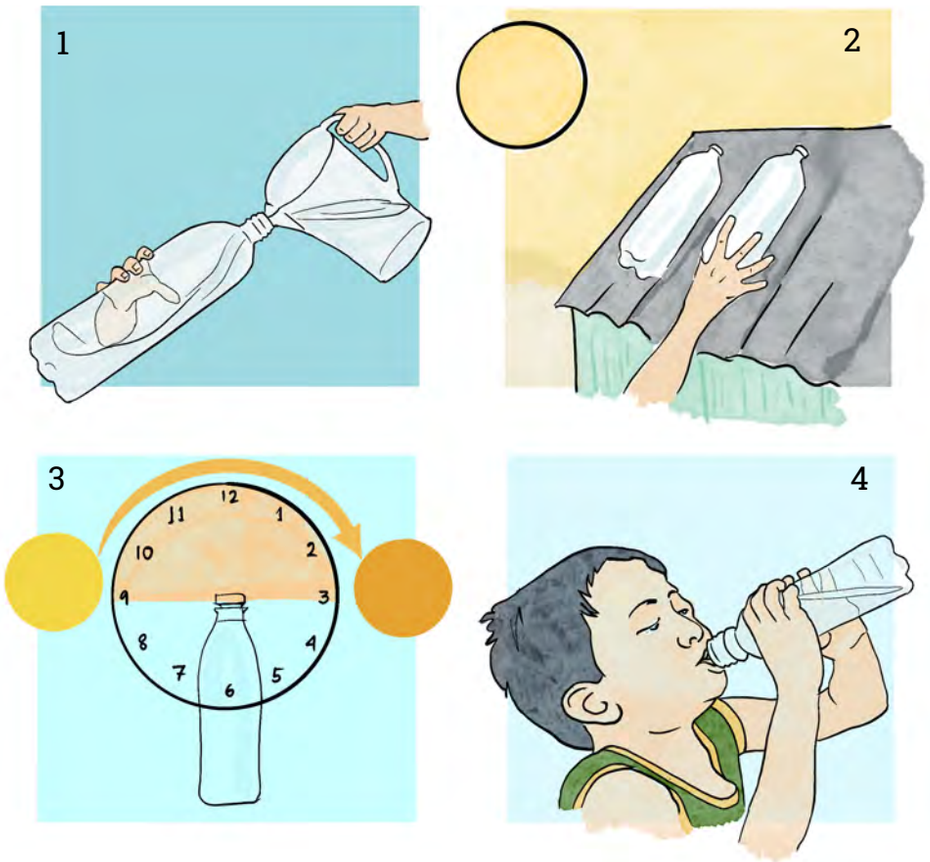
10. The method is very useful in Indonesia, Africa where there is high sunlight.

11. Take 1 or 2 litre bottle with PET marks.

12. Wash the bottle well, the first time you use it.

13. Contaminated water is filled into transparent plastic bottles and exposed to the full sunlight for 6 hours.

14. The UV-A radiation together with a raised water temperature (about 50° C) kills the microorganisms and makes the bottled water consumable.



SODIS Process

FAQS:

Q- What do you mean by water quality?

A- It is nothing but the physical, chemical and biological characteristics of water.

Q- What is coagulation?

A- Coagulation is the process by which dirt and other suspended solid particles chemically "stick together" into clumps of alum and sediment, so they can easily be removed from water.

Q- Whether use of Alum or Potassium Permanganate is safe for drinking?

A- Yes.

Q- Which is the most efficient method for water disinfection? UV or boiling?

A- Boiling is the safest method of water disinfection. UV cannot kill the bacteria.

LEARNING OUTCOMES/ GREEN HABIT:

Child will understand various ways to purify water at household level.

9 WHAT IS YOUR DAILY USE OF WATER?

Level/ Class: Standard 3

Curriculum links: Environmental Science, Maths

Activity duration: 1 Day

Materials needed: 1 litre bottle, bucket and mug

Approach: Classroom activity or Home

TOPIC:
Water Management

CONCEPT:
To measure daily use of Water

AIM:
To inculcate habit of Judicious and calculative use of Water.

KEY QUESTIONS TO ADDRESS:
What are the basic properties of Water?

PREPARATION:
NA

METHOD/GUIDE:

1. In the classroom, discuss all the activities that require water from morning till we sleep at night.

2. Taking into consideration water usage, ask children to prepare chart in the below format:

Time	Activity	Water required
Morning	Brushing	1 mug
	Bath	
	1 bucket	
	Drinking	2 bottles
	Leakage	Half bucket

3. Explain the above chart and ask them to prepare and present in front of the class.

4. Teacher should demonstrate and measure how much water 1 bucket, 1 mug will hold.

5. Keep the same measurement parameters for all the class.

6. Teacher should also prepare the chart and show it to the class.

7. After the presentation of the whole class, discuss the methods by which we can reduce, reuse and recycle water.

LEARNING OUTCOMES/ GREEN HABIT:

Child will consciously optimize his/her water usage by avoiding all possible habits leading to water wastage.

Std. 3

10 WHAT WILL FLOAT AND WHAT WILL SINK?

Level/ Class: Standard 3

Curriculum links: Environmental Science

Activity duration: 45 min

Materials needed: Tub, Water, Small Plastic ball, coin, stone, flower, leaves, spoon, stick, sand, salt

Approach: Classroom activity

TOPIC:
Water Management

CONCEPT:
To make children aware that some of the objects float and some sink in water.

AIM:
Introduction to float and sink properties of water.

KEY QUESTIONS TO ADDRESS:
What are the basic properties of Water?

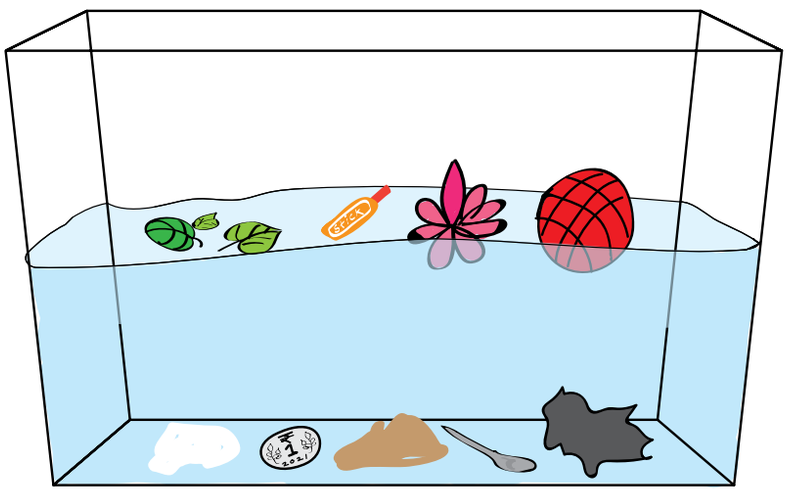
PREPARATION:
NA

METHOD/GUIDE:
1. Display all the materials to children and let them guess what we are going to take up today in the class.

2. Take water in a tub.

3. Take a small stool and keep the tub on that stool. Let children sit in a circular manner around it.

4. Pick up one of the listed items and ask whether it will float or sink.



5. Some items will float on water, some will sink and some will dissolve in water.

6. If items such as plastic wrappers, papers, and garbage get mixed in water, quality of water degrades. It is called Water Pollution.

7. We should keep rivers, lakes, wells and campus from where we fetch water, clean. Discuss about it.

FAQS:

Q- What do you mean by float and sink?

A- Anything which stays on the surface of a liquid is float. Anything which goes down under the surface of water is sink.

LEARNING OUTCOMES/ GREEN HABIT:

- Not to immerse my idol in water bodies instead, practice bucket immersion during the festivals.
- Not to put solid waste into the water bodies.

11 RAIN IN THE CLASSROOM

Level/ Class: Standard 4

Curriculum link: Environmental Science

Activity duration: 45 min

Materials needed: Glass Vessels, Gas, Salt, Water, Spoon, Plate that can cover vessel, ice cubes

Approach: Science Laboratory

TOPIC:
Water Management

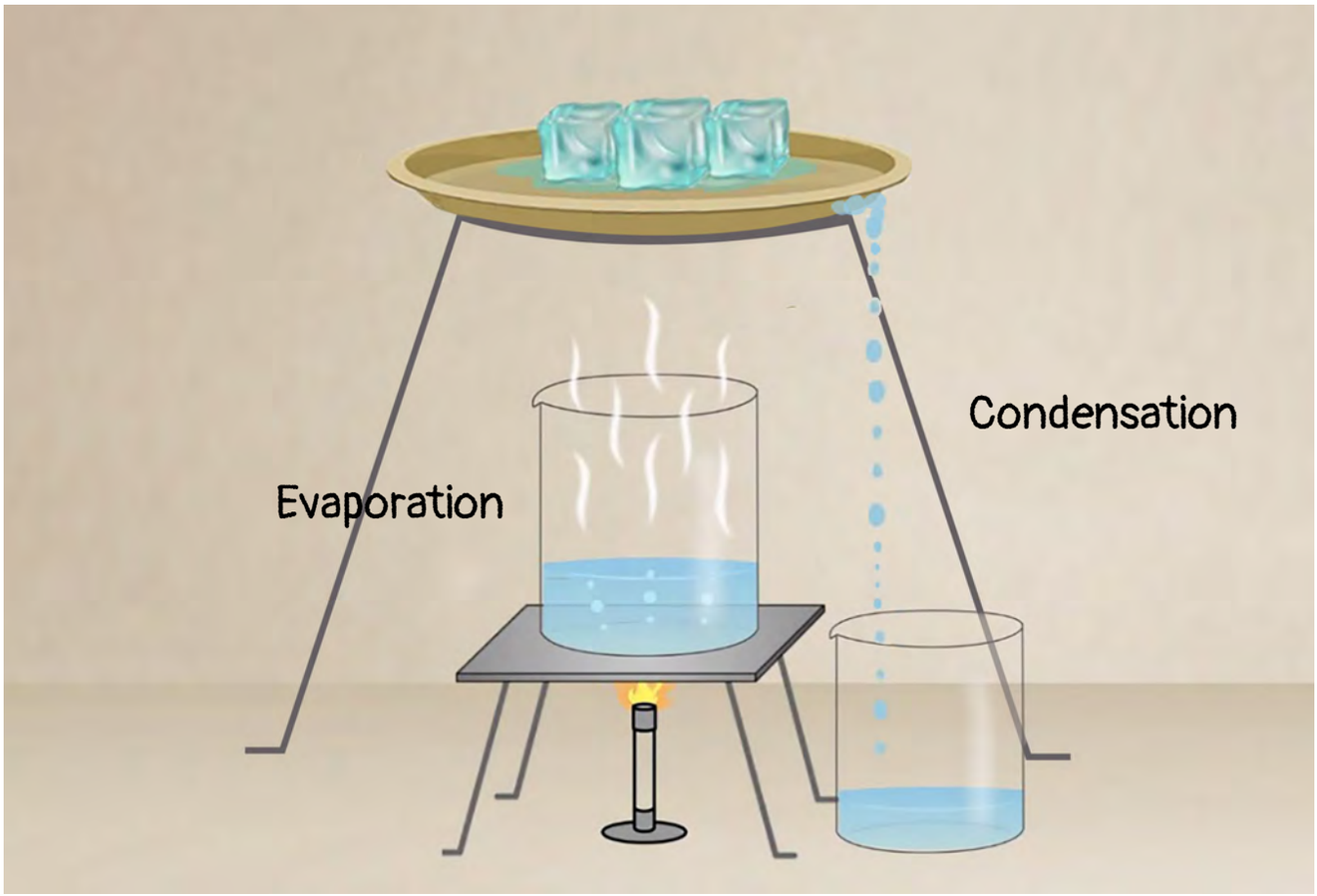
CONCEPT:
To make them understand, processes in Water cycle such as evaporation, condensation, surface runoff etc.

AIM:
Basics of Water Cycle.

KEY QUESTIONS TO ADDRESS:
What is a Water Cycle?

PREPARATION:
NA

METHOD/GUIDE:
1. Discuss with children what they understand about the Water Cycle.
2. Let them talk about their observations such as thunder, black clouds, maybe rainfall months etc.
3. Tell them we will try to create “Rain” in the classroom.
4. Take a glass vessel full of water and ask one of the children to add salt.
5. Stir the solution with the help of a spoon.
6. Ask one of them to taste one drop of solution. Let the child answer the taste of water.
7. Put a vessel on the gas and let the solution boil.
8. Now we can see the vapours coming out from the vessel, ask the children elsewhere can they see vapours. (Drying of clothes, spilled water on floor gets dried out after some time, steam gets collected on mirror while taking bath)



9. Name the process as Evaporation. Evaporation happens when a liquid turns into a gas.

10. Once the solution starts to boil, cover the vessel with the plate.

11. Put ice cubes on the plate.

12. Ask children to observe the plate bottom.

13. Children can see the small droplets of water getting collected at the bottom of the plate.

14. Add more ice cubes over the plate.

15. After some time, water droplets will start to fall in the vessel. Name this process as condensation and ask them if they have observed it anywhere.

16. Condensation occurs when water vapor (gaseous form) in the air changes into liquid water when it comes in contact with a cooler surface.

17. Carefully collect some water droplets in a spoon and ask the same child to taste it. Will it be salty?

18. Discuss, with the children, the water cycle.

FAQS:

Q- What is run off?

A- During rain fall, the water which flows over the surface is called as runoff.

Q- What is evaporation?

A- When water is heated it gets converted from liquid to vapor state. This is evaporation. The vapour being light goes up in the sky.

Q- What is condensation?

A- Small drops of liquid that are formed when warm air touches a cold surface.

LEARNING OUTCOMES/ GREEN HABIT:

Understand and observe evaporation, condensation various processes in detail.

