



Vocational Education

Standard Six

व्यावसायिक शिक्षण इयत्ता सहावी (इंग्रजी माध्यम)





Tele MANAS Helpline

Tele MANAS (Tele Mental Health Assistance and Networking Across States)
(14416/ 1800-89-14416)

Under the National Mental Health Program, the centrally sponsored scheme Tele MANAS is being implemented in the state of Maharashtra from October 2022. Under the Tele MANAS Program, free 24×7 integrated and comprehensive mental health services are provided through the helpline number 14416. This includes treatment and counselling by experts for various mental problems. The information provided by you after calling the Tele MANAS helpline remains completely confidential, so students, parents and teachers should feel free to call the helpline number and tell them about their problems and doubts and get guidance on it. Tell others to take help from this facility as well.

Manodarpan

The Manodarpan Helpline (8448440632) is a free telephone service that has been made available since July 2020. It is provided by the Ministry of Education through the Manodarpan Cell at the National Council of Educational Research and Training (NCERT) to offer psychological guidance and support to students, parents and teachers. This service is available every day of the week from 8:00 AM to 8:00 PM. Students, parents and teachers can call this helpline to receive the necessary guidance and counseling.

The Co- ordination formed by GR. No. Abhayas- 2116 (Pra.Kra.43/16)
SD- 4 dated 25.4.2026 has given approval to prescribe this textbook
in the meeting held on 01.06.2026 and it has been decided to
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Vocational Education



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as well as useful Audio-Visual materials for teaching learning.

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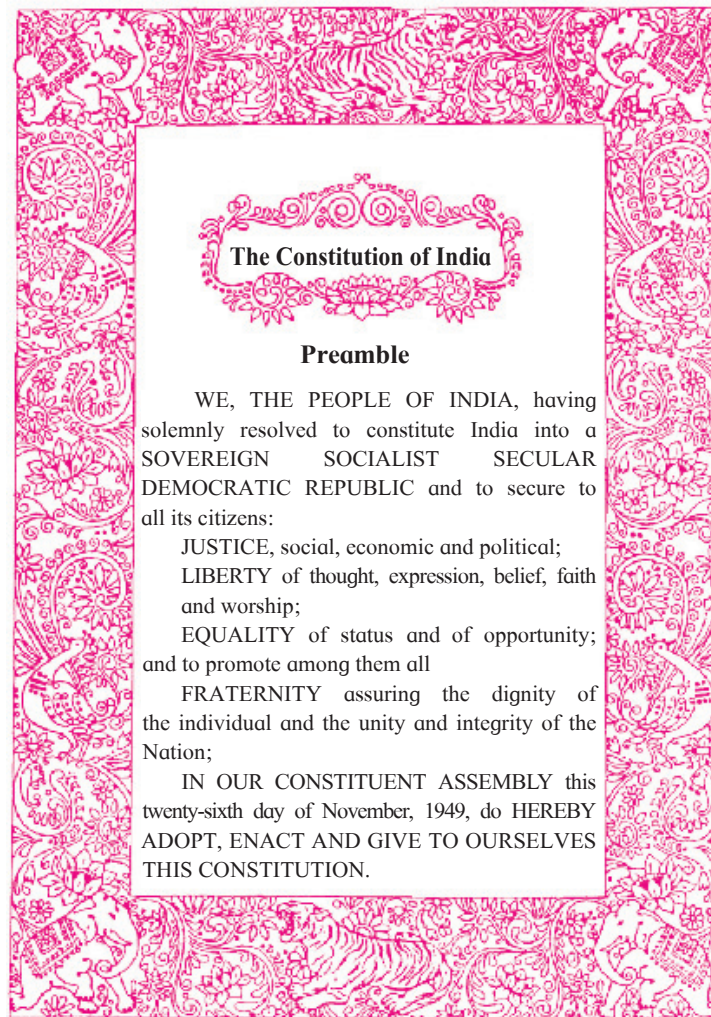
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The Constitution of India

Chapter IV A

Fundamental Duties

ARTICLE 51A

Fundamental Duties - It shall be the duty of every citizen of India -

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities, to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvīda-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians
are my brothers and sisters.

I love my country, and I am proud
of its rich and varied heritage. I shall
always strive to be worthy of it.

I shall give my parents, teachers
and all elders respect, and treat
everyone with courtesy.

To my country and my people,
I pledge my devotion. In their
well-being and prosperity alone lies
my happiness.

राज्यगीत

जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा
जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा ॥१॥

भित्ती न आम्हा तुझी मुळी ही गडगडणाऱ्या नभा
अस्मानाच्या सुलतानीला जबाब देती जिभा
सह्याद्रीचा सिंह गर्जतो शिव शंभू राजा
दरी दरीतून नाद गुंजला महाराष्ट्र माझा
जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा ॥१॥

काळ्या छातीवरी कोरली, अभिमानाची लेणी
पोलादी मनगटे खेळती, खेळ जीवघेणी
दारिद्र्याच्या उन्हात शिजला
निढळाच्या घामाने भिजला
देश गौरवासाठी झिजला

दिल्लीचे ही तख्त राखितो, महाराष्ट्र माझा
जय जय महाराष्ट्र माझा, गर्जा महाराष्ट्र माझा
जय जय महाराष्ट्र माझा ॥२॥

Preface

Dear students,

Welcome to Class six. We are delighted to place the Class six textbook on 'Vocational Education' in your hands.

In this era of modernization, mechanization, and technology, skill-based education holds special significance. In accordance with the National Education Policy, emphasis is placed on fostering the dignity of labor, creativity, problem-solving abilities, and an entrepreneurial mindset among students.

Education is not merely about bookish knowledge; it is a process of acquiring essential skills. Through vocational education, you will gain a basic understanding of three types of work: work based on living organisms, work involving machines and tools, and work related to human services. Through this subject, you will learn about various types of work, use different tools, and complete projects. By identifying your personal interests and aptitudes and engaging in practical work, you will be able to develop new skills. These skills will certainly prove useful in your daily life.

The activities included in the textbook will encourage you to think and create. Some activities are designed for individual work, while others are meant to be done in groups. Along with classroom learning, the book also incorporates field visits.

You will also find the information accessed via QR codes very engaging. Please let us know which parts of the textbook you enjoyed the most and what else you would have liked to see included. We are confident that you will really like this textbook.

So, let us embark on this educational journey of vocational learning with enthusiasm, curiosity, and self-confidence. Best wishes for a bright future!



(Anuradha Oak)

Director

Maharashtra State Bureau
of Textbook Production
and Curriculum Research, Pune.

Pune.

Date: 01 May 2026

Indian Solar Year :

Vaishakh Shuddha 11,

Shake 1948. Maharashtra Day

About The Book

National Education Policy 2020 or National Curriculum Framework is an Activity Book of Vocational Education for Grade 6th is developed in alignment with the vision of the National education Policy (NCF-SE)2024.

In the National curriculum Framework 2024 (NCF-SE 2024, work has been categorized under three board forms : work with life forms, work with machines and materials, and work in human services. The intent at this stage is to provide vocational exposure to the students through a wide range of activities categorized into three forms of work. to achieve this, students are expected to take up nine projects across Grade 6 to 8 i.e., three projects in each grade and one from each form of work.

The textual material developed for the Middle Stage will take children well beyond the preparatory stage. Curricular goals, competencies, and learning outcomes has been the guiding principles while developing the text book The following Curricular Goals (CG) given in the activity book cover a range of competencies .