Additional Resources:

- https://storyweaver.org.in/stories/19983-the-water-seed-paani-ka-beej
- https://storyweaver.org.in/stories/34911-the-case-of-the-missing-water

12 WATER STORAGE

Level/ Class: Standard 4

Curriculum links: Environmental Science

Activity duration: 60 min

Materials needed: NA

Approach: Classroom activity

TOPIC:
Water Management

CONCEPT:
To make children understand the importance of water storage.

AIM:
- Need of Water Storage
- Changes that have occurred in water storage methods.

KEY QUESTIONS TO ADDRESS:
Why do we store water?

PREPARATION:
NA

METHOD/GUIDE:
1. Ask children from where do we get water. Answers may be rain, river or spring or dam or tap?
2. Discuss with the children, how do we get water in summer or winter or whenever there is no rain.

3. Try to give emphasis on the need of water storage and its careful use.

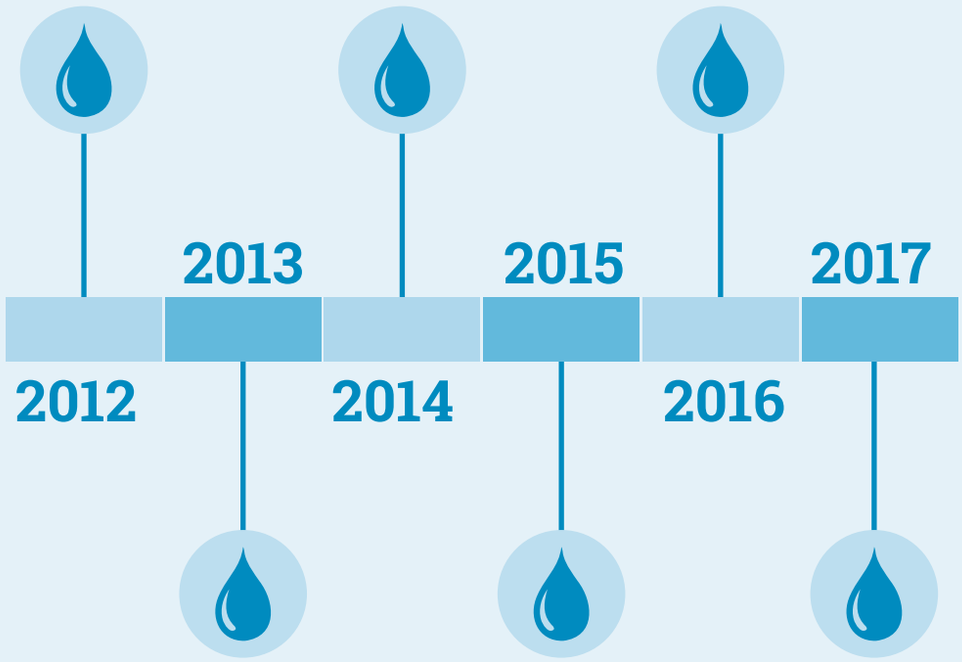
4. Ask children what they use at their household level to store water.

5. Give them an assignment to ask their grandparents, parents what methods they were using to store water at home.

6. Discuss about old ways just like Matka, Panpoi, Copper or Brass pots, Ghagar etc.

7. Nowadays we are having RO, Water Filters, Stainless steel containers.

8. Ask children to draw a timeline with the help of family members in the following manner.



9. Next day, present in front of the class.
   - Do discuss if your place has traditional water storage structures such as Malgujari talav, Taanka or any big dams.

Taanka

Malgujari talav

Koyna Dam

FAQS:

Q- How we store the water at home?

A- Personal and community methods of storage are used at home. e.g., drum, earthen pots, steel/ copper pots/utensils are usually used at home for storage of water whereas cement tank, PVC tanks are used to store water on mass scale.

Q- What is the traditional method of rainwater storage on mass scale?

A- Tanks or ponds are traditionally used to store rainwater.

LEARNING OUTCOMES/ GREEN HABIT:

Understand and observe evaporation, condensation various processes in detail.

13 HOW WATER COME TO YOUR PLACE?

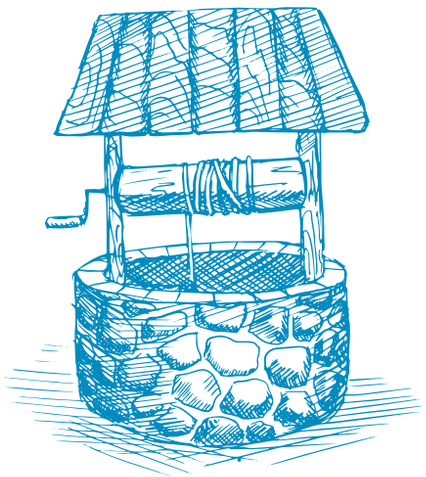
Level/ Class: Standard 4

Curriculum links: Environmental Science

Activity duration: 60 min

Materials needed: NA

Approach: School Field Trip



TOPIC:
Water Management

CONCEPT:
To make children understand how water comes to their place.

AIM:
How does the water distribution system work?

KEY QUESTIONS TO ADDRESS:
What is the need of a Water Distribution System?

PREPARATION:
NA

METHOD/GUIDE:
1. Ask children from where do they get water for drinking & other use. Answers may be rain, river or spring or dam or borewell or dug well.

2. Ask them from where water comes to our taps in school.

3. Make two or three groups of students as per the number and take them on a field trip.

4. Prepare a small questionnaire:

    a. What is the source of water in our school?

    b. Where are these water sources located?

    c. How much water is consumed daily in the school?

    d. How is water transported from there to school?

    e. Who is in charge of the school water - Supply, Operation and Maintenance, Quality check etc.?

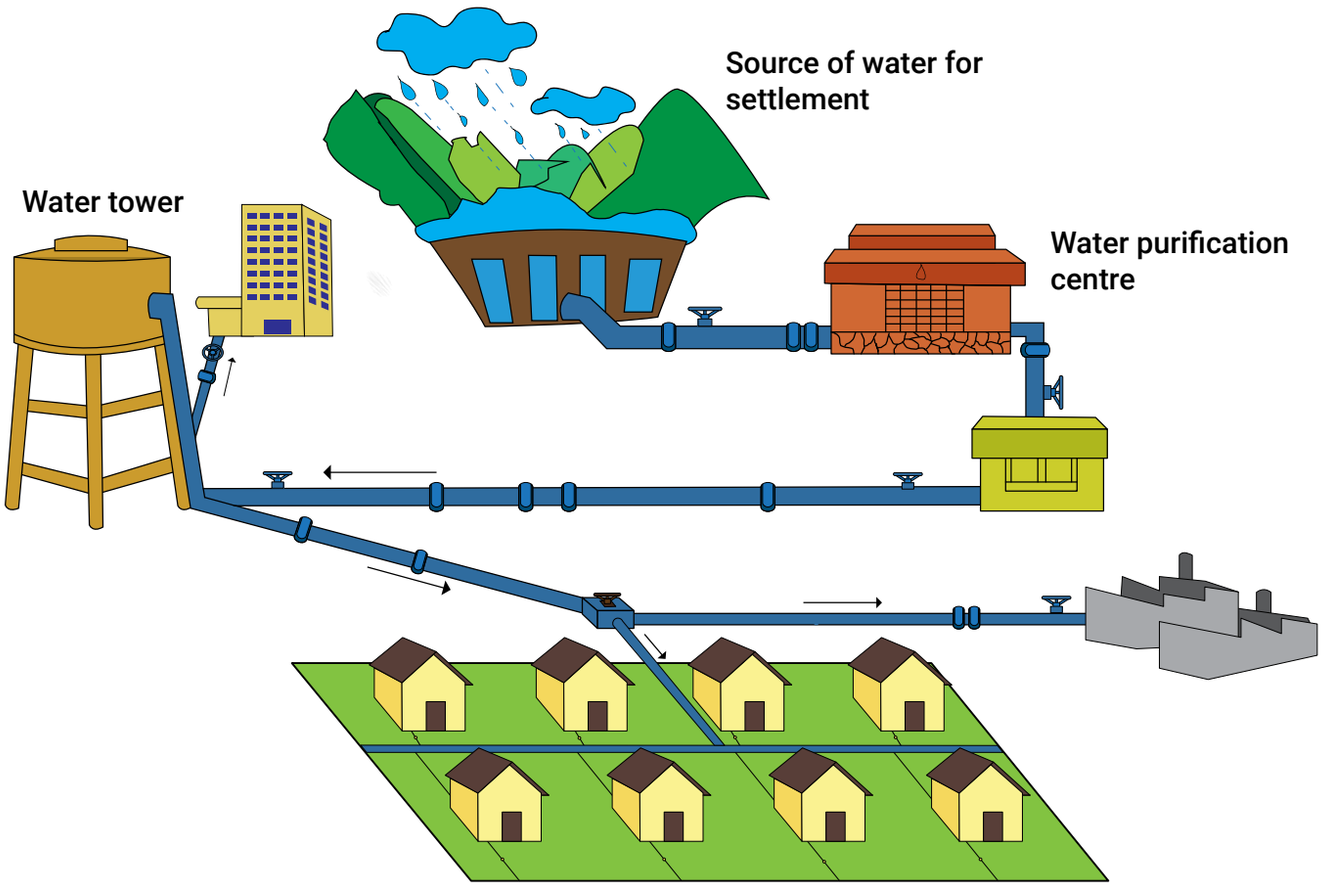
f. If it is there, then how is it being fulfilled? Through purchase of tankers or by borrowing from the neighbour etc.

5. Fill the questionnaire with the help of students and draw a diagram of the School's water distribution system.

6. Ask them to do similar activities for their home with the help of parents.

7. Emphasise on the journey of water to our school or our home and judicious use of water.

8. Do a small Water Distribution System exhibition and ask children to explain it to students of other standards.



Journey of water from source to house

FAQs:

Q- What is dug well and borewell?

A- Dug well is a hole in the ground dug by shovel & is lined with stone/brick/ cement etc. Borewell is a hole made in the ground using machine and usually is deeper than dug well.

Q- What is spring?

A- When the water bearing rock is cut by a river or nala and is exposed on the surface, the groundwater which comes out is called spring. It is a natural media.

Q- What is a dam?

A- Dam is a big man-made reservoir constructed to store water on the surface.

LEARNING OUTCOMES/ GREEN HABIT:

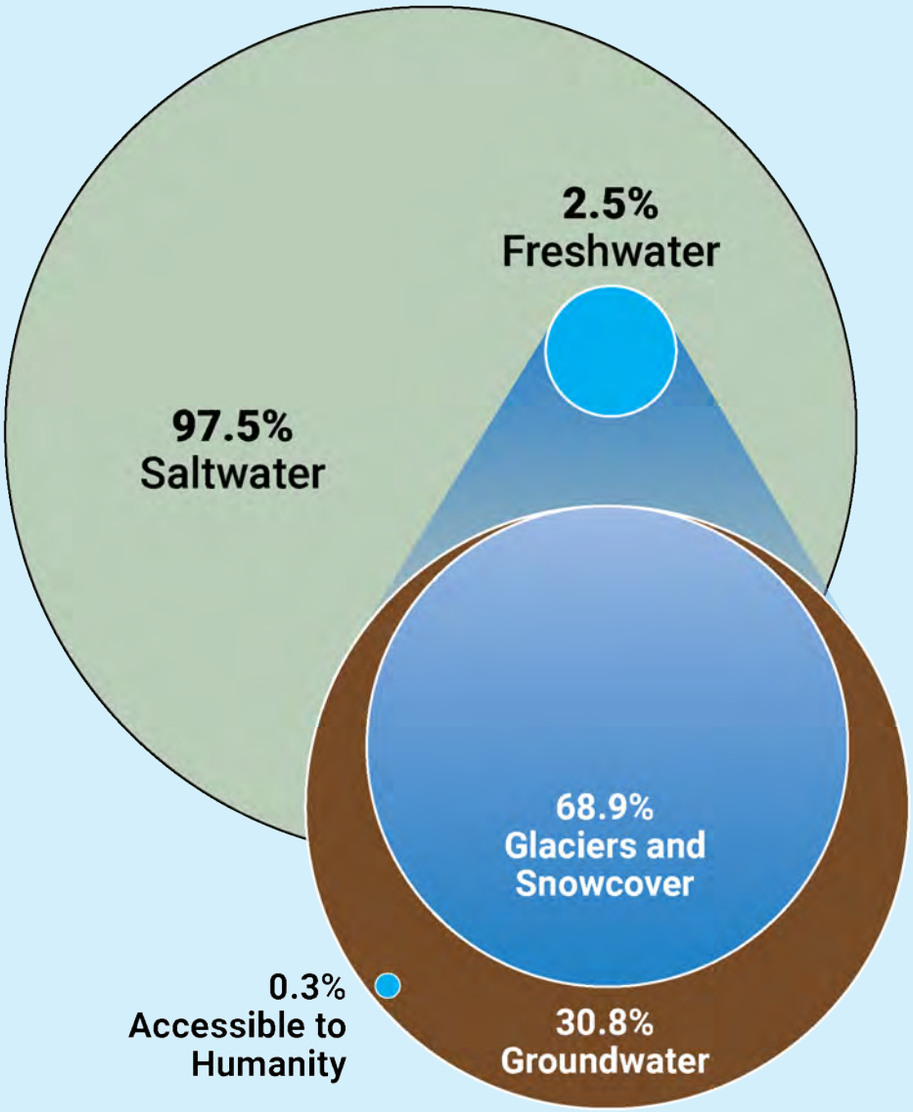
Introduce a rainwater harvesting system to the house and make community aware of rainwater harvesting or use rainwater barrels to collect rainwater and reuse that in the outdoor cleaning/car cleaning/gardening etc.

Water Source	Water volume in Cubic Km	Percent of Fresh Water	Percent of total Water
Oceans, seas & bays	1,338,000,000	-	96.54
Ice caps, glaciers & permanent snow	24,064,000	68.7	1.74
Groundwater	23,400,000	30.1	1.69
Soil Moisture	16,500	0.05	0.001
Ground ice & permafrost	300,000	0.86	0.022
Lakes	176,400	0.26	0.007
Atmosphere	12,900	0.04	0.001
Swamp Water	11,470	0.03	0.0008
Rivers	2,120	0.006	0.0002
Biological Water	1,120	0.003	0.0001

Source: https://www.usgs.gov/special-topic/water-science-school/science/how-much-water-there-earth?qt-science_center_objects=0#qt-science_center_objects

Additional Resources:

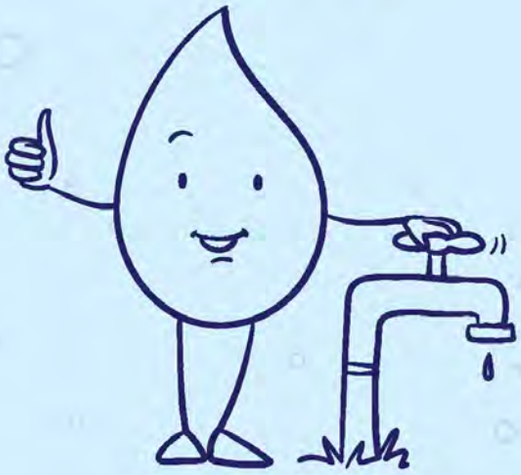
1. About 70% of Human Adult body contains Water.
2. 70% of the human brain is water.
3. Out of total fresh water on the earth 68.7% is trapped in glaciers, 30.1% in groundwater & only 0.26% in lakes.
4. Nearly 97% of the world's water is saline or otherwise undrinkable.
5. Frozen water is 9% lighter than water, which explains why ice floats.
6. On average, women in Africa and Asia have to walk 3.7 miles to collect water.



7. 80% of all illness in the developing world come from water borne diseases.
8. Groundwater irrigation has been expanding at a very rapid pace in India since 1970s and now accounts for over 60 percent of the total area irrigated in the country.
9. About 85% of the rural drinking water supply is also met from ground water sources in India.

(http://cgwb.gov.in/AQM/NAQUIM.html#:~:text=Groundwater%20is%20an%20important%20natural,area%20irrigated%20in%20the%20country.)

SAVE OUR WATER



1. Take a shower of 5 minutes or less

Saves up to **70 Litres** per shower

2. Install a water-saving toilet flush system

Saves up to **700 Litres** each year

3. Turn off water when brushing teeth

Saves up to **20 Litres** per day

4. Turn off the tap while washing dishes/clothes

Saves up to **50 Litres** per day

5. Close tap properly and fix leaking taps and pipes

Saves up to **75 Litres** each day

FACTS AND FIGURES

76 million people in india do not have access to safe drinking water

54% of India faces high to extremely high water stress

ADDITIONAL RESOURCES

- **Water cycle for kids by USGS**

  https://www.usgs.gov/special-topic/water-science-school/science/water-cycle-schools-and-kids?qt-science_center_objects=0#qt-science_center_objects

- **Toys from Trash**

  https://www.arvindguptatoys.com/air-and-water.php

- **Book: SODIS**

  http://arvindguptatoys.com/arvindgupta/sodis.pdf

  https://www.sodis.ch/methode/index_EN.html

- **Creative Lesson Plans on Water**

  https://archive.org/details/CreativeLessonPlansOnWater-Drcsc/page/n9/mode/2up

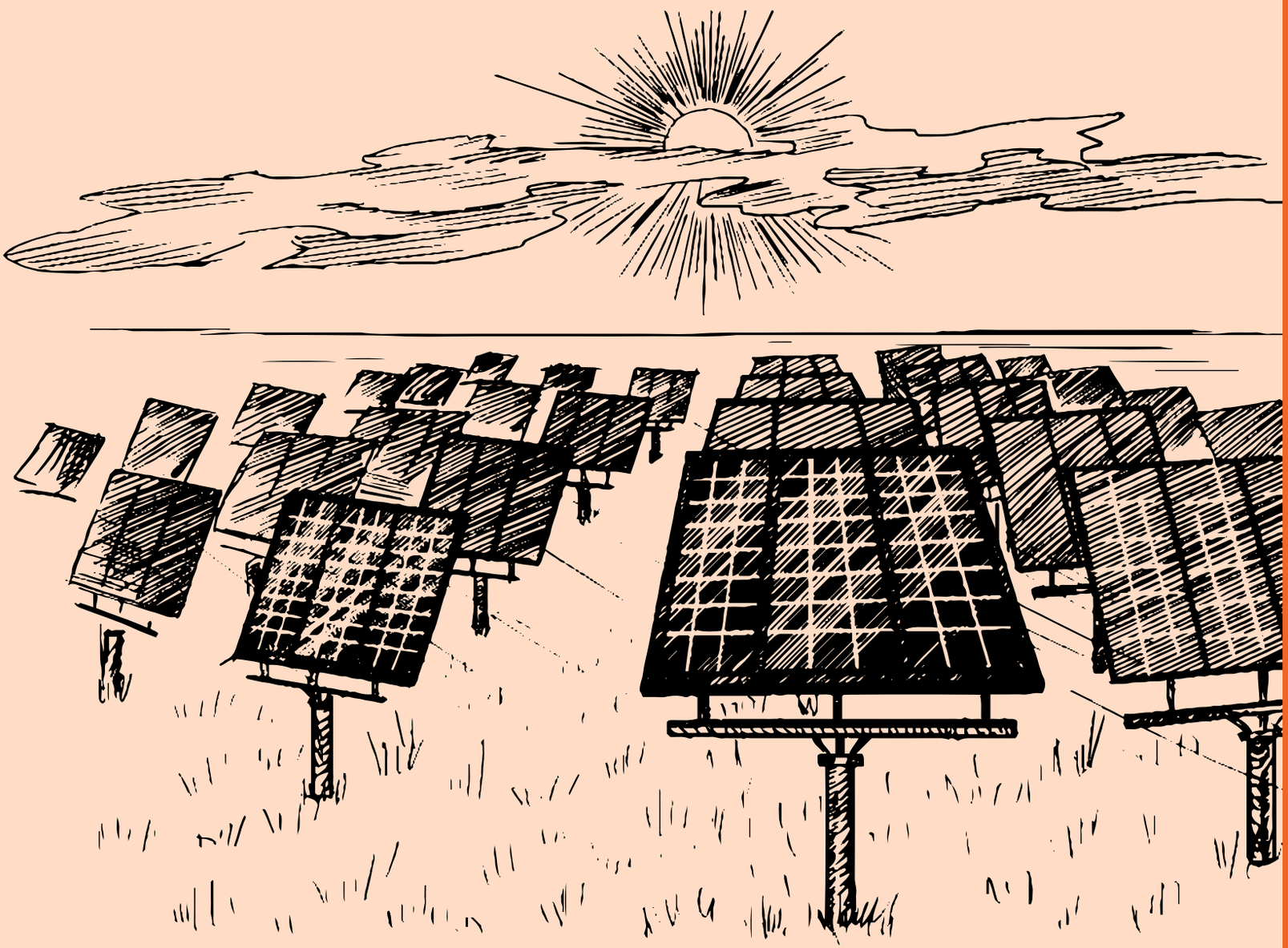
- **Water Stories**

  https://storyweaver.org.in/search?query=water

SN	Topics and sub-topics	Presence in syllabus (mention standard, subject)	Presence in textbooks (mention standard, subject)	Comment on adequacy of treatment, gaps, biases etc.
1	Topic	Standard 1	Nil	Simple activities about smell, sugar, dissolution of salt in water, Sarbat preparation can be added. P for Pani in Marathi and W for Water in English can be introduced.
		Standard 2	Nil	Simple activities such as why do we bring water bottles in the school can be added. Activity to list down various chores that require water can be added.
2	Topic	Standard 3, Environmental Studies		
2.1	Water	Standard 3, Environmental Studies Chapter 8- Our Need of Water	This chapter describes the need for water for all living things such as animals, plants and humans. We need water not only for drinking but also for cleaning, cooking, growing crops and also for industrial purposes.	Activity to list down various chores that require water, to measure the amount of water used with a mug or bucket and to prepare a chart of the same can be added.
2.2	Water	Standard 3, Environmental Studies Chapter 9- Where does Water come from?	This chapter explains the various sources of water such as rain, rivers, lakes, springs, dams, wells and borewells. This chapter also mentions the importance of harvesting rainwater.	Introduction of the concept of ground water and ways to reduce daily water consumption can be added.

SN	Topics and sub-topics	Presence in syllabus (mention standard, subject)	Presence in textbooks (mention standard, subject)	Comment on adequacy of treatment, gaps, biases etc.
2.3	Water	Standard 3, Environmental Studies Chapter 10- More about Water	This chapter explains about the various properties of water such as color, odor, shapeless, state of water and several substances dissolve in water.	The concept of quality of water can be introduced.
2.4	Water	Standard 3, Environmental Studies Chapter Our Body	This chapter describes the various body parts and their functions.	Percentage of water in the human body and a picture of the human body with the water level in it can be introduced.
3	Topic	Standard 4, Environmental Studies		
3.1	Water	Standard 4, Environmental Studies Chapter 3- Storage of Water	This chapter explains about the old and traditional methods of water storage such as wells, aads, water tanks in forts and modern methods such as dams, borewells.	Changes at home in water storage methods such as from matakas, copper pots to recent filters can be added.
3.2	Water	Standard 4, Environmental Studies Chapter 4 - Water Safe for Drinking	This chapter talks about the substances that dissolve in water or some float on the water. By settling or by swirling alum water can be cleaned. Water must be boiled to destroy microorganisms from it.	SODIS (Solar Water Disinfection) method which has been recommended by WHO can be introduced.

SN	Topics and sub-topics	Presence in syllabus (mention standard, subject)	Presence in textbooks (mention standard, subject)	Comment on adequacy of treatment, gaps, biases etc.
3.3	Water	Standard 4, Environmental Studies Chapter 5 - Water for Every Household	This chapter explains the importance of storage of Water and what are various types of containers we use nowadays. It also talks about how to keep drinking water neat and clean. Cities and towns have water purification centers and distribution systems.	An activity to be conducted by children to understand the Water Distribution System at their household and school can be introduced. They can also draw a diagram of it with the help of a teacher.
3.4	Water	Standard 4, Environmental Studies Chapter 6 - Variety in Food	This chapter talks about diversity in food items and it varies as per the region. In the map, rice, wheat and jowar are marked.	The amount of water required to produce one unit of crop and fruits can be introduced.
3.5	Water	Standard 4, Environmental Studies Chapter 15 - My District, My State	This chapter explains the physical set-up of our State and Variety in crops according to climate, soil and availability of water.	The amount of water required (in liters) for few important crops can be introduced.
3.6	Water	Standard 4, Environmental Studies Chapter 24 - Are We endangering our environment?	This chapter talks about the types of disasters, change in environment and also change in ways of drawing water as per the population growth.	Representation of ways to draw water based upon the timeline in the pictorial format can be introduced.



SECTION 4:

Energy, Air Pollution and Climate Change

4.1. INTRODUCTION

4.1.1. OVERVIEW OF THE THEME

Energy is an integral part of all living things on earth. It supports all forms of life. Energy is also an important component and input for all the processes and activities happening on the earth. It is part of natural systems as well as anthropogenic systems. It is important for life support as well as all the developmental processes in the society.

Pollution is an undesirable product of deriving energy from different sources. Pollution has negative impacts on the living things and the environment.

Climate change is one of the unintended consequences of emission of air pollution gases in the atmosphere. Processes of using energy are a major source of such air pollutant gases. Climate change poses risks and stress on all human and natural systems.

Energy is mainly derived from natural resources. Some renewable energy sources are also being developed and brought into use recently. Though in smaller proportions, these are promising. It needs to make energy use efficient and shift towards renewables.

The United Nations identifies the following Sustainable Development Goals (SDG) for energy, air pollution and climate change.

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 13: Take urgent action to combat climate change and its impacts

These goals are targeted to be achieved collectively by 2030.

4.1.2. RATIONALE, EXPECTED LEARNING OUTCOMES AND SUMMARY OF CURRICULUM ANALYSIS

Energy is consumed by all of us in different forms. All human processes and development activities utilise energy. All these processes and activities cause pollution and lead to different impacts. It is also responsible for climate change and associated risks. The choices made by the human beings and societies about their lifestyle, systems they design and development processes has its direct bearing on the energy and resources used and their consequences.

Therefore, it is important to raise a world population aware of these aspects as well as also looking forward to the choices and solutions that are sustainable in the long run for the environment and societies. They should be able to understand the interconnectedness of different elements in the environment and be sensitized to think of solutions to save the environment. They should know the importance of energy in their life, consequences of its uses, the alternatives available and the kind of

systems that should be created and promoted to achieve sustainability in energy uses. They should experience the sustainable practices and are able to assess them in order to make their choices.

Students are introduced to the concepts with the aim to build their understanding through environment education methodology of activities. They are encouraged to think and express, and consolidate their learnings through field observations, interactions, demonstrations and discussions. They will learn about different concepts related to energy, air pollution and climate change themes such as renewable energy, energy efficiency, types, sources and impacts of air pollution, sustainable transport modes, weather and climate change at the basic level.

TOPICS

The three topics are integrated in this theme i.e., energy, air pollution and climate change.

The topics covered under this theme for primary standard of grade 1 to grade 4 are following:

- Energy for life support
- Renewable energy – solar energy, wind energy, food and muscular energy
- Uses and sources of energy
- Energy conservation
- Sources of air pollution
- Weather
- Climate change

Subsequently, advanced topics will be introduced in secondary standards of grade 5 to grade 8. Some of the concepts introduced in primary standards will be further enhanced in secondary standards.

The topics to be covered in secondary standards will be as follows:

- Renewable energy – solar energy, wind energy, food and muscular energy
- Uses and sources of energy
- Energy conservation
- Energy efficiency
- Sources of air pollution
- Impacts of air pollution
- Sustainable transportation – energy efficiency systems, green modes, fuel saving
- Weather and climate
- Impacts of climate change
- Climate change mitigation and adaptation

Energy, air pollution and climate change are comparatively complex concepts. Certain basic concepts need to be introduced to students before these more complex concepts can be introduced. Therefore, these concepts are not elaborated in the textbooks much in detail at the primary level of grade 1 to grade 4.