- CG- 1: To develop in -depth basic skills and allied knowledge of work and their associated materials or procedures
- CG-2 : To understand the place and usefulness of Vocational skills and vocational in the world of work
- CG-3 : To develop essential values while working across areas and
- CG-4 : To develop basic skills and allied knowledge to run and contribute to a home.

A variety of activities have been included in the activity book to cover the above curricular goals.

The Activity book contains six illustrative projects ,two for each form of work. one project may be taken up by students or preferably ,the school can design other projects based on local considerations. The illustrative projects are described as follows:

Project 1 is on developing a school Kitchen Garden .Students will engage in creating and maintaining a kitchen garden on school grounds or in pots . They will learn about the various agricultural practices through field visits and hands-on learning, with a focus on the importance of organic farming .

Project 2 is on preparing a biodiversity register, Students will be studying a variety of life within a school premises or near by areas and documenting the various living things. They will learn to identify different species of plants, animals and insects, understanding their roles in ecosystem. This project will enhance their observational skills, knowledge of biodiversity, and the significance of conservation. It will also instill a sense of environmental stewardship and the importance of protecting natural habitats.

- Project 3 is on maker skills. In the maker skills project, students will explore various hands-on activities, such as making toys and maintaining a bicycle. They will learn to use tools and materials to create functional or artistic items, fostering creativity, problem solving and technical skills. This project will encourage innovations, critical thinking and the practical application of theoretical knowledge, preparing students for potential careers in designs, engineering, and manufacturing.

- Project 4 is on Animations and Games. It will introduce students to the fundamentals of digital creativity. They will learn to design and develop animations and games, gaining skills in coding, graphic design and story-telling. This project will enhance their technological proficiency, creativity and logical thinking.

- Project 5 is on school museum. It will help students to develop the skills of creating and managing exhibits that showcase the history, culture and achievements of their family and community. They will learn about research, documentations and presentation skills. This project will cultivate an appreciation for heritage, enhance organizational skills, and promote team work. It will also provide a platform for students to express their creativity and engage with their family and community.

- Project 6 is on Cooking without Fire. In this project, students will explore the art of preparing nutritious meals without the use of heat. They will learn about nutrition, food safety, and culinary creativity. This project will teach them practical life skills, the importance of healthy eating and the ability to prepare meals in emergencies or with limited resources. It will also encourage teamwork and the joy of cooking.

Features and Evaluation

All projects incorporate comprehensive themes such as Indian knowledge traditions, values, heritage, gender sensitivity, and inclusivity. The thought-provoking and stimulating questions incorporated into the various activities will engage students and foster enjoyable learning alongside assessment. Context-relevant illustrations have been created to make the learning experience more engaging. Questions within the lessons have also been included to assess the understanding of the activities. The questions provided at the end of the project—under the section ‘Think and Answer’—are designed to encourage critical thinking, logical reasoning, responsiveness, and analytical skills among students. (It is mandatory to have students carry out all the activities associated with these projects.)

Students will certainly enjoy working on these projects, and this will help develop the desired competencies in them.

Note : Certain Technical apps have been mentioned in this book to provide information about technology. However, these are cited solely for illustrative purposes; the organization has no intention of promoting any specific company or individual.

National education Policy 2020

Perspectives and Principles

Under the National Education Policy 2020 and the State Curriculum Framework 2024, Vocational Education has been incorporated as a core subject starting from Class 6. Within this, productive work is categorized into three groups.

The State Curriculum Framework 2024 provides a detailed classification of productive work into three groups:

1. **Life-based work:** This involves working with plants and animals. For example, cultivating a vegetable garden (kitchen garden) and caring for animals.
2. **Work involving tools and materials:** This involves working with various materials (e.g., paper, wood, clay, and fabric) and using basic tools (e.g., scissors, garden trowels, knives, hammers, screwdrivers, etc.) as well as simple machines (e.g., levers, inclined planes, screws, wheels and axles, etc.).
3. **Work in Human Services:** This involves understanding people's needs and communicating with them to determine how best to assist them. It entails comprehending the processes and resources required to provide specific services and utilizing communication skills effectively in the process. Examples include healthcare, social work, education, food services, and community services.

Since this stage focuses on developing broad capabilities for productive work, a key objective is to introduce learning through various activities categorized into these three work groups. It is expected that three projects—one from each group—will be undertaken at each grade level. This allows for the completion of a total of nine projects between grades six and eight.

Schools are required to assess their available resources and local conditions, and then select three projects—one from each of the mentioned above categories. This book provides detailed examples of two projects from each category that 6th-grade students can undertake. These examples illustrate how to create a well-structured project plan, what aspects to focus on, and how to execute the project while keeping the curricular goals of the State Curriculum Framework 2024 at the core. In addition to these examples, a template (Appendix 1) is also provided in the book to help students design their own unique projects.

The design of this book is based on the following principles:

1. **Easy introduction to vocational education:** Vocational education is being introduced at the secondary level for the first time. The objective of this book is to make this transition as smooth and simple as possible, without imposing any burden on teachers or students.

2. **Examples of projects based on resource availability:** The book contains examples of projects that schools can undertake by utilizing various resources—such as experts, tools, and materials—depending on their availability.
3. **Alignment with learning outcomes:** While designing the book, care has been taken to ensure that the learning outcomes prescribed for Class VI and the associated competencies are achieved.
4. **Consistency in project structure:** A uniform format should be used for all projects. Each project will follow a specific framework, ensuring a consistent approach to achieving learning outcomes.
5. **Coherence within projects:** Although the projects comprise various activities, these activities should be designed to facilitate learning; they should be interconnected to ensure progressive learning.
6. **Student-centric (Participation):** The teacher should engage in a ‘conversation’ with the students. Students should be given opportunities to record their own learning and thoughts based on the activities they have undertaken.
7. **Guidance for Teachers:** A framework for implementing projects has been provided for teachers who are teaching vocational education for the first time. Guidance is offered regarding what is expected from students, and assistance is provided to help teachers understand the expectations placed upon them under the State Curriculum Framework 2024.
8. **Inculcation of Values:** This book provides students with opportunities to ‘Do’ various things—such as recording their small successes, exchanging feedback, working with peers, persisting in their efforts, answering questions, reflecting, in short, ‘Experiencing’ values associated with the work.
9. **Approach to Project Implementation:** The focus should be on the actual ‘Doing’ of Activities, alongwith components like preparation, documentation, and reflection. Learning should comeout from the process of performing the activities. To achieve this, primary activities should, as far as possible, be based on what students are currently doing and what they can easily observe in their immediate surroundings.

This book offers guidance to teachers regarding instruction and the assessment of student learning through the questions included in the various sections. Nevertheless, teachers should develop their own tools and techniques for formative and summative assessments. This book contains important notes for teachers, headmasters, and students. This textbook also includes useful appendices. They help teachers implement the activities and projects of vocational Education for class 6th.

For Teachers and School Head Master

To achieve the objectives of the National Education Policy (NEP) 2020, and in accordance with the State Curriculum Framework for School Education 2024, Vocational Education has been introduced as a distinct subject starting from Class 6. The aim of this subject is to foster vocational competencies through 'Learning by Doing,' instilling a 'Dignity of Labour,' and providing exposure to various fields of work. Successful implementation will help mold responsible, self-confident, and productive citizens who respect all professions. Vocational education will also equip students with the perspective to apply concepts learned in other subjects to real-life situations.