However, some day to day aspects of this theme can be taught to students without going into the complexity of the concepts. As energy, air pollution and climate change are closely linked with the lifestyle, it is important to sensitize students about the impacts and promote certain good practices and habits among them. The students' conceptual understanding may be developed by building upon their own observations and experiences in the environment and at home.

Air and its composition, windmill and cooking at home is touched to some extent in textbooks. Additional concepts at this stage such as energy from the sun, wind, food and muscular energy, good habits of switching off etc, may be introduced through day to day practices at our home, school and society. Also emphasising on the action oriented, hands on learning and developing an explorer among students.

4.1.3. ACTIVITY FRAMEWORK

Curriculum-mapped Activity Plan for Energy, Air Pollution and Climate Change

SN	Topics and subtopics	Presence in textbooks	Concepts	Activities
1.	Energy • What is energy • Energy as life support on earth	Absent	• Energy is the capacity to perform work • Energy is essential to support life on earth • Plants need energy. Sun is the source of energy for plants. • Animals and human beings need energy. They get energy from food.	Std 1 • Who moves the trees and the clouds? • Sun Dryer Std 2 • Playing, walking and cycling makes you hungry • Food for Work Std 4 • A Potted Plant
2.	Renewable Energy • Solar energy • Wind energy • Food energy and muscular energy	Standard 2, Marathi, Lesson 14, Pawan Chakki, windmill and its uses	• Wind has energy which can do work, called wind energy. • Sunlight has energy that can be used to do work, called solar energy. • Food has energy in the form of chemical energy. Muscular energy is used by humans and animals to do work. They derive their energy from the food they eat.	Std 1 • Who moves the trees and the clouds? • Sun Dryer Std 2 • Playing, walking and cycling makes you hungry • Food for Work Std 4 • Trap the Heat

SN	Topics and subtopics	Presence in textbooks	Concepts	Activities
3.	Energy • Uses of energy • Sources of energy • Types of fuel	Standard 3, EVS, Lesson 10, cooking, use of cooking gas as fuel	• Food is the source of energy for human beings and animals for their own body functions and activities. • We use energy to cook food and other purposes of heating and lighting at home. • Different types of fuels are used for these purposes. • Fuels are obtained from different sources. • Electricity is a form of energy. It is used in households for running appliances. It can be generated using different fuels. It is also generated from wind and solar energy.	Std 1 • Save Electricity Std 2 • Playing, walking and cycling makes you hungry • Food for Work Std 3 • Who cooks our food? • Electricity Runs Fans and Lights
4.	Energy Conservation	Absent	• Conservation of energy used at home and school • Methods of conserving energy in cooking • Stop electric wastage by switching off appliances not in use • Use of renewable energy such as solar energy reduces dependence on energy from fossil fuel	Std 1 • Save Electricity Std 3 • Switch Off! Std 4 • Cook Smart • Trap the Heat

SN	Topics and subtopics	Presence in textbooks	Concepts	Activities
5.	Air Pollution • What is air pollution • Sources of air pollution	Standard 4, EVS, Lesson 9, composition of air and percentage of gases in atmosphere, types of gases, its importance and air pollution	• Sources of air pollution • Cooking requires energy; energy obtained from burning fuels causes air pollution • Generation of electricity by burning of fossil fuel causes air pollution	Std 3 • Who cooks our food? • Electricity Runs Fans and Lights • Switch Off!
6.	Weather and Climate	Absent	• Solar radiation influences wind flow, its speed and direction. Wind flow affects the weather of a place. It is related to the climate of the region	Std 4 • Whirlwind
7.	Energy, air pollution and climate change • Climate change mitigation • Control of air pollution Renewable energy	Absent	Inculcating habits and promoting actions. • Solar and wind energy are renewable sources of energy. • Use of clean energy sources and energy efficiency, and reducing dependence on fossil fuel energy will reduce air pollution. • Use of clean energy sources and energy efficiency, and reducing dependence on fossil fuel energy will reduce GHGs responsible for climate change.	Std 1 • Sun Dryer Std 3 • Who cooks our food? • Electricity Runs Fans and Lights • Switch Off! Std 4 • Trap the Heat • Cook Smart

4.2. ACTIVITIES/PROJECTS

1 WHO MOVES THE TREES AND THE CLOUDS?

Level/Class: 1

Curriculum links: Parisar Abhyas

Activity duration: 30 minutes

Materials needed: Writing and drawing material

Approach: Outdoor activity for whole class, observation and discussion.

TOPIC:
Energy, wind energy

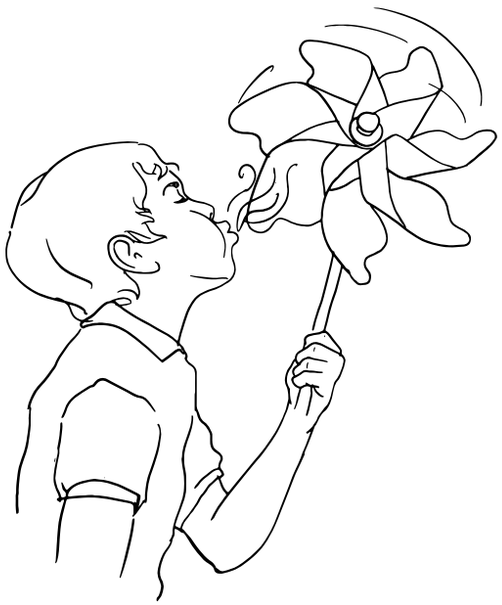
CONCEPT:
Moving air is called wind. Wind has energy that can do work. We can observe this when we see wind moving objects in our surroundings.

AIMS:
Understand that wind can move leaves, trees and blow clouds from one place to another place. Wind has energy that can do work like moving things. This is called wind energy.

KEY QUESTIONS TO ADDRESS:
What is wind energy?

METHOD/GUIDE:
Take the students outside in the school garden. Ask them to observe moving leaves, trees and clouds, etc. Have they ever wondered what makes them move? Ask them to observe the wind blowing. Do they feel the wind?

Explain to the students, we see leaves and trees moving when the wind blows. The moving air is called wind. Wind makes the leaves and trees move. Wind also blows and moves clouds from one place to another place.



Wind has energy that can do this work like moving things. This is called “wind energy.” What other works do they see which are done by the wind?

Ask them to draw the things they have seen moved by the wind. Display these pictures in the classroom with an appropriate title and labels (For example: “Wind Energy Moves ...” for the title, and “Clouds”, “Leaves”, “Dust” etc as labels).

LEARNING OUTCOMES/ GREEN HABIT:

Wind has the energy to move things. It is called wind energy. Energy can do work like moving things.

FAQS:

Q- How is wind energy used in our life? How is wind energy converted to something we can use?

A- Wind energy is used to generate electricity in a windmill. Blowing wind rotates the fan of the windmill connected to an electricity generator which generates electricity. Wind energy is a renewable form of energy and the electricity generated from wind energy is pollution-free. Maharashtra is one of the leading states in India to generate electricity from wind energy.

2 SUN DRYER

Level/Class: 1

Curriculum links: Parisar Abhyas

Activity duration: 30 minutes

Materials needed: Writing material

Approach: Outdoor activity for whole class, observation and discussion

TOPIC:
Energy, solar energy

CONCEPT:
Sun has energy transmitted in the form of sunlight. Sunlight converts into heat after falling on an object. The energy from the Sun can be used to do work. It is called solar energy.

AIMS:
Understand that the sun has energy that is used for work like drying things such as clothes, grains, pickles, etc.

KEY QUESTIONS TO ADDRESS:
What is solar energy?

METHOD/GUIDE:
Ask students the things they have seen kept in the Sun for drying in their home or society such as clothes, food grains, etc. Take them outside and ask to observe things kept in the Sun for drying.

Come back to class and note down different things they mention on the board were dried in the Sun. They can mention things kept for drying in the Sun like food items such as pickles, papad, vegetables, fruits, fishes, etc and other things like harvested crops, pottery, cooking fuel (upale/dung cake, crop residue), etc in the village areas.

Ask the students what dries these things kept in the Sun.

Explain to the students, Sun has energy which helps in drying clothes, food grains and other things kept under Sun. The sunlight converts into heat after falling on any object. This heat is a form of energy that helps in drying things kept in the Sun. Heat in the Sun can help in doing other work as well.

LEARNING OUTCOMES:

Sun has the energy that is called solar energy. This energy is used for doing work such as drying different things.

GREEN HABIT:

Dry clothes in the sun or in the open instead of in dryers or washing machine.

FAQS:

Q- How is solar energy used in our life? How is solar energy converted to something we can use?

A- Solar energy is used to generate electricity through solar panels. It is also used to generate heat energy in solar water heaters. Solar energy is a renewable form of energy and pollution free. Solar energy can be used in households for generating electricity and water heating. Heat from solar energy is used in cottage industries for drying food items.

3 SAVE ELECTRICITY

Level/Class: 1

Curriculum links: Parisar Abhyas

Activity duration: 30 minutes

Materials needed: Writing material, sticky notes, chart paper

Approach: Indoor activity for whole class, discussion and action

TOPIC:
Energy, energy conservation, saving electricity

CONCEPT:
Electricity is used at our home, school and public places. It is a valuable resource used for different purposes. Sometimes we leave fans and lights ON even when it is not required. We leave these ON while leaving the room or use lights in daytime instead of opening windows and curtains. We must save electricity. That can be done by switching off the fans, lights and other devices when not required.

AIMS:
Inculcate the value of electricity conservation.

KEY QUESTIONS TO ADDRESS:
How to save electricity at our home and school?

METHOD/GUIDE:
Ask students what runs the fans, lights or other devices we use at home or school. Explain to them that electricity is used to run these devices. Electricity is a form of energy we use to do work.

Tell them that electricity is a valuable resource. It is also required for many other purposes such as in agriculture for watering, in factories for making goods. It is also used at offices and public places like streets, parks, bus stops, railway stations, etc. But it is a limited and scarce resource and not available to all the people.

A lot of electricity is wasted when we keep the fans, lights and other devices ON even when it is not required. Many times we leave fans and lights ON while leaving the room for some time. They are running even when no one is there in the room to use it. We put ON lights in daytime instead of using natural lights by opening the windows and curtains. Opening windows improves ventilation and

brings in fresh air. This wastage of electricity can simply be saved by switching off the fans, lights and other devices when it is not in use or required.

Ask students how this wastage of electricity can be stopped. Write down the ideas generated by them on the board.

Ask students to look for any such fans, lights and other devices left ON and inform people using them. They can write a reminder note on a piece of paper and put it there. Caution them not to try switching off by themselves rather take help of elders to switch them off. This will also make elders aware of this.

They can also request elders at school and home to use natural light and ventilation wherever possible instead of electric lights. They can note the number of times they found them ON and got them switched off on a chart paper put up in the classroom. They can count such incidences every month and compare if it is reducing.

LEARNING OUTCOMES:

Electricity is a valuable resource that must be saved by stopping its wastage. Ask elders to switch off the appliances not in use and use natural light and ventilation.

GREEN HABIT:

Save electricity wastage when not in use.

FAQS:

Q- What precaution to take?

A- Electricity is hazardous for small children. They should be kept away and asked not to touch electric switches, plugs and sockets and other appliances. They should remain away from them and ask seniors or adults at school or home to switch them off when found not in use. They should not try to touch them or switch them off by themselves.

4 PLAYING, WALKING AND CYCLING MAKES YOU HUNGRY

Level/Class: 2

Curriculum links: Parisar Abhyas, Science, games

Activity duration: 30 minutes

Materials needed: Sports materials, Football, Carrom, Chess, etc

Approach: Outdoor and indoor sports activity and discussion with whole class.

TOPIC:

Energy, food energy, muscular energy

CONCEPT:

Human beings need energy for their activities and work. Food is the source of energy for human beings. Muscular energy in our body helps us do physical and mental work. Physical activities like walking, cycling and playing are good for our health.

AIMS:

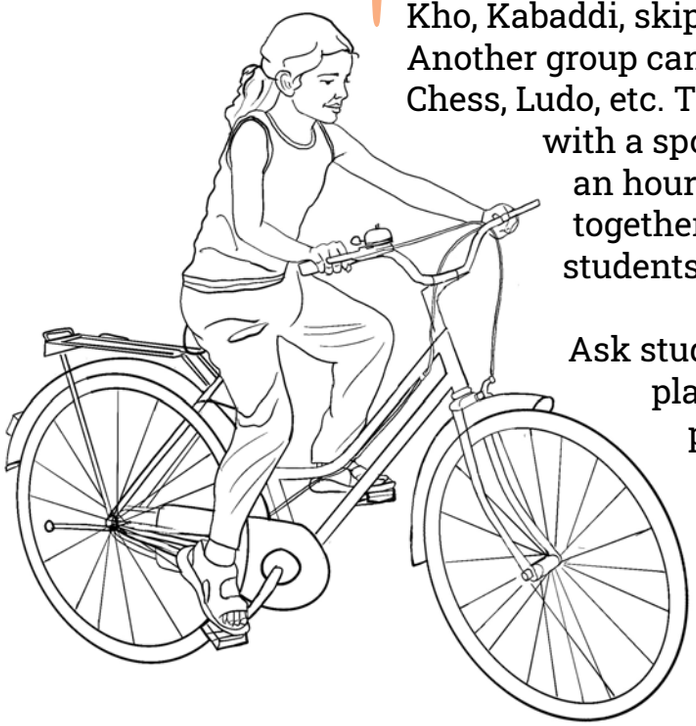
Understand that food is the source of energy for human beings, and muscular energy is used by human beings to do the work.

KEY QUESTIONS TO ADDRESS:

Where do human beings get energy from?