Students in Class 6 will undertake one project from each group. While the sequence of these projects is not fixed, completing all of them within the academic year is mandatory. These projects may be conducted simultaneously or sequentially. Student groups can be organized based on the number of students, available resources, and the nature of the specific project. Before initiating the projects, it is important to co-ordinate with other related subjects.

The projects in this workbook have been designed based on learning outcomes; attention should be focused on the following points while carrying out the activities :

1. Using tools and equipment for the actual work.
2. Breaking down the work into smaller tasks, determining the course of action, and proceeding accordingly to reach the final outcome.
3. Follow safety rules while carrying out projects and using tools.
4. Linking school-based activities to the local environment or other fields of work.
5. Evaluating the work based on its scope and quality.
6. Ensuring the active participation of every student while working collaboratively in a group.
7. Applying what has been learned in school in day to day.
8. Ensuring active student participation in the activities while carrying out the projects.

This process will inculcate the work ethic among the students and 'Every type of work has dignity'.

The feeling of not being inferior will take root.

Pedagogy

- **Resources and Experts:** Resources, spaces, and mentors (e.g., mechanics, farmers, artisans, technicians) required for the projects should be selected from the local community. Field visits and interactions with professionals should be incorporated into the projects.
- **Emphasis on Process:** The focus should be on the ‘Process of Doing’ and creativity rather than just the final product. Values such as teamwork, perseverance, and sensitivity should be encouraged.
- **Inclusivity:** There should be no discrimination based on gender or social groups when assigning tasks. Necessary modifications should be made to the projects to accommodate students with disabilities.

Criteria for Project Selection

Students may choose their own projects instead of those listed in the textbook, provided the following criteria are met :

- The projects should be suitable for Class 6 students.
- They should have connections to other subjects.
- Students should have the opportunity to interact with experts and gain hands-on work experience.
- Skills useful in life and a sense of the dignity of labor should be developed.

(Detailed information regarding this is provided in Appendix 1.)

* **It is mandatory to implement all activities included in the project.**

Important :

Safety Measures

- **Physical Safety:** Students must be instructed on safety protocols while using tools and equipment. Utmost care must be taken regarding student safety during field visits.
- **Internet Safety:** Ensure that students do not share personal information while using the internet or Artificial Intelligence (AI) tools and that they work only under the supervision of teachers. It is mandatory for teachers to explain the relevant safety guidelines before the internet is used.

For Students

Dear students,

Welcome to Class 6. In this class, you will be learning a new subject called 'Vocational Education.' This textbook has been prepared for that purpose.

This subject will help you gain information about various types of work and learn 'How to Perform' these tasks yourselves.

When you think about work, always keep two things in mind:

1. All types of work are important.
2. People do not work solely for a livelihood (to earn money); they also work to create an identity for themselves and to make life more enjoyable and fulfilling.

In your routine life, you see people doing various kinds of work. Vocational Education will help you understand practical aspects and the world of work. The projects will give you the opportunity to work hands-on, collaborate in groups with friends, and learn skills that foster self-reliance in life.

How to use this book?

First, read the project introduction to get an idea of what needs to be done.

- **Required Materials :** Check the list of materials provided at the beginning of each activity and gather them.
- **Follow the Steps :**
 1. Sequential steps are provided for each activity within the project. Follow them to complete each activity. Do not rush; ensure you have understood the current activity before moving on to the next one. Make important notes while interacting with experts during field visits.
 2. Use a separate notebook for this subject to answer all the questions and complete the charts found in the book.

This will help you learn and assess your understanding.

- **Review your work :** Once the work is completed, [consider] what you learned and...

Reflect on what else there is to learn. Questions have been provided to help you write about and reflect on your current activities. Write your responses in your own words and in simple language. Discuss your observations and thoughts with your peers. Review your answers once you have completed the activity.

- **Take help:** If you have any doubts about an activity, do not hesitate to ask teachers, parents, or friends for assistance. Ask questions until a concept becomes clear to you. Discussion makes learning more enjoyable and effective.
- **Use technology:** You can utilize the internet or artificial intelligence (AI) tools. These tools help in finding information or completing tasks quickly (e.g., ChatGPT or translation tools). Remember, using these specific tools for your project is not mandatory; you may use them as needed while adhering to safety guidelines.
- **Be creative:** You are expected to answer some questions using your own creativity. Let your imagination run free.
- **Stay positive:** Learning new things can be challenging. Remain positive and remember that practice makes a man perfect.
- **Create your own projects:**
Try to undertake new projects that go beyond those listed in the textbook. If you encounter difficulties while working on a project, consult library books and seek advice from others. Discuss your ideas with your group and teachers before trying something different. You can carry out these activities after school hours or at home.

Important

Internet Safety : Always use the internet or artificial intelligence (AI) tools under the supervision of adults. Exercise caution regarding what you view, upload, or download on the internet.

Do not upload or download any information on the internet without consulting your teacher or parents. Do not share your personal information. Before handling or using the internet or AI tools, learn the safety guidelines from your parents or teachers and follow them.

Competencies and learning outcomes vocational Education Curriculum

Curriculum Competency	Learning Outcome
CG-1: Developing foundational skills and acquiring knowledge regarding work-related materials and methods.	
C - 1.1: For practice Identifying tools/ equipment and understanding their uses.	1. Clarifies the concept related to the vocation/trade. 2. Identifies and lists tools/equipment according to the trade. 3. Explains the usage of tools/equipment. 4. Uses tools/equipment in daily life. 5. Handles tools/equipment safely.
C - 1.2 Planning Approaching the task methodically and systematically.	6. Outlines the sequential steps to complete the task. 7. Plans the time required to complete the task. 8. Systematically follows a streamlined process to complete the task.
C - 1.3 Handling materials/equipment required for the work.	9. Identifies the materials and equipment needed for the task. 10. Handles materials and equipment correctly while performing the task. 11. Cleans the used materials and equipment and stores them in the proper place. 12. follow the safety rules while handling materials and equipment.
Curriculum Competency / Learning Outcome	
Curriculum Competency	Learning Outcome
CG-2: Understanding professional skills, the professional standing of a vocation, and its utility within the world of work.	
C 2.1 Describing the contribution of a vocation within the world of work.	13. Becomes familiar with various vocations in the surrounding area. 14. Explains the importance of various vocations in daily life. 15. Explains the social utility of various vocations.
C 2.2 Applying skills and knowledge learned in that field.	16. Uses abilities/knowledge learned in one vocation to other vocations. 17. Implements skills learned in that field to daily life. 18. Follows safety rules while using skills related to that field.
C 2.3 Evaluating and determining standards for related products/ materials.	19. Identifies various products and tools. 20. Identifies the quality of products and materials. 21. Measures products and materials. Curriculum Competency / Learning Outcome.
Curriculum Competency	Learning Outcome
CG-3 Developing essential values/attitudes while working in various fields.	
C 3.1 The following values/attitudes are developed while working :	22. Focuses on the details of the given task. 23. Works with patience until a task is completed. 24. Considers the difficulties of others and offers help while working in a group. 25. Respects the feelings, suggestions, cooperation, and needs of others. 26. Shows a willingness to put in physical effort to enhance business growth and quality. 27. Participates in the physical labor required for the task.
CG- 4 Developing basic skills and related knowledge to assist with and contribute to household chores.	
C 4.1 Applying acquired vocational skills and knowledge at home.	28. Applies acquired vocational skills and knowledge to perform household tasks. 29. Makes efficient use of manpower by utilizing knowledge and skills gained while doing housework. 30. Uses vocational knowledge for the maintenance of household items and for minor repairs.