METHOD/GUIDE:

Divide the students into two groups. Take one group of students for outdoor sports like football, basketball, Kho-Kho, Kabaddi, skipping, running, cycling, gymnastics, etc. Another group can be taken for indoor games like Carrom, Chess, Ludo, etc. This activity can also be done combined with a sports/games period. After playing for half an hour to one hour, bring back both the groups together and ask from which group most of the students feel tired and hungry.



Ask students why we feel tired and hungry after playing active sports or doing some heavy physical work. Note down their answers on the board.

Tell them that we feel hungry after physical activities like playing, walking, running, cycling or working hard for some time. For instance, we

feel hungry after the games/sports period because we use energy while playing or doing physical activities. This energy is called “muscular energy.” The energy is used slowly when we do less physical activities while sitting like playing Carrom, Chess or Ludo.

Now, ask them why we eat food. Again note down their answers on the board.

Explain to them that food provides us energy to do day to day activities like playing, walking, running, cycling or doing work. It also provides nutrition for building our body parts, fighting diseases and keeping healthy. For doing any activity or work we need energy and food provides energy to our body. Therefore, after eating our food we again feel energetic. Therefore, doing physical activities like walking, cycling and playing active sports also helps us keep healthy.

LEARNING OUTCOMES:

Human beings need energy to do activities and work and food is the source of energy for human beings. Muscular energy in our body helps us do physical activities and perform work. Doing more physical activities is good for human health.

GREEN HABIT:

Save electricity wastage when not in use.

FAQS:

Q- How does food give energy?

A- Food stores energy in the form of chemical energy. This chemical energy stored in food is used by muscles in our body to do work. This is called muscular energy. Our body needs oxygen to utilise this chemical energy stored in food and releases carbon dioxide as a by-product in this process. This process is called respiration.

5 FOOD FOR WORK

Level/Class: 2

Curriculum links:
Parisar Abhyas, Science

Activity duration: 30 minutes

Materials needed:
Writing material

Approach: Indoor classroom activity with whole class, observation and discussion.

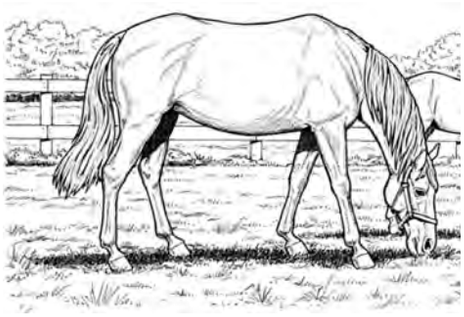
TOPIC:
Energy, food energy, muscular energy

CONCEPT:
Animals do various types of work for human beings. They need energy to do those works. This is called muscular energy. They get this energy from the food they eat.

AIMS:
Understand that human beings have domesticated animals such as bullocks for work. Animals use their muscular energy to do the work. Animals need food to live and carry out the work such as ploughing fields or pulling carts.

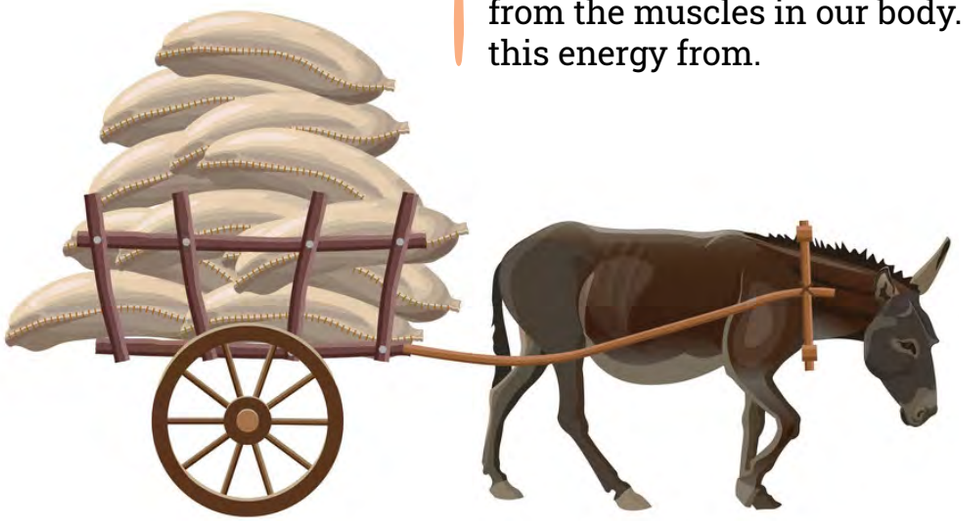
KEY QUESTIONS TO ADDRESS:
Where do animals get energy?

METHOD/GUIDE:
Discuss with the students the concept of work.



Ask the students to lift or push several objects, say books, pencils, chairs, etc. Students can do work like sweeping, collecting waste, carrying waste bins or doing gardening activities, tilling, planting, etc.

Make them understand that in all these lifting and pushing activities work is done and energy is provided from the muscles in our body. Ask them where they got this energy from.



Ask the students to name animals that work for human beings. They can share from their observations the work being done by the animals. For example, oxen ploughing the farms, bulls or horses pulling the carts,

donkeys carrying loads and other activities. The energy used by animals to do the work is called muscular energy.

Ask students to tell the food these animals eat to get the energy. For example, grass, fodder, milk of their mothers, gram, etc.

Using both human and animal examples show the link between food, energy and work. Tell them that muscular energy is a very old form of doing work.

EXTENSION/VARIATION:

Ask students to bring pictures and photographs from newspapers and magazines, etc depicting work being done by humans, animals or machines. Ask them to identify and tell the work which is done by using the muscular energy and which is done not using the muscular energy.

LEARNING OUTCOMES:

Energy is required for doing work.
Muscular energy is used by human beings and animals to do the work.
Food is the source of energy for humans and animals to do the work.

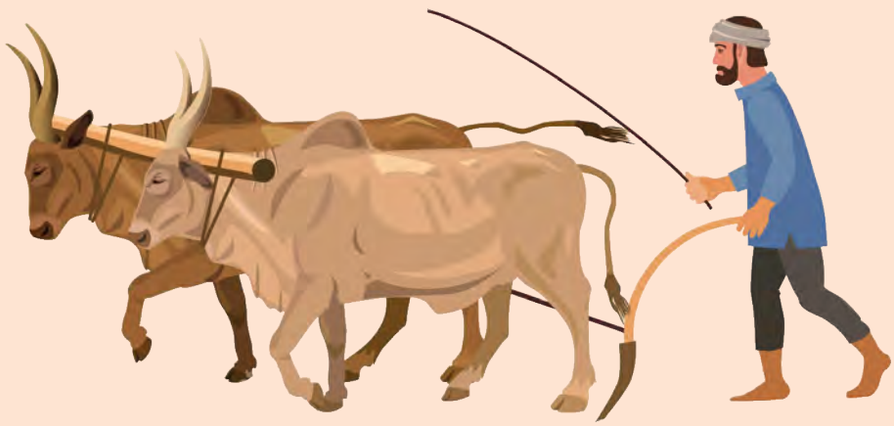
GREEN HABIT:

Provide good food and rest to domestic animals.

FAQS:

Q- How is muscular energy used for work?

A- Muscular energy in humans or animals is used to do work like pushing, pulling, lifting, etc. In these processes, the energy stored in the muscles gets converted into kinetic energy to do the work. Animals are used to do work for human beings and this is a non-polluting way of doing work.



5 WHO COOKS OUR FOOD?

Level/Class: 3

Curriculum links: Science

Activity duration: 30 minutes

Materials needed: Writing material

Approach: Outdoor and indoor activity with whole class, observation, interview and discussion

TOPIC:

Energy, uses of energy, sources of energy, types of fuel

CONCEPT:

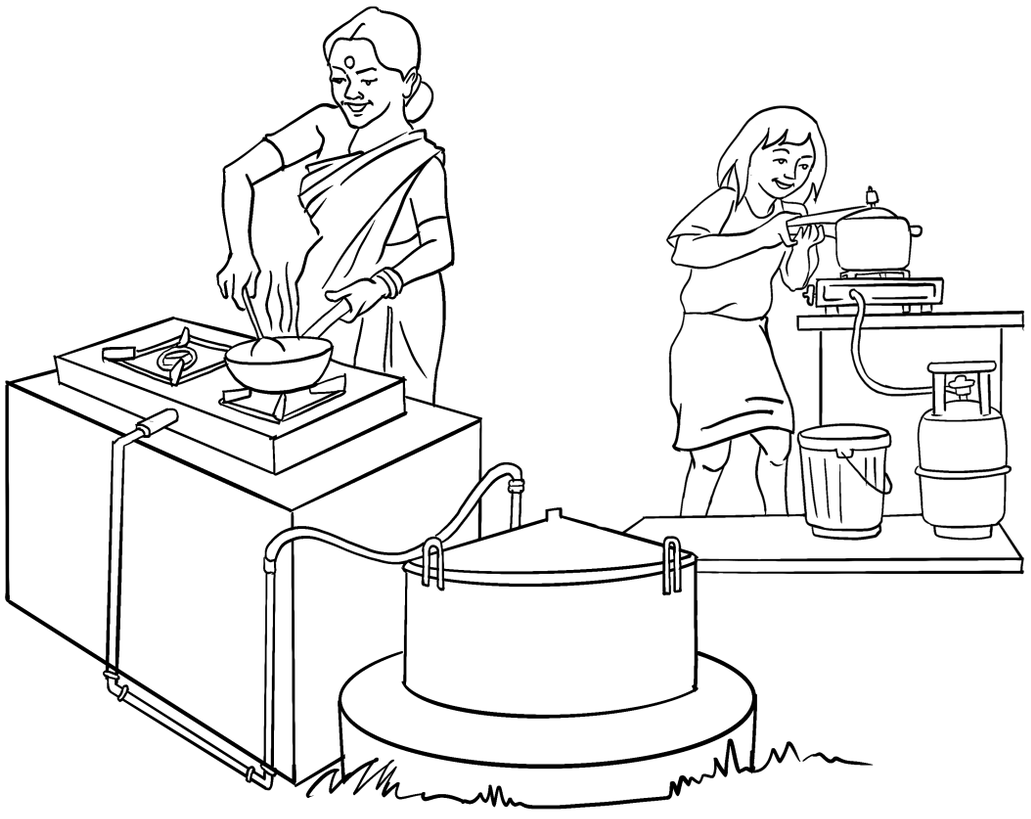
Heat and light are forms of energy. We use heat to cook our food and light for creating brightness at night. We generate heat and light by burning different types of fuels. These fuels are gas, oil, wood, coal, etc. Fuel is burnt to generate heat and light that is used for doing different work like cooking, heating and lighting.

AIMS:

Understand that energy is used at our home for cooking and different fuels are used to generate heat energy required for cooking.

KEY QUESTIONS TO ADDRESS:

What energy is used for cooking food? What are the sources of energy?



METHOD/GUIDE:

Ask students to observe how cooking is being done and what fuels are used for cooking at their home. They can fill the table below by ticking the fuel used for cooking at their home. They can also ask some of their neighbors or friends what fuel is used at their home for cooking.

Type of Fuel	Tick which is used at your home	Tick which is used at your neighbor's or friend's home
Wood/ Firewood		
Cow Dung Cake/ Upale		
Agriculture Residues		
Coal		
Kerosene Oil		
Liquefied Petroleum Gas (LPG)		
Piped Natural Gas (PNG)		
Other (please mention)		

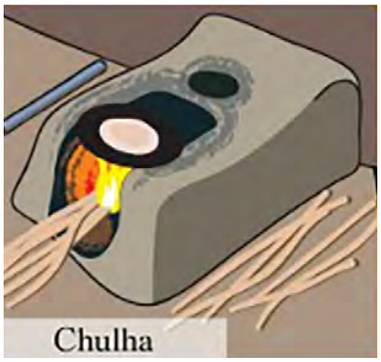
Tell students to ask their parents where they get this fuel from for cooking the food at their home.

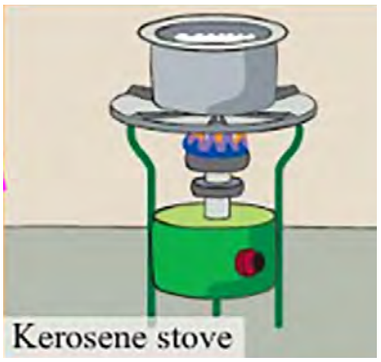
Ask students to share the fuels or sources of energy used for cooking at our home. Note these on the board. Discuss in class different types of fuel used for cooking. Prompt them to fuel they have not seen being used for cooking.

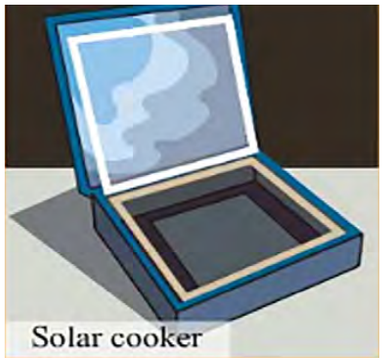
EXTENSION/VARIATION:

Ask students to find out about other energy sources or fuels used for other purposes at their home. Like for heating of water for bathing, for lighting purposes, for keeping warmth in winters, etc. such as sawdust, Upale, briquettes, wax candles, burning oil in Diya, hurricane lamp (lantern lamp), etc. Tell students to find out from their parents where they get these fuels from.

Discuss in the class that we use different types of fuels for generating heat and light for many purposes at our home. We get this from different places.


Chulha


Kerosene stove


Solar cooker

LEARNING OUTCOMES:

Energy is used for cooking food at our home. Energy is also used for other purposes of heating and lighting. We use different types of fuels at our home for these purposes.

GREEN HABIT:

Soak pulses and rice before cooking to reduce fuel usage.

FAQS:

Q- How do we get energy from any fuel?

A- When we burn any fuel in the presence of oxygen or in the open air it produces heat and light. This heat and light are also forms of energy. This process of burning is called combustion and the energy produced as heat or light can be utilized for doing the work. Smoke is produced as a by-product in this process.

Q- Why do some fuels provide more heat faster than the other fuel?

A- The material which gives a higher amount of heat on burning or combustion are used as fuel. Some materials give more energy per unit of weight or volume compared to another. This amount of heat or energy produced on burning is called the calorific value of that material or fuel. Higher the calorific value, more energy is obtained from that fuel. The calorific value for most of the fuel depends on the carbon content of the fuel.

7 ELECTRICITY RUNS FANS AND LIGHTS

Level/Class: 3

Curriculum links: Science

Activity duration: 30 minutes

Materials needed: Writing material

Approach: Indoor classroom activity with whole class, observation and discussion

TOPIC:

Energy, electricity, pollution

CONCEPT:

Electricity is a form of energy. We use electricity to do many works in our day to day life. Electricity appears like a clean form of energy. There is no smoke and soot to be seen. But electricity is generated by burning fossil fuels like coal, petroleum or gas in a power plant. Electricity is also generated from wind and solar energy as well as from flowing water from dams. Electricity generated by burning coal, petroleum or gas causes pollution at the place of generation. This pollution is harmful for the living things and the environment. Hence, by conserving electricity we not only save energy and money but also reduce the pollution and its harmful effects on living things and the environment.

AIMS:

Understand that electricity is a form of energy used for many purposes, it causes pollution while using fossil fuels to generate electricity.

KEY QUESTIONS TO ADDRESS:

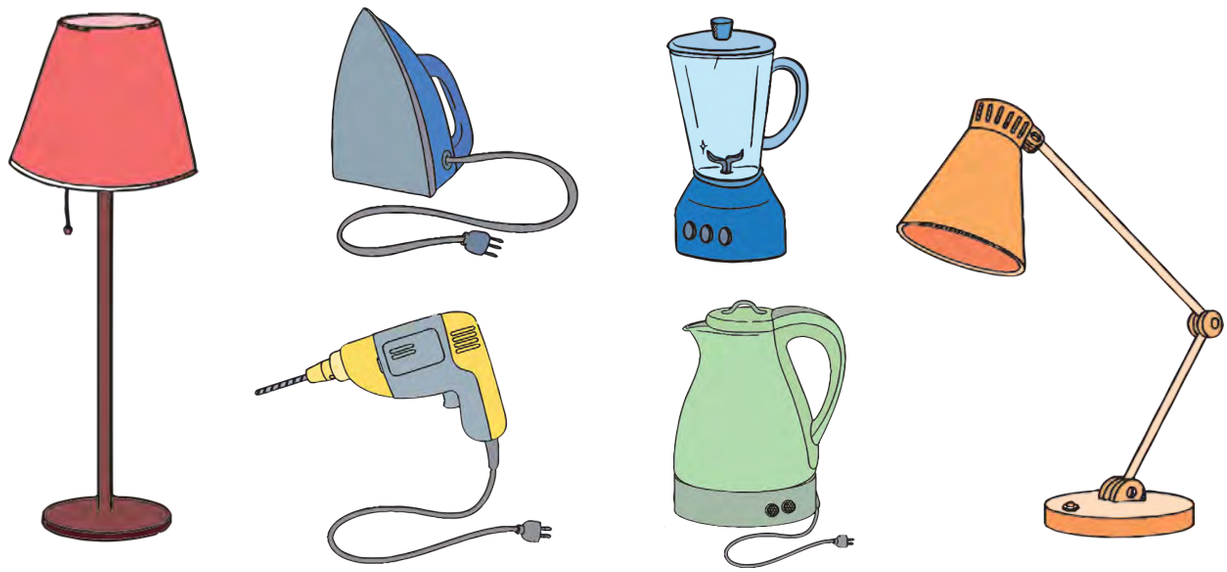
What is the form of energy we use at home? How is pollution caused when we use electricity?

METHOD/GUIDE:

Ask the students to think of all the activities they are involved in or observe throughout the 24 hours of the day and list all those that directly or indirectly require electricity. Ask each of them to tell one such activity and list it on the board. They will be amazed at the long list that emerges. Remind them to include use of mobile, microwave, air conditioner (AC), washing machine, iron, heater, water heater, pump, purifier, inverter, etc.

Explain to them that every one of us uses a great deal of energy in the form of electricity even as we go about our day-to-day activities. In fact, our modern lifestyles are today greatly dependent on energy, especially on electricity. Further explain to them that fossil fuels like coal, petroleum or gas are burnt to obtain this energy. Burning of these produce pollution. Pollution is harmful for the environment and the living things.

Each of us uses electricity and also contributes to cause an equivalent amount of pollution as well as harmful effects on the environment and the living things. We also deplete the natural resources like coal, petroleum and gases formed in millions of years.



Electric Appliances

LEARNING OUTCOMES:

Electricity is a form of energy we use to do day to day activities. It is generated by burning fossil fuels. It looks clean but it causes pollution at the place of generation which is harmful for the environment and the living things.

GREEN HABIT:

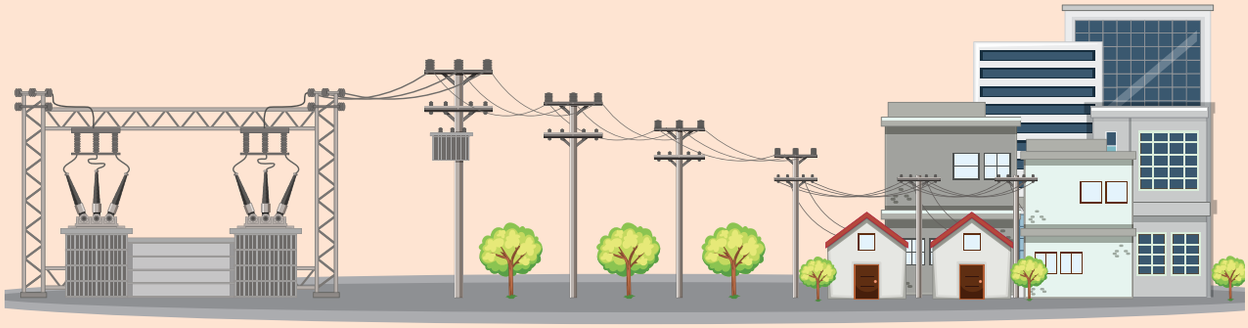
Use natural light and ventilation whenever possible instead of electric lights and fans.

FAQS:

Q- How is electricity produced and supplied to our homes and schools?

A- Electricity is produced by different processes. In a thermal power plant, electricity is produced by rotating huge generators or turbines by the pressure of steam generated by boiling water at high temperature through heat from burning coal or petroleum products. In a hydroelectric power plant, it is produced by rotating the turbines by the kinetic energy of flowing water from the height of a dam. Whereas in a wind farm, electricity is produced by rotating the generator or turbine with the kinetic energy of wind. The fan of the windmill rotates due to the flowing wind which is connected to the generator. In a solar power plant, electricity is produced either by the photovoltaic (PV) cell in the solar panel, which generates electricity when sun rays fall on it. In some solar thermal power plants, solar radiation is used to heat up water to generate steam that rotates the turbine.

Electricity is supplied from power plants to our homes or schools through the network or cables and power grids. There is some energy that gets lost in this transmission.



8 SWITCH OFF!

Level/Class: 3

Curriculum links:
Science

Activity duration: 30 + 30 minutes

Materials needed:
Writing material

Approach: Outside and inside the classroom with whole class, discussion, exploration and taking action

TOPIC:
Energy, conservation of electricity

CONCEPT:
In India, we generate a huge amount of electricity, but still we are not able to fulfil the basic needs of many people living in different parts of our country. Also a major part of this electricity is generated by burning coal in power plants. This causes a huge problem of pollution and badly affects people and other living things and the environment especially near these power plants. Forests are cut for the mining of coal. Our demand for electricity is also increasing. Therefore, we must use electricity very judiciously and be conscious about its wastage.

Conservation of energy is an important value that we need to practice in our day to day life. An important factor we need to become aware of is that while most people are careful in their own homes, there is a tendency to be careless about energy conservation at other places like schools, institutions and offices, probably because we feel that we do not have to pay for the energy consumed. But someone is paying! Moreover, all of us have to pay for energy wasted in terms of environmental costs - the natural resources used and the pollution created. So, the perception of “energy for free” has to change.

AIMS:
Understand that electricity though seems cheaper is a precious resource and we need to use it wisely, we need to stop any wastage of electricity and switch off the appliances and devices when not in use.

KEY QUESTIONS TO ADDRESS:
How to stop wastage of electricity?

METHOD/GUIDE:

1. Ask the students what we use electricity for? We use it for lighting, running fans and coolers, for running devices like computers and mobiles and electrical appliances like televisions, refrigerators and washing machines, etc. It is used in schools, shops, hospitals, offices, factories and public places like stations and airports. It is used on the roads for street lights and traffic signals.

2. Ask students where we get electricity from? Explain that electricity is produced in a few different ways, such as by burning coal, petroleum, or natural gas in power plants. That causes pollution which is harmful to human beings, other living things and the environment.

   At their homes, do they get regular electricity supply, or do they face power cuts? Explain that electricity supply may not be regularly available in all parts of Maharashtra or the country. Some areas face shortages of electricity.

   Explain to them that, Many times, electrical appliances are left "On" even when they are not in use or there is no one using them like lights, fans, TV, AC, water heater/geyser, etc. Sometimes we close the windows that give us natural light or natural ventilation and put on lights or AC. This wastes a lot of electricity at our home, schools and workplaces. This might look like a small waste but if we look at many such appliances left on in many such households just imagine the amount of electricity being wasted. What if we save this electricity and conserve it by "Switching Off" the appliances when not in use.

3. Divide the class into groups of 5 students and ask them to be vigilant of such incidents of appliances being left on (if possible) in different sections of the school. Also ask them to be vigilant of such incidents at their home. They should "Switch Off" such appliances not in use.

   They should be vigilant for a week and note down such incidents in their notebook in the given observation table. (One example is given.)

Observation Table

Sl	Date and Day	Time (approx.)	Place with description	Appliance
1.	3.4.21 Saturday	9.30 am	School, class 4th	Two fans

The student group who finds more such incidents and Switch Off should be encouraged to announce that in the assembly and tell their experience.

EXTENSION/VARIATION:

If found successful this activity can be continued.

Ask students to make posters of the ideas for saving electricity from their experiences and display them in school and their society.

LEARNING OUTCOMES:

Electricity is a precious resource. Not all have access to it. Saving electricity will make it available to them. It will also save pollution and their harmful effects. Switching off appliances not in use at home and school can collectively save a lot.

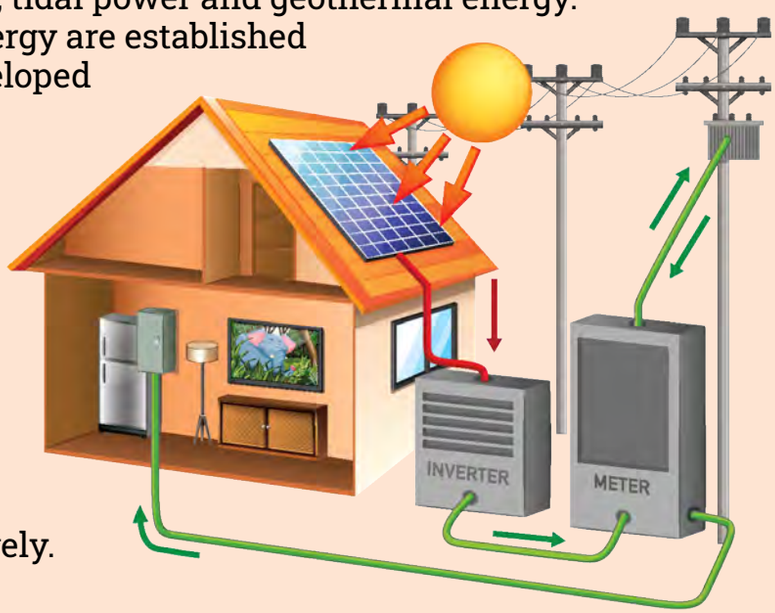
GREEN HABIT:

Switch off lights and fans when they are not in use.

FAQS:

Q- What are other sources of electricity?

A- Electricity can be generated from other sources like hydro power, solar energy, wind energy, tidal power and geothermal energy. Hydro, solar and wind energy are established forms of energy with developed technologies to generate electricity. In India, tidal and geothermal are in their nascent or development phase for electricity generation. In India, for electricity generation, after the thermal power plants, hydropower, solar power and wind energy contribute most, respectively.