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Conduct the teaching learning process for students with special needs, sign language as well as other supplementary pedagogical methods should be used. Students with special need should be given the opportunity to express themselves in whatever way is possible for them.

My Projects

Work with Life Form	Project
	1.

Work with Machines and materials	Project
	1.

Work in Human Services	Project
	1.

Name : Standard : Division.....

School Name :

During this year I have selected One project from each Area as above.

Part 1

Work With Life Forms



To help students become productive members of Society it be important to provide them with exposure to different occupations and Livelihoods. To develop the Skills required for occupations related to plants and animals, this field has been included under work with life form.

This work form includes two projects – School Kitchen garden and Biodiversity register, to provide students with practical/ hands on experience related to such occupations.

A Kitchen garden is a small garden developed around a home, school or any open space. It may include fruit trees, vegetables, medicinal plants, flowering plants, and other useful plants. A kitchen garden Is not only a source of food but also on important part of an environmentally friendly lifestyle, vegetables available in the market are often stored for long periods or processed using chemicals. As a result, their taste, freshness and nutritional value may be reduced.

In this context, a school kitchen garden can be on excellent and sustainable solution.

To pursue occupations related to plants and animals, it is essential to understand the diversity found among them therefore, the Biodiversity project has been included to help students develop observation skills and understand different forms of life.

Biodiversity refers to the variety of all living organisms on Earth. It includes plants, animals, birds, microorganisms, and their habits. Every living organism plays an important role in maintaining environmental balance. Forest, rivers, oceans, mountains, grasslands and other ecosystems support a wide range of living organisms and this variety if known as Biodiversity

Biodiversity is a retail foundation of life on Earth. It provides humans with clean air, food, medicines fuel timber and many other natural resources. Biodiversity also helps improve soil fertility, conserve water, and reduce the impact of natural disasters. The existence of many industries depends on Biodiversity today. Increasing pollution deforestation, urbanisation and climate change pose serious threats to Biodiversity.

Therefore conserving Biodiversity is essential for protecting the environment for ensuring a sustainable future for humanity.



School Kitchen Garden



Kitchen Garden

The diet that is used in everyday life includes important food items such as vegetables. Parents and Grandparents go to the market to purchase them. Therefore, “The duration of vegetables coming from the farmers field to our food is long”. In the olden days, due to lack of transport facilities, every family used to grow the vegetables they needed near their homes.

In olden days people's lives were highly planned. The remains found in the houses and courtyards of the Indus Valley Civilization (Sindhu Sanskriti) mention seeds and places for storing grains. This proves that kitchen gardens (perasabaug) have existed since ancient times.

“As we move towards modernization in the 21st century, it is essential to consider nature and the environment.” In various parts of Maharashtra kitchen garden, nourishment garden, backyard garden, creeper/Vine, green corner, orchards, potted vegetables, terrace garden, vertical garden, wall packet, these all are known by various names. We all enjoy different kinds of food. Some of us like to eat fresh fruits and vegetables, cooked with herbs (medicinal plants) and spices, some like preserved food, such as pickles and tomato sauce. Most of our food which comes from farms, vegetables, such as brinjal(eggplant), cucumber, chilli, or herbs, coriander and mint, can be grown in kitchen garden.

A kitchen garden, also known as vegetable garden, a garden is where fruits, vegetables and herbs are grown. The 'production' or yield from the garden is usually sufficient to meet the family's needs.

In this unit, we will learn about the school kitchen garden.

In this project you will learn about growing plants for food in your school.

Objectives :

Learn about tools and materials.

Visit a farm/ garden/ nursery

Make vermi-compost.

Plan the layout and maintenance of kitchen garden

Undertake measures for care of plants and maintenance of the kitchen garden

Crop Harvesting cutting



Purpose

Figure 1.1 School Kitchen Garden

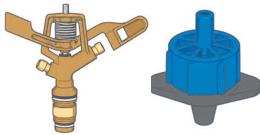
What will I be able to do

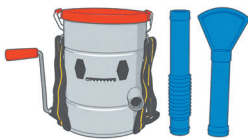
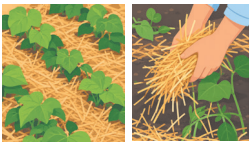
At the end of the project, you will be able to do

1. Identify common gardening tools, equipments and materials and describe their uses;
2. Prepare a kitchen garden either on the school campus or potting a soil using gardening tools;
3. They can be grow by planting seeds or seedlings and help them grow through watering them, using of manure and fertilisers and taking care of them;
4. Keep the plants of the backyard (kitchen garden) safe with the help of fencing and organic pesticides;
5. Produce from the kitchen garden or pot can be harvested.

What will I need To carry out this project, you will need various tools and materials .

Table 1.1: Common tools and materials used for cultivating plants in kitchen garden

Tools/Materials	Sketch	Uses
Pickaxe		digging/ loosening the soil
Spade		used for mixing fertilizers, and mixing the soil
Garden tub		for carrying soil and cowdung
Garden trowel		used for digging up soil and planting seedlings
Hand hoe (khurpi)		weeding /pulling weeds
Dibbler		to make holes in the soil for planting seeds/
Watering can		used for watering plants beds or pots, seedlings and plants
Hose pipe		irrigation or large scale watering plants
Sprinkler Irrigation		A method of applying water similar to natural rainfall

Gardening shears		to cut /prune the branches of plants
Gardening gloves		used to protect hands and to provide a firm grip on tools
Spray pump		used to apply pesticides for Control
Agricultural Duster		used to disperse dry powder based agrochemicals over crops
Fence		protection from animals
Stick/rope/wire		to give supports to vine type Vegetables
Shade net		to protect from sunlight.
Mulching		to control weeds and maintain the soil
Measuring tape		to take measurements while constructing

Note : If any tool or material is unavailable, ask your teacher or parents for an alternative. You may also use the internet safety to find information.



Did you know this



Figure 1.2 We used traditional method of making manure by using dung of farm animals.

Cowdung Manure or Farmyard Manure, it refers to the well -decomposed mixture of cow or buffalo dung, urine, and agricultural waste used to enrich the soil for plants and crops. (Figure 1.2)



SAFETY RULES:

Some key precautions to be followed while doing kitchen gardening are as follows:

1. Take care while using or handling the tools.
2. Make proper use of tools.
3. Regularly clean the tools and equipment, and wipe them after washing to prevent rusting.
4. Wear gloves when handling tools.
5. Use mask when spraying pesticides or medicines.



Figure 1 .3 (In kitchen garden use the tools carefully.)



Figure 1 .4 (Learning from an expert)

6. Ensure tools are stored in an organized manner in a store to prevent anyone from tripping over them.

PRIOR KNOWLEDGE:

To get first -hand knowledge of how to make your kitchen garden, you can visit an agricultural farm.If there are no farms near your school, you can visit a Nursery, a Garden or an Orchard.

Activity 1

Visit to an agricultural farm/nursery /garden.

It is important to prepare a list of questions before the visit, so that the meeting will be easy. You can use these questions for getting information.

1. Which plants have been grown?

2. Were all the plants planted at the same time?

3. Which Vegetables and Fruits trees can be planted in a backyard ?(kitchen garden)

4. How is the soil cultivated for sowing or planting?

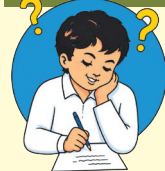
5. How do you protect plants from pests, diseases and other damage?

(Questions can be formulated as follows)

* **What were the innovative things you learned during the visit?**

* **Discuss your observations from the field trip with your teachers and friends and write down what you learned about growing Fruits and Vegetables.**

Do you know this?



In ancient India, great importance was also given to tree Ayurveda. Tree Ayurveda encompasses the knowledge and experience related to plant health, growth and treatment of diseases.

It involves the cultivation of many plants species, water management, soil conservation, fertilizers, various diseases affecting plants and their treatment. The knowledge has been rekindled. This knowledge can be used to maintain soil health, promote different agricultural practices and preserve biodiversity.



What can I do?



Figure 1.5 Growing Plants in a kitchen garden

- | | |
|--|-------------------------------------|
| 1) Arrangement of tools, equipment and other material. | 4) Take care of soil. |
| 2) Vermicompost | 5) Arrange fencing |
| 3) Prepare the soil, add manure and sow seeds. | 6) Care of the plants |
| | 7) Harvesting vegetables and fruits |

As shown in Figure 1.5, plants in a kitchen garden need proper care and attention to grow well. Before developing a kitchen garden, and while maintaining it,

The following activities can be carried out to help crops grow healthy and strong.



Activity 2

Planning a school garden



Figure 1.6 Planning for creating a backyard garden

The first step in planning a school garden is to measure the available land area, if there is not enough land/space available in the school premises, to measure the space for placing pots, and to determine the various components of the garden.

While planning a kitchen garden, it is important to know the following.

1. Will the garden be on the ground, in pots, or both?

2. How will you measure the area of the garden?

3. How will you create a seasonally crop calendar for year-round production?

4. Which specific crops will you grow in the backyard?

5. What factors did you consider when selecting the location?

While choosing a site/location for a school garden, proper consideration should be given to the exposure of the crops to sunlight, drainage of water from the soil or pot, distance between two rows of plants and between two trees and other factors. Crops require essential nutrients and minerals for growth, mainly nitrogen, phosphorus and potassium. These nutrients are obtained from the soil and potting soil, but organic fertilizers like compost, vermicompost and green manure and inorganic/chemical fertilizers like urea, super phosphate, muriate of potash are used to supply them as per the requirement.

You can grow fast growing medicinal plants, flowering plants, or leafy vegetables in your kitchen garden. For example, coriander, mint, spinach, marigold, and medicinal plants can be grown. This helps you get produce from the garden in short time.

Activity 3 Making Vermicompost in the Backyard

Vermicompost is a high-quality natural fertilizer prepared from organic waste with the help of earthworms. Earthworms consume household wet waste, dung, and dried leaves to create fertile, aerated, and nutrient-rich soil. This process is called Vermicomposting. Vermicompost increases soil fertility, promotes healthy crop growth, and aids in environmental conservation. It is considered an extremely useful and effective component for sustainable agriculture. While there are many methods of preparing vermicompost, one such method is described below:



Figure 1.7 (a) Earthworms for preparing vermicompost

1. **Container:** Use a box made of wood, plastic, or any waterproof material. It should be covered with an old gunny bag or a thick piece of cloth. Small drainage holes at the bottom are essential to let out excess water.
2. **Waste Material:** Fill the box with kitchen wet waste, leftover food from school meals, dried leaves, and other biodegradable garden waste. These layers of waste are called “Bedding Material.”
3. **Moisture:** Add water to keep the bedding material moist. However, take care that water does not accumulate.
4. **Earthworms:** For this process, Red Worms (*Eisenia fetida*) are used.
5. These worms can be obtained from a vermicompost project.
6. Release the red worms onto the bedding material.
7. **Do's and Don'ts:** Add fruit and vegetable peels, coffee grounds, and eggshells to the bed. Avoid adding meat, dairy products, oily substances, or citrus fruits. These can hinder the growth of the worms, create stickiness, and attract harmful insects that may damage the earthworms.
8. **Completion:** In a few months, dark, crumbly soil will form at the bottom of the box. This indicates that the vermicompost is ready for garden use. This can be used as fertilizer for the backyard.



Figure 1.7 (b) Vermicompost prepared from wet waste and kitchen waste



Do you know?

Compost manure can be prepared using organic waste. (Search the internet to learn the process of making compost manure)

Use the following questions to check, what you have learned from the activity:

1. What material are used to prepare vermicomposting?

2. What types of material were added to the bed or Compost bin?

3. What changes did you observe in the bin over time?

4. What other elements or tools can be used instead of a compost bin?



Activity 4

Preparing Soil for Planting Crops in the Backyard

Step 1: First, clean the ground by removing stones, weeds, and trash. Dig the soil to a depth of 1 to 1.5 feet using a spade or pickaxe to loosen it. This makes the soil porous and promotes better root growth.

Step 2: Mix manure, vermicompost, or compost into the soil. This makes the soil fertile. If the soil is clayey, add sand; if it is sandy, add more manure/compost.

Potting: For backyard gardening, use clay, plastic, or cement pots. Pots must have a hole at the bottom for water drainage. Place small stones or broken pieces of bricks/tiles over the hole to prevent waterlogging.

Soil Mixture: To fill the pots, prepare a mixture in the following ratio: 2 parts garden soil (loam), 1 part manure/compost, and 1 part sand.

Preparation for Sowing It is necessary to prepare the soil in the nursery bed or pot before sowing seeds or planting saplings. Add fertilizer to the soil according to the teacher's instructions.



Figure 1.8: Preparing beds for the backyard garden (Left) and soil mixture for pots (Right).

To review what we have learned from this activity, the following questions will be useful:

1. How did you prepare the soil for planting?

2. Did you use organic fertilizer? If yes, what was the ratio of soil to organic fertilizer?



Activity 5

Sowing Seeds and Planting Saplings in the Kitchen Garden

To get a good yield in a kitchen garden, proper sowing of seeds and organized planting are very important.

Seed Quality: Use healthy and certified seeds for sowing. Before sowing, the soil should be made loose and fertile.

Sowing Method: In a kitchen garden, seeds should be sown in rows or by broadcasting (spreading). Do not sow seeds too deep.

Transplanting: When transplanting saplings, select healthy plants that have 3 to 4 leaves. Planting should be done early in the morning or in the evening.

Spacing: Maintain proper distance between each plant to ensure good growth. Water the plants immediately after planting.

Before sowing, read the instructions on the seed packets regarding the recommended planting depth, spacing, and planting season. Seeds saved by farmers or gardeners from the previous harvest can also be used. Take advice from an expert for sowing these seeds. If you purchased saplings, ask the seller about the correct planting method.

1. Sowing Seeds

- Dig holes or create small furrows in the soil according to the recommended spacing for sowing seeds. If planting in a vegetable pot, it is essential to know how many seeds or saplings to place in each pot. The number of seeds or saplings per pot is determined by factors such as the size of the plant, the size of the pot, and the plant's growth habit (shrub, vine, etc.).
- Place the seeds in the holes or furrows. If the seeds are very small, scatter them evenly on the soil surface.
- Cover the seeds lightly with soil according to the recommended planting depth.
- Press the soil down gently to ensure good contact between the seeds and the soil.