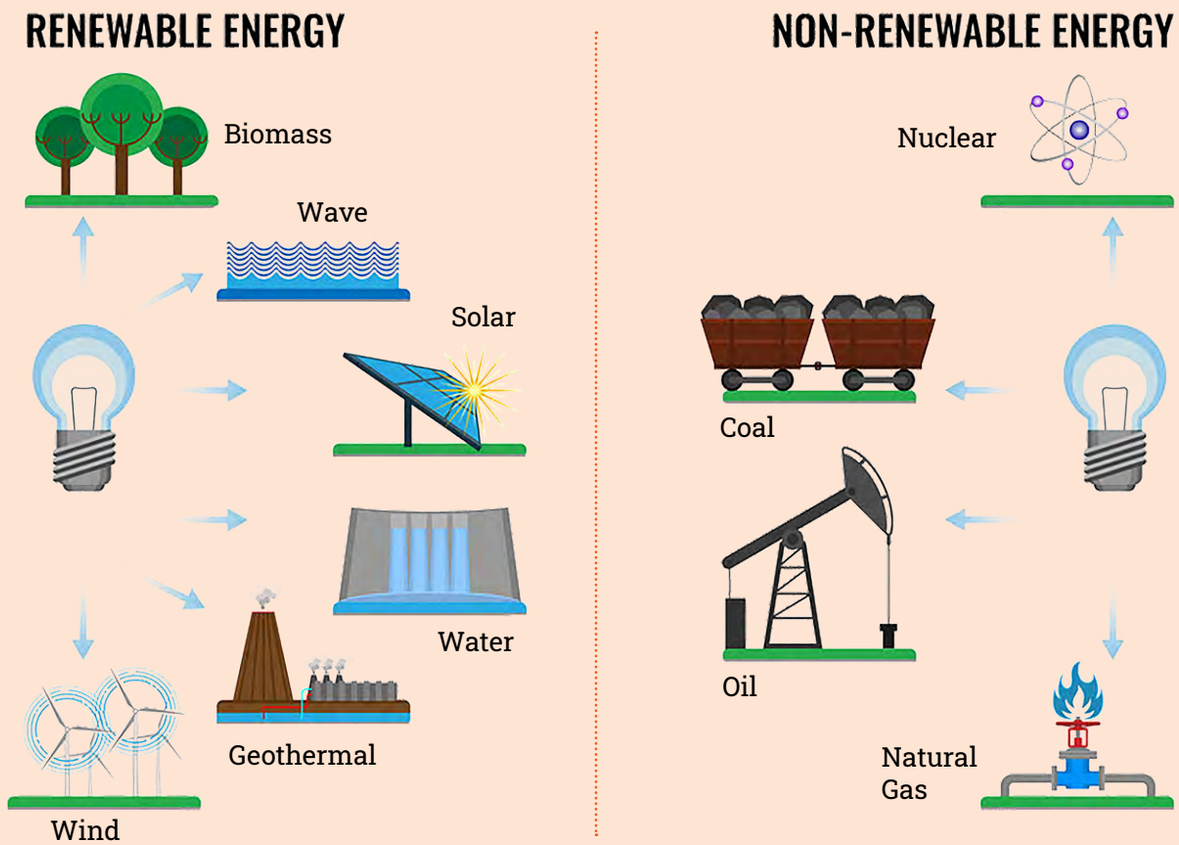


FAQS:

Q- What are renewable and non-renewable energy sources?

A- Renewable energy is derived from sources that do not get exhausted or depleted. Electricity production through renewable energy is a non-polluting process. Solar, wind, hydro, tidal, geothermal and biomass based energy sources are the renewable forms of energy to produce electricity. Whereas, non-renewable energy are those derived from finite resources like fossil fuels. Fossil fuels are coal, petroleum and natural gas. These are formed by the deposition of fossils of plants and animals under earth. Temperature and pressure under the earth over a period of millions of years have converted them into fuel like coal, petroleum or gas. Fossil fuel can get exhausted in the future if exploited heavily. Therefore, it is a non-renewable form of energy.

The process of electricity production from non-renewable sources is very polluting. Energy can also be derived from nuclear power, but nuclear energy generation is highly risky due to the chances of accidents. This is a risk which can impair generations of populations over huge areas.The nuclear waste generated from nuclear power plants is also highly hazardous for all living forms on earth due to their nuclear radiations. Mining of nuclear fuel to feed nuclear plants also generated nuclear waste. Nuclear waste can travel across the globe and remain radioactive for millions of years.



9 A POTTED PLANT

Level/Class: 3 or 4

Curriculum links:
Science

Activity duration:
Observation each day for 5 minutes for 5 to 8 weeks

Materials needed: Fast growing potted plant such as of moong, gram, mustard, fenugreek (methi), wheat, coriander, sunflower or other existing.

Approach: Indoor activity with whole class, can be done at home or school

TOPIC:
Energy, plant need solar energy for photosynthesis

CONCEPT:
Though you may not realize it, every day the plants around you are moving. Even though most plants have roots that bind them to the surface they grow on, plants are able to stretch, grow, and bend to adjust to changes in their environment, but they move or change position so slowly that it's difficult to tell that they are moving at all. However, recording their position over a long period of time, we can see just how much they move and get clues about why. Phototropism allows plants to maximize sunlight exposure on their leaves by orienting them towards the sun. Plant phototropism can be so extreme that some plants, such as sunflowers, actually change their orientation to track the position of the sun in the sky over a single day.

AIMS:
Understand the concept that plant need energy and they obtain it from the sunlight.

KEY QUESTIONS TO ADDRESS:
Do plants need energy to grow? Where do plants get energy from?

METHOD/GUIDE:
1. Ask students what energy plants need to survive. Plants need sunlight to prepare food through photosynthesis. Plants tend to grow in the direction they get sunlight enough to prepare their food.

   Instruct students to take some fast growing plants like moong, gram, mustard, methi, wheat, coriander for planting in a pot. Position the plant on a stable surface slightly away from the Sun on a window. The sunlight must be coming through that window.

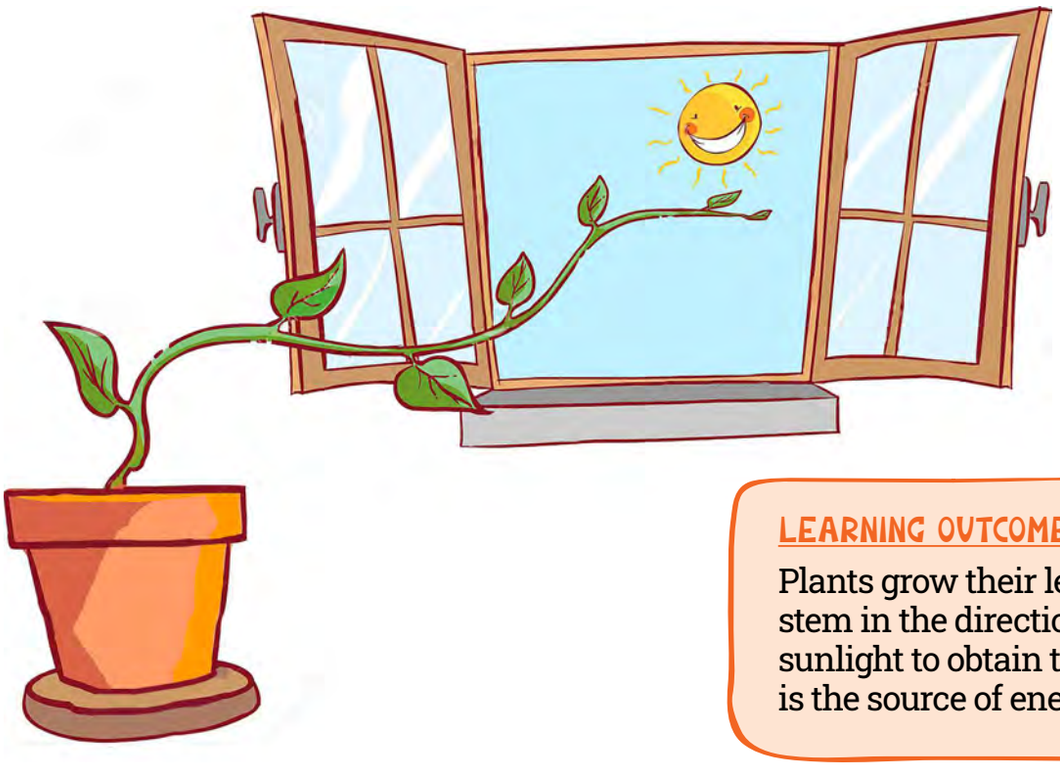
2. Observe the plant growing. They will start to notice the plant "leaning" towards the window or sunlight. Ask them to draw the movement of plants every 5 days in their notebook. They may also take photographs of the plant for keeping the record.

   After a few weeks, once again rotate the plant so that it is leaning away from the window and observe the plant for another few weeks. Note the observations in their notebook. Place photographs according to the dates and mark the changes.

Sl No	Date	Leaning of plant towards sunlight

Discuss the results and observations by the students in class.

Explain to them that through this activity we can see that plants need energy from the sunlight for their survival and they grow in the direction of the sunlight.



LEARNING OUTCOMES:

Plants grow their leaves and stem in the direction of the sunlight to obtain the energy. Sun is the source of energy for them.

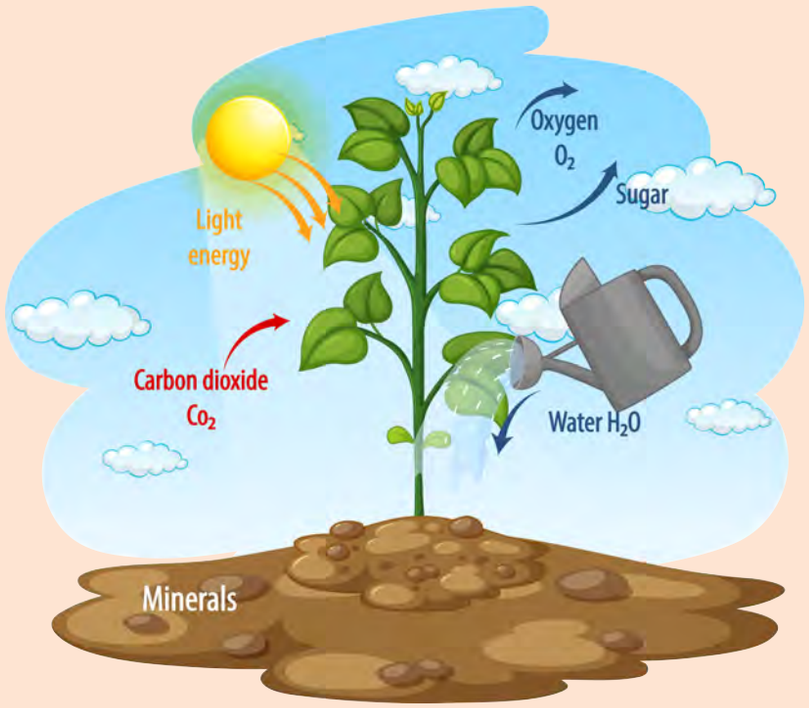
FAQS:

Q- What are the factors required for photosynthesis?

A- Plants need carbon dioxide, water and minerals to do photosynthesis in the presence of sunlight. Photosynthesis is done in the chlorophyll present in the leaves of the plants. Oxygen is released as a byproduct of photosynthesis.

Q- Can plants do photosynthesis at night?

A- No, plants can not do photosynthesis at night as it requires sunlight for the same. If light of similar wavelength is provided artificially, plants can do photosynthesis. This is done in urban farming without the soils with artificial light required by plants in an indoor environment, the technique is called hydroponics.



Q- Are there plants which grow without sunlight?

A- There are some exceptions, these are plants that do not have chlorophyll and do not perform photosynthesis. They live as parasites on other plants and extract their energy or food from their host. They are parasitic plants. They do not produce their food and are called heterotrophic plants.

10 TRAP THE HEAT

Level/Class: 4

Curriculum links: Parisar Abhyas, Science

Activity duration: 1 + 2 hours

Suitable time: Sunny days

Materials needed: Wooden or cardboard box without a lid, glass sheet to cover box, thermometer (0°C to 110°C), black paint

Approach: Outdoor activity with whole class

TOPIC:
Energy, solar energy, solar heating device

CONCEPT:
The sunlight heats up the surface of the objects it falls. Black colour absorbs the maximum part of radiation in the sunlight. Hence, it absorbs the maximum amount of heat from the sunlight. The sunlight after falling on an object reflects back in the form of the heat wave which gets trapped by the glass sheet on top. Therefore, the temperature inside the box becomes higher. The insulating material of the box, the black colour of the surface and the glass top helps in trapping maximum heat inside the box.

AIMS:
To demonstrate how solar energy can be utilized by converting to heat energy.

KEY QUESTIONS TO ADDRESS:
How do solar heating devices like solar cookers work?

METHOD/GUIDE:
Take a wooden or cardboard box of any available size (shoe box). Let the students paint the inside of the box with black colour. Place the box in the sunlight. Put a 0°C to 110°C thermometer inside the box and ask the students to note the temperature readings.

Cover the box with a transparent glass sheet. Keep it in sunlight for half-an-hour. Now let the students record the temperature of air inside the box. Ask students to take temperature readings at 30 minute intervals for 2 hours.

Observation Table

Sl No	Duration of taking readings	Temperature reading	Difference in temperature
1.	30 min		
2.	60 min		
3.	90 min		
4.	120 min		

Observe that the device acts as a heat trap. The black surface absorbs the light and gives out heat. The glass sheet kept above the box reflects the heat back into the box. The heat gets accumulated in the box.

Explain to the students that the temperature inside the box would not rise indefinitely. With increasing temperature, the heat loss from the box increases. When the heat gain and heat loss become equal in the box, the temperature will reach its maximum level.

EXTENSION/VARIATION:

Keep cardboard of different colours in the sunlight for 10-15 minutes. Touch them and note which colours make cardboard hotter.

LEARNING OUTCOMES:

Students should be familiar with the working of solar heating devices like solar cookers.

GREEN HABIT:

Use solar devices for water heating, lights, lamps, inverters and chargers.

FAQS:

Q- What are some devices that use solar energy?

A- Solar heating devices are solar water heaters, solar dryers for crops and grains, solar concentrators for generating steam at high temperatures for electricity production.

Solar photovoltaic (PV) cells in solar panels use solar energy to generate electricity. Many useful appliances are made using solar panels like solar lights, lamps or streetlights, solar water pump, solar chargers and inverters, etc.

11 COOK SMART

Level/Class: 4

Curriculum links: Science

Activity duration: 40 minutes

Materials needed: Cooking vessel with lid, water, stove, watch

Approach: Indoor activity with whole class, observation and discussion

TOPIC:
Energy, conservation of energy

CONCEPT:
Energy in the form of heat is required for cooking food. A lot of heat is dissipated into the environment when we cook in an open or uncovered vessel. A closed vessel or vessel covered with lid traps and keeps the heat inside. This helps in cooking the food at low flame and with lower consumption of fuel. It also cooks the food properly. Therefore, covered utensils should be used for cooking to save energy.

AIMS:
To demonstrate the difference in energy consumption when cooking in covered and uncovered vessels.

KEY QUESTIONS TO ADDRESS:
What is best practice to save energy while cooking food?

PREPARATION:
Need cooking facility

METHOD/GUIDE:
1. Demonstrate to students through this activity that putting a lid on the vessel while cooking saves energy. This activity can be performed in the school with a canteen or in the laboratory. You can also instruct students to perform this at home under the supervision of their parents.