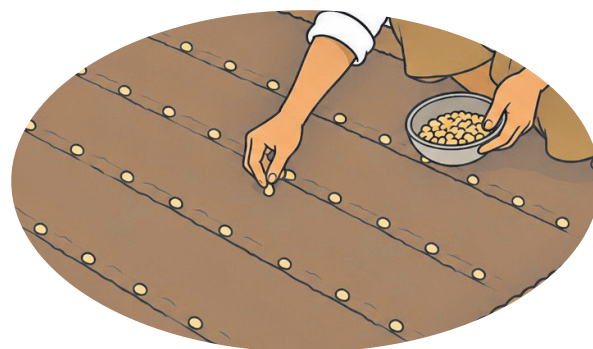


Figure 1.9 Sowing seeds in furrows

2. Planting Seedlings

If you are planting seedlings, then follow the steps given below:

- Dig holes in the prepared soil. The hole should be slightly larger than the length of the roots of the seedlings.
- Carefully remove the seedlings without damaging the roots.
- Place each seedling into the prepared hole. The soil level around the seedlings should match the soil level in its original container.
- Gently fill the holes with soil to secure the plant in its place.

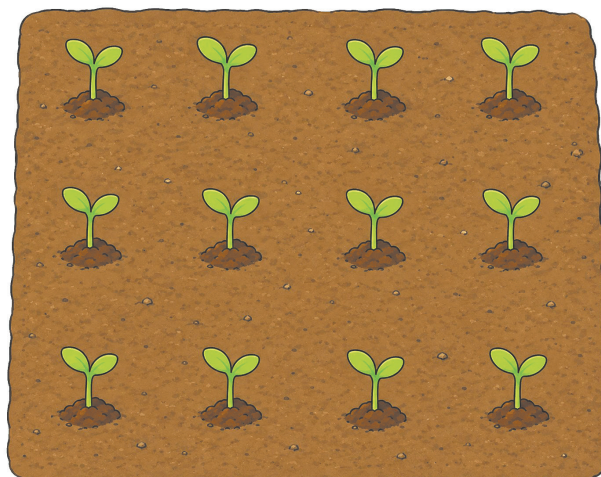


Fig 1.10 condition of seedling's after replanting.

Write the names of the plants and date of sowing and labels with the help of permanent marker. These labels can be pasted on cardboard or chart paper and covered with old plastic sheets to make them durable. Place the labels in each row, Section or pot in the garden. The date written on the label will help you record the growth of plant from time to time based on the date written on them.

What did You learn?

1. How deep was each type of seed sown?

Table 1.1 Seed sowing Depth Statistics

Sr. No.	Name of plant/crop	Seed sowing Depth (cm)
1.		
2.		
3.		
4.		

2. How much distance was maintained between two plants while sowing seeds or planting saplings.

Table 1.2 Distance between two plants in a Row

Sr. No.	Name of plants/crop	Distance between two plants (cm)
1.		
2.		
3.		
4.		

3. Was the plant to plant space same for all the plants grown by you?

Yes/No



Activity 6

Taking care of plants/crops in the garden

Proper care of the crops planted in the garden ensures healthy growth and good yields. Regular maintenance is required at every stage of crop growth. The area where the crop is grown should be fenced.

Water the crops regularly as required. Avoid more or less watering. It is best to water in the morning or evening. Organic fertilizers such as cow dung, compost, vermicompost, etc. should be used from time to time. This increases the fertility of the soil. Weeds should be removed from time to time, as they compete with the crops for nutrients. Keep watch on pests and diseases that affect the crops. If necessary, use organic pesticides. The soil should be loosened from time to time, so that air can circulate and the roots grow better. Vine crops should be supported by sticks or wires.

1. Building a fence

While the crops are growing, care must be taken to ensure that animals or people living in the area do not disturb the crops. For this, it is necessary to build a fence around the garden.

- Locally available bamboo, old pipes or old wooden sticks can be used as 'poles'. Use strong rope or wire to tie the fence between the poles.
- Measure the area that needs to be fenced.
- Draw a diagram of the area and decide where to put the fence.
- Fencing can be constructed using bamboo or locally available materials.

The following questions will be helpful in preparing your essay.

- Which material will you use for the fence?
- How many poles and how much length of rope/wire will be needed to build a fence?

Care and maintenance of plants

(a) Watering the plants : It is necessary to water the plants regularly, ensuring that the soil remains moist but not waterlogged. This is because over- or under-watering is generally harmful to the plants. Decide how to water the plants. You can use a cup, mug, bucket, water jug, jar, pipe or other means.

(Figure 1.12). Create a schedule to ensure that plants receive adequate water, especially during dry seasons. New plants need frequent watering. Water plants early in the morning or in the evening to reduce water loss due to evaporation.

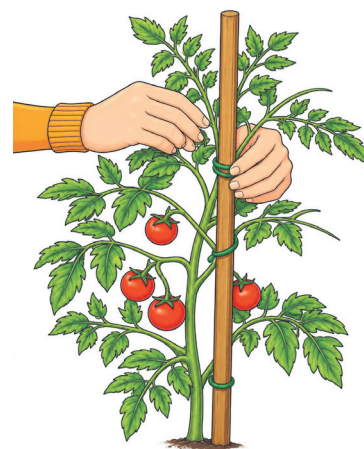


Fig 1.11 Staking a plant for support.

(b) Staking Creepers and Saplings using the ‘Chavad’ Method:

To make sure young saplings and creepers stay steady and get proper support, we give them support. The ‘Chavad’ staking system is a common way to give strength and stability to plants. This method is used for plants whose stems are very thin and delicate. For example, creeper crops like tomatoes, cucumbers, peas, and similar plants need support to grow upright. To support them, we can use bamboo sticks, fallen thin branches of trees, or plastic pipes (sticks). The height and thickness of the supporting stick should be decided based on the height and weight of the plant. Use a thin wire to gently tie the plant to the stick.

When watering plants, you must consider the season, the type of crop, and the type of soil.

1. How will you know when the plants need water?

2. How many times a day should you water the plants in a backyard garden?

3. What is the correct time of day to water the plants?

4. What factors determine the amount and frequency of watering depend?

c) Mulching : To keep the soil moist, stop weeds from growing, and ensure the soil temperature stays mostly even, spread a layer of straw, wood shavings (sawdust), or dry leaves around the base of the plants.

d) Weeding : Look at your plants regularly and pull out any unwanted weeds as soon as you see them (Figure 1.13). Use a ‘Hand Khurpi’ (small hand hoe) to remove weeds. If a ‘Hand Khurpi’ is not available, search through various sources to see what else can be used instead.

(e) Crop Protection: Checking the garden regularly to control pests and using organic pesticides. For example, make



Figure 1.12: Watering newly planted sapling beds.



Figure 1.13: Removing weeds growing at the base of plants using a hand khurpi.

organic pesticides using ingredients like neem extract, garlic extract, chili extract, etc.



Do You Know?

Neem-based pesticide is an excellent organic option. It is used to control pests like caterpillars, grasshoppers, whiteflies, aphids, jassids, etc., in crops. By following the step-by-step activity given below, we can make organic pesticide ourselves:

1. Take 500 grams of neem leaves (if possible, you can ask experts at your local Krishi Vigyan Kendra or Agricultural Research Center to suggest leaves of other helpful plants). Wash them and chop them into small pieces.
2. Mix the neem leaves in 5 liters of water. add EM solution as possible to prepare Neem extract.
3. Keep this mixture in a watering can or a large bottle for about 14 days.
4. Use a strainer to separate the solid pieces from the liquid. Use the remaining liquid extract as a pesticide spray.

Points to consider while decorating a backyard garden:

1. Use stones as borders around flowerbeds and pots to make them look attractive. You can even paint these stones with bright colours.
2. Place decorative items near the garden entrance. For example, you can create 'sculptures' using painted earthen pots, drawings made on stones, or old unused items lying around the school.
3. We can also make a scarecrow to keep the garden safe from birds.



Activity 7

Observing the Growth of Plants in the Backyard Garden

It is very important to check the crops or plants grown in the backyard garden regularly to see if they are growing properly. Regular observations help us learn about changes in crop growth, problems, and improvements.

To observe, track changes in the height of the plants, the number of leaves, and their size. Check if the leaves are green and fresh. If you see yellowish or dried leaves, take the right steps to fix it. Keep an eye on flowering and fruiting. Check for leaf spots, holes, or pests, and take immediate action if you spot any. Record the growth speed of the plants day by day. By paying attention to the growth of plants, you can understand their development and needs.



Figure 1.14: Monitoring plants while observing their growth.

- Keep a regular record of the growth of plants in your backyard (kitchen garden).
- Note down other observations like changes in leaf color, flower appearance, and pest attacks. Use a diary/calendar to record these observations.

Table 1.3: Observation Diary for Plants Growing in the Backyard (Kitchen) Garden

Date of Observation	Observations (Information about plant growth, height, pests, leaf color changes, flowers, etc.)
First Week (Date)	
Second Week (Date)	
Third Week (Date)	

(You can also take photographs of the crops in the backyard garden to keep a record of their growth.)

Activity 8 Cutting or Harvesting Vegetables in the Backyard Garden

Harvesting the crops grown in the backyard garden at the right time is very important. Harvesting at the correct time and using the right method keeps vegetables fresh, tasty, and nutritious.

- Time for cutting or harvesting: Harvest vegetables after they become fully mature. For example, pick okra (ladyfinger) when it is tender, and pick tomatoes when they are semi-ripe.
- Harvest crops early in the morning or in the evening so that the vegetables stay fresh.
- Cut them carefully using hands or scissors. Take care not to hurt yourself or damage the plant.
- Keep the harvested vegetables in a clean place. Do not let dust or dirt touch them.
- Separate good vegetables from bad ones. Keep the harvested vegetables in a cool, airy place, or use them quickly.



Figure 1.15: Enjoying the joy of harvesting the rewards of your hard work.

Grading the Produce: Once vegetables are ready to use, grade them based on different features. Gather more information about harvesting methods. For example, for leafy vegetables like fenugreek (methi) and spinach, use the ‘cut and regrow’ method where you harvest the outer leaves while letting the inner leaves grow. For root vegetables like carrots and radishes, gently loosen the soil around the plant stem and pull them out by hand or with the help of a small digging tool (kudali/khurpi), then wash them clean with water. For crops like tomatoes, eggplants, and chilies, use small gardening scissors to cut them along with their stalks.

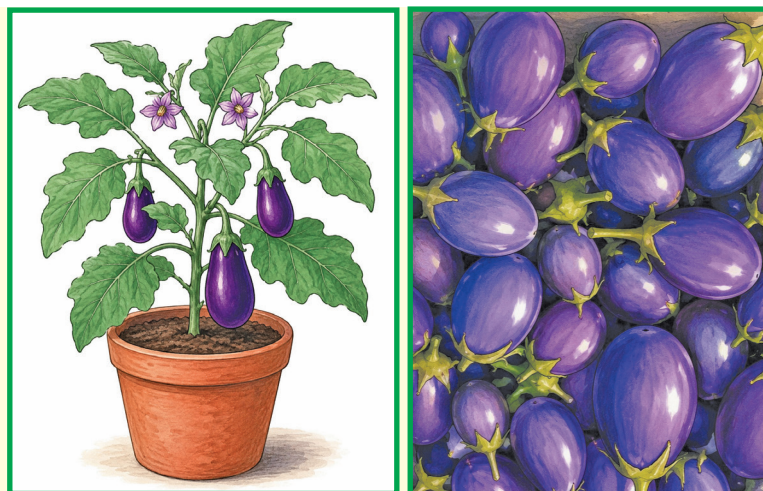


Figure 1.16 (a): Eggplant (Brinjal) crop, and (b): Harvested eggplants.

What Have We Learnt?

1. Which crops did you grow?

- a) -----
- b) -----
- c) -----

2. How did you know that the crop in the backyard garden was ready for harvesting?

- a) -----
- b) -----
- c) -----

3. Which tools did you use to cut or harvest the crops?

4. What precautions will you take while harvesting so that the crops are not damaged?

5. What did you do after harvesting the produce from the backyard garden?

Activity 9**Visiting the Vegetable Market (Bazaar)**

Visit your local vegetable market (bazaar), observe the vegetables and fruits, and record their prices.

Table 1.4: Price Chart of Vegetables or Fruits in the Market

Sr. No	Name of Vegetable / Fruit	Market Rate per Kilogram / Bunch
1.		
2.		
3.		
4.		
5.		

Activity 10**Fixing the Price of Crops Grown in the Backyard Garden**

Vegetables grown in the school backyard garden can be used for the Mid-Day Meal (Midday Meal Scheme). You can also discuss with your teacher and classmates about how else these vegetables can be utilized. To fix the price of the produce grown in the garden, you will have to think about many factors like the cost of seeds or saplings, the expense of fertilizers used to improve the soil quality, the tools used, and equipment costs. If you want to sell this produce, you must fix a price for each product. Discuss with your classmates and teachers to learn how the price of backyard garden crops is calculated. Table 1.5 will be helpful for estimating the price of the produce.

Table 1.5: Price Estimate of Produce from the Backyard (Kitchen) Garden

Sr. No.	What produce did you harvest? (1)	How much money did you spend on seeds/saplings and other materials? (2)	What was the harvest amount? (In number or weight) (3)	What is the market price of this farm produce? (4)	How much money will you get for your produce? (5)
1.					
2.					
3.					
4.					

- Do you know that plants can grow without soil? For example: Money plant, lucky bamboo, etc.
- Create an attractive layout design for your backyard garden using artificial intelligence (AI).
- Use an app that identifies unknown plants to recognize unfamiliar plants around you.
- Use digital technology to practice geotagging your school backyard garden.
- Find the scientific names of the crops grown in your garden.

Important Things Learnt from Others:

- Write down the three most important things you learned from others.

Record the activities involved in setting up the backyard garden and the time required for them.

It is important to understand how much time is required for an activity to be completed. Calculate the approximate number of periods you spent on each activity. Make them on the timeline below. If you did more than the activities suggested in the book. Please add the number and time taken.

- Record the activities and time required to create a backyard garden.

Activity No:	1	2	3	4	5	6	7	8	9	10
Time Duration (Hours/Days):	—	—	—	—	—	—	—	—	—	—

• Internet Safety :

Take help from your teacher while using the internet. Be careful and do not upload or download anything without checking for safety, and do not open or share personal information anywhere.

Think and Answer

1. What did you enjoy the most while doing this project?
2. What challenges or difficulties did you face during the activities?
3. What would you do differently next time?
4. Which environmental conditions helped your plants grow well? If the plants did not grow well, what should be done next time?
5. Interview experts like farmers, gardeners, agricultural scientists, or people who use farming equipment like harvesting machines to get more information about these backyard garden activities.
6. Gather information about various types of agriculture-based businesses.