   For conducting the experiment, pour two cups of water into a vessel. Place it on a lighted stove and record the time required for the water to boil.

2. Empty the vessel and let it cool. Pour two cups of water into the vessel again and cover it with a tight-fitting lid. Place the vessel on the stove and record the time that it takes for the water to boil. You will know that it is boiling when you can hear the water against the sides. You can also use a glass vessel or a beaker if available.

Record your observations in the observation table.

Observation Table

Sl No	Method	Time taken
1.	Boiling water without the lid on the vessel	
2.	Boiling water with the tight fit lid on the vessel	

Analyze the observations, in which case does water take more time to boil. When the vessel is without the lid or with the lid on?

3. Discuss with the students the inference based on the observations. Less time taken means less energy is used for cooking the same amount. Therefore, covering the vessel while cooking consumes less energy and also conserves it. Hence, we should cover the vessel while cooking or heating and suggest the same to people.

Vessel without the lid

Vessel with the lid

EXTENSION/VARIATION:

Discuss with the students how they will save cooking energy at home, what they will do to keep bath water warm, etc.

LEARNING OUTCOMES:

Different cooking methods and fuel consumptions. Covering the vessels while cooking consumes less energy and conserves fuel and energy.

GREEN HABIT:

Cook food in covered vessels or a pressure cooker.

FAQS:

Q- Why is it advised to use a pressure cooker for cooking food?

A- In a pressure cooker food is cooked at higher pressure. The boiling point of water increases at higher pressure. Hence, water boils at a higher temperature than its boiling point of 100^0 C. Therefore, food cooks faster at the higher temperature. So, cooking in a pressure cooker consumes less energy and saves cooking fuel.

12 WHIRLWIND

Level/Class: 4

Curriculum links: Science, Social Studies

Activity duration: 40 minutes

Suitable time: Hot sunny day when weather is hot and still

Materials needed: Two rectangular sheets of any easily available material - one white which should be about 1 meter, square shape and the other black, which should be about 0.30 meter and square shape, incense sticks and matchbox

Approach: Outdoor activity with whole class

TOPIC:

Weather, wind and solar radiation

CONCEPT:

Solar radiation carries heat energy, which warms up the earth and is the driving force behind all our weather. By absorbing the heat radiated back from the earth, the air heats up. As hot air expands, it weighs less and floats upwards. Rising air expands, and expansion of a gas cools it down, which is why mountain tops are cooler. This phenomenon is the basic process responsible for the climate of a place. Sunlight also evaporates water from the oceans, from lakes and rivers. Solar energy is utilized in turning water into vapor, and increases the humidity of the air. Therefore, the air from large water bodies like oceans keeps the land cool.

AIMS:

To demonstrate how a whirlwind is created by unequal heating of ground by sunlight.

KEY QUESTIONS TO ADDRESS:

How does the movement of wind happen in the atmosphere over a region? How is the climate of a region dependent on the movement of air and the sunlight falling on the ground surface?

METHOD/GUIDE:

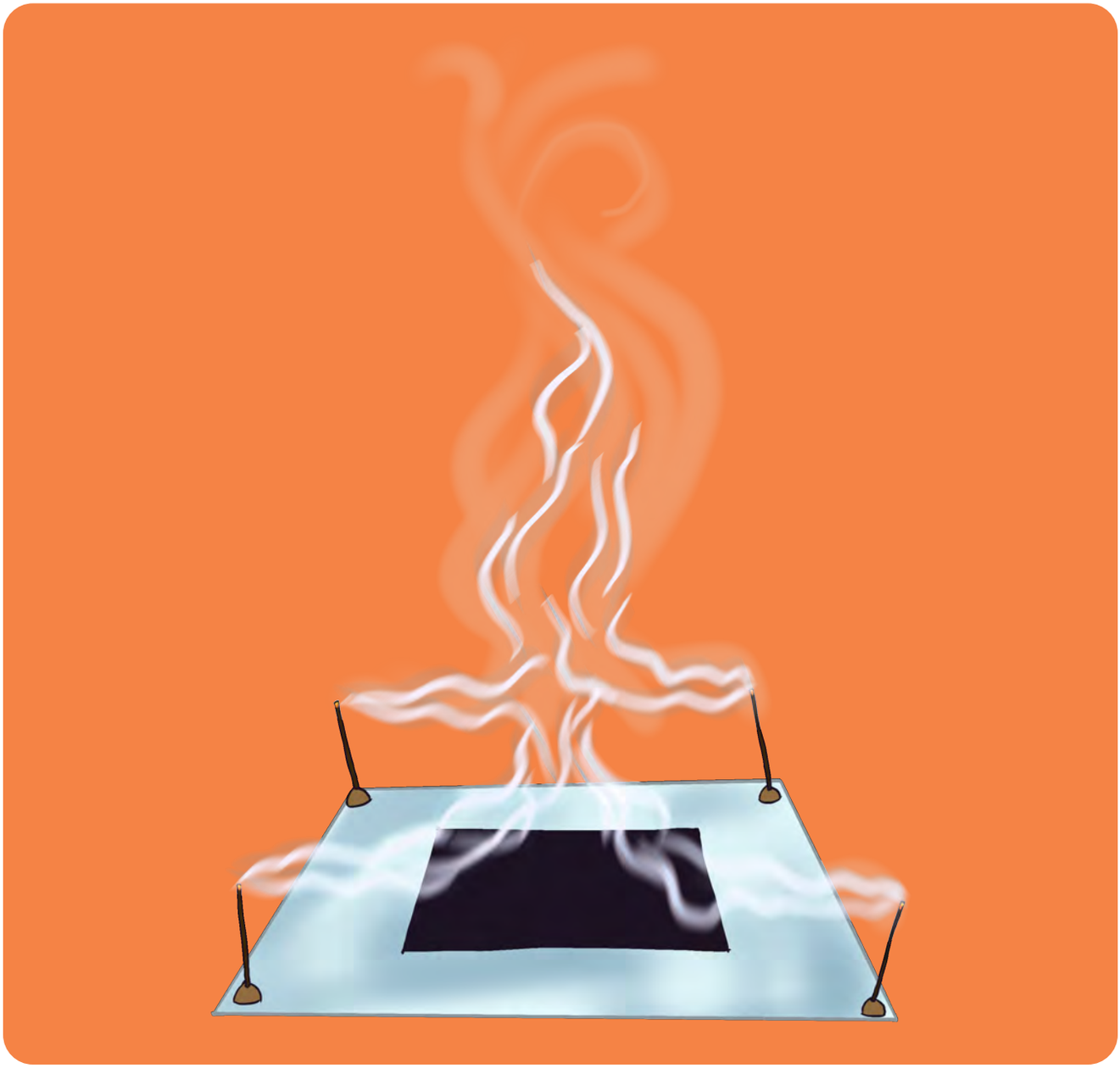
Ask students to place the smaller black sheet at the centre of the white one. These should then be placed in full sunlight on a hot sunny day.

After a few minutes, it will be noticed that the air over the black surface is shimmering. Ask students to think why this may be happening. The teacher should suggest that the air is rising because it has been heated.

After this, the incense sticks should then be lighted and placed on all sides of the sheet.

Ask students to observe the movement of the smoke. The drawing in of the smoke towards the black surface should be noted, and the reasons explained.

Students should also be asked to notice that the smoke spirals upwards over the black area from where the air is rising and that the column of smoke becomes wider as it goes up.



EXTENSION/VARIATION:

Ask students to relate the weather observed on high mountains and coasts to the experiment they did in the classroom.

LEARNING OUTCOMES:

Science behind formation of a whirlwind i.e., unequal heating of ground by sunlight. Effect of solar radiation and wind on weather.

FAQS:

Q- What role solar radiation has in influencing the climate of a region?

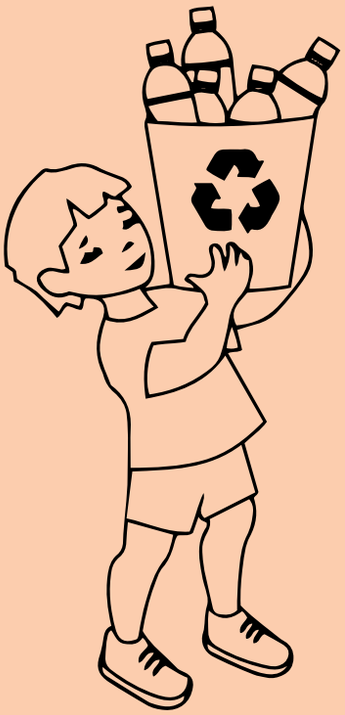
A- Solar radiation, over the regions, heats up land masses and water bodies differently. This also happens due to the unequal heating over the equator, tropical and polar regions as well as due to the latitude, altitude and vegetation cover. The unequal heating sets the movement of air masses over earth in different regions in set patterns. This redistributes the heat and moisture/ water vapour and influences the humidity, evaporation as well as the precipitation (rain, snowfall, etc) over a region. Temperature, humidity and precipitation broadly defines the climate of a region. Local factors like altitude, landform (plane, hills, plateau, etc), presence of water body and vegetation cover influences the local climate of the place and are responsible for the variations in climate within a region.

Q- What are sea breeze and land breeze?

A- Sea breeze is the wind that blows from a large water body towards the land. It is experienced near large water bodies like the sea, river or lake. It happens due to the difference in air pressure created by differing heating of water and land by solar radiation. Land heats up much faster than water. During the day time, air above the land becomes hotter and moves up, and the wind from the water side blows to fill this gap created due to low pressure. This helps keep the land side cooler. By contrast, land breeze is the reverse effect. Land cools more quickly than water, and at night wind blows from land side towards the large water body side. This is experienced more strongly near a sea so it is called sea breeze. The term offshore wind may refer to any wind over an open water body. Wind farms are often situated near a coast to take advantage of the wind speed resulting from sea and land breezes.

13 GREEN HABITS

Standard	Green Habits
1	Dry your clothes in sun or open instead of dryers or washing machine
1	Save electricity wastage when not in use
2	Walk or use a bicycle when you can
2	Provide good food and rest to animals do work for us
3	Soak pulses and rice before cooking to reduce fuel usage
3	Use natural light whenever possible instead of electric lights
3	Switch off lights and fans when they are not in use
4	Use solar devices for water heating, lights, lamps, inverters and chargers
4	Cook food in covered vessels or pressure cooker



14 ANNEXURE

Textbook Analysis for Energy, Air Pollution and Climate Change for Grade 1 to Grade 4

Theme	Sub-theme	Class	Subject	Lesson Name	Lesson No	
Energy	Energy	2	Marathi	Pawan Chakki	14	
Energy	Solar Energy and Appliances	2	Marathi Majet Shikuya Marathi	Mazhe Ghar	18	
Energy	Role of Electric Appliances	2	Marathi Majet Shikuya Marathi	Ekuya and Boluya	20	
Energy	Cooking Gas, Energy Consump-tion	3	EVS	Cooking	10	
Air	Air Percentage	4	EVS	Air	9	
Air Pollution	Air Quality	4	EVS	Air	9	

	Page No	Content Form	Content sub topic
	27	Lesson/Note	Windmill and its applications, image of solar panel
	18	Image and activity	Picture of home is given and ask to write name of material from own house, given picture of solar geyser, also given fridge, washing machine and fan electric appliances
	20	Image and activity	List of appliances and images are given their name to repeat the activity like computer, fridge, washing machine, TV, fan, solar geyser, mobile, and given one sentence using the appliances name with their role
	82	Lesson/Note	Nowadays, many people prefer to use cooking gas as fuel. It is easy to use. It lights quickly, there are various types of cooking stove and their energy consumption models.
	57	Lesson/Note	There is information given about the percentage of gases in the atmosphere, its form and importance, etc.
	57	Lesson/Note	Composition of air in the atmosphere and air pollution

Credits

Biodiversity

Activities adapted from

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning I

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning II

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning III

Centre for Environment Education, Paryavaran Mitra Teacher's Handbook

Centre for Environment Education, IEC for Maharashtra Gene Bank Project, Shivarferi Handbook

Centre for Environment Education, IEC for Maharashtra Gene Bank Project, Habitat Linked Projects Based Learning (H-PBL) modules.

Solid Waste Management and Personal Health

Activities adapted from

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning I

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning II

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning III

Centre for Environment Education, Garbage to Gardens

Centre for Environment Education, Building Blocks

Centre for Environment Education, Towards Cleaner Air

Centre for Environment Education, Paryavaran Mitra Teacher's Handbook

Centre for Environment Education, Handprint for Waste Management Module for Teachers

Centre for Environment Education, Swachhagraha Children's Activity Book

Centre for Environment Education, Joy of Washing Teachers' Manual

Unicef and CACR, Hand Washing With Soap Module for class 1-4

Unicef and CACR, Hand Washing With Soap Module for class 5-8

Unicef and CACR, Training Module for Menstrual Hygiene Management for Adolescent Girls

Centre for Environment Education, Teachers' module on Air Quality

Centre for Environment Education, Joy of Washing

Bal Bharati, English Textbook for Class 5th

Bal Bharati, Science Textbook for Class 6th

Conceptualization and writing of new activities/ projects: Sanskruti Marathe, Programme Officer and Kunal Jaiswal, Project Officer, Centre for Environment Education, Pune

Water Management

Energy, Air Pollution and Climate Change

Activities adapted from

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning I

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning II

Centre for Environment Education, NCERT and VIKSAT (1986), Joy of Learning III

Centre for Environment Education, Paryavaran Mitra Teacher's Handbook

Centre for Environment Education, Energy Matters

Centre for Environment Education, Towards Cleaner Air

Centre for Environment Education, Towards Green Future

Centre for Environment Education, Building Blocks

Centre for Environment Education, Schools for Clean Air Student Activity Book on Air Quality

Conceptualisation and writing of new activities/ project: Amarnath Karan, Scientist SD, Centre for Environment Education, Pune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