Exercise

Question 1. Answer the following questions in one sentence using your own words:

1. What is a backyard garden (kitchen garden)?
2. Write two major benefits of a backyard garden.
3. Name four crops that can be grown in a backyard garden.
4. Write down the uses of tools and equipment needed for a backyard garden.
5. Will a seed found inside a fruit sprout immediately if put in the soil?
6. Write down the different types of plant beds (vaphe).
7. Give examples of organic fertilizers.
8. Where are drip irrigation and sprinkler irrigation methods used?
9. How will you control fruit borer caterpillars if you spot them on a tomato crop?

Question 2. Choose the correct option:

1. Which crop can be mainly grown in a backyard garden?
a) Sugarcane b) Vegetables c) Cotton d) Jowar (Sorghum)
2. What kind of method is drip irrigation?
a) Traditional b) Modern/Improved c) Natural d) Chemical
3. What type of fertilizer is cow dung manure?
a) Chemical b) Biological c) Organic d) Artificial

Question 3. Answer in brief:

1. Define a backyard garden and explain its importance and benefits in detail.
2. How will you carry out intercultural operations (care and maintenance) in a backyard garden?
3. Prepare a simple layout plan for a backyard garden for your home.
4. Prepare a crop calendar/schedule based on the Kharif, Rabi, and Summer season.

Question 4. Match the following (Tell me, what is my use?):

Group A

- 1) Khurpi (Hand Hoe)
- 2) Kudali (Pickaxe)
- 3) Secateur (Pruning Shears)
- 4) Zari (Watering Can)

Group B

- 1) Watering plants
- 2) For cutting branches
- 3) Removing weeds
- 4) Digging soil

Question 5. Make a list of the different leafy vegetables and fruit vegetables that you would plant in the backyard garden you prepared.



Biodiversity Register



We see different trees, birds, animals, and insects around us. This variety of living organisms is called biodiversity. Biodiversity includes plants, animals, birds, fish, insects, and microorganisms found in the soil.

Biodiversity is extremely important for maintaining the balance of nature. It supports natural processes like the food chain, nutrient cycle, and water cycle. Similarly, biodiversity is of great use to humans to fulfill basic needs like food, clothing, shelter, medicines, fuel, etc.

However, industrialization, deforestation, pollution, and climate change are having serious impacts on biodiversity. Therefore, conserving biodiversity is an extremely urgent need today. Conservation of biodiversity is necessary to protect natural wealth for sustainable development and for future generations.

Goal

Learn about the Biodiversity Register.

Identify places to record biodiversity.

Record biodiversity at different places.

Use different sources to gather information.

Prepare a presentation on biodiversity.



(See Figure 2.1).

Biodiversity Register

We have already learned about living organisms in Science.

Collecting information about the variety of living organisms in a particular area or specific place in a scientific manner, and compiling it in a proper format, is called

a Biodiversity Register. This includes information on the habitats of living animals, birds, etc. It includes various types of information such as terrain, soil types, scientific and local names of living organisms, diets of animals, and beneficial and harmful factors.

Deforestation carried out for urbanization and industrialization changes the habitat of living organisms, which poses a threat of extinction to many species. Therefore, it is important to record biodiversity. Since humans are also a component of this biodiversity, any harm to any plant or species affects the entire ecosystem, including humans.

Biodiversity registration provides people with useful information. For example, which are the local plants? Which animals and birds depend on them? What are the medicinal uses of the plants? Which insects are useful or harmful to plants or crops? When should crops be planted, etc.

You can prepare your own 'mini' biodiversity register by systematically recording the biodiversity around you. If you spot a plant, insect, bird, or animal that you are not familiar with, you can use the following methods to gather more information about it:

1. Talking to teachers, elders, family members, or experts.
2. Finding and gathering information from books on this subject in the library.
3. Searching for information on a computer with the help of the internet.
4. Using applications on mobile phones.
5. Visiting different areas in your surroundings, observing them and taking notes.



Terms used in the biodiversity register to clarify the concept of this project

- **Scientific Name:** This is a special name given to living organisms that remains the same in all regions. This name is used worldwide to refer to a single living thing. (This name is written in English in an italic style) (*Italic*)
- E.g., The coriander plant has different names in every language; to study it across the whole world, the name (*Coriandrum sativum*) is used.
- **Diversity:** The differences among the various types of living organisms found in an environment mean diversity.
- **Crop Season:** The time period during which specific crops are cultivated.
- **Fruit Season:** The specific time period during which certain fruits grow. E.g., Summer - Mango, Watermelon.
- **Sources of Plant Cultivation:** Things from which new plants are grown, such as seeds, saplings, tubers, stem cuttings, etc.
- **Affected Crop:** A crop that has been damaged by pests. E.g., plants affected by diseases, leaf or fruit-eating insects, or any other reason.
- **Host:** A plant or animal on which other plants or animals live and survive is called a host. For example, dogs give shelter to fleas. These fleas suck their blood. Similarly, some plants are hosts to caterpillars; these caterpillars grow by eating the leaves or fruits of specific plants.
- **Nuisance Organisms or Pests:** Insects or animals that are harmful to crops, trees, food storage, or household items, e.g., flies, mosquitoes, rats, etc.
- **Insecticide:** Elements used to prevent or control the damage caused by insects to hosts. These elements are in liquid, solid, or gaseous form.
- **Weed:** Unnecessary plants that grow alongside the main crops.
- **Herbicide / Weedicide:** This is used to prevent or control the damage caused to plants due to weeds.
- **Geographical Indication Tag (GI Tag):** A GI Tag is an identification mark given by the government to a special product associated with a specific place, which is recognized worldwide. The quality, characteristics, or fame of that specific item are solely due to that location. For example, there are many varieties of rice in our country — Navara rice of Kerala, Basmati rice of Uttarakhand, and Govind Bhog rice of West Bengal. Jalgaon bananas from Maharashtra, Alphonso mango from Konkan, Solapur Jowar, etc., are examples of GI tags.
- **Habitat:** The natural living space of a species.

Objective

At the end of the project, you will be able to:

1. Systematically record the biodiversity found in your surroundings.
2. Use different methods to gather information related to biodiversity.
3. Increase your knowledge by properly analyzing the information collected about surrounding biodiversity.

Required Materials / Tools

The following materials/tools are required to record biodiversity:

- Notebook, pen, pencil, eraser, scale, and sharpener.
- Handheld magnifying glass to observe the details of plants or insects.
- A teacher's or parent's camera or smartphone can be used to take photographs or record audio-visuals.
- It is necessary to take photographs of living organisms to include them in the biodiversity register.
- You can also use smartphones to identify living organisms.

Safety Rules

- Wear shoes when going out into fields or nature.
- Cover your hands and legs to protect yourself from mosquitoes and insects.
- Exercise caution while observing plants, insects, birds, and animals.
- Do not trouble any animal, bird, or insect.
- Do not bring any object out of its natural habitat.
- Do not cause harm to any plant or sapling.
- Do not leave any garbage behind. Garbage created by humans is harmful to nature.

• Internet Safety:

Take help from your teachers while using the internet. Be cautious and do not upload or download anything without verifying its safety. Do not disclose personal information anywhere.

Activity 1 Environmental Observation

Whenever possible, step outside the classroom into nature and observe the living organisms around you. Even in a small space, a tiny universe of plants, insects, spiders, squirrels, birds, and other animals can be found. The living organisms here are interconnected with one another. Record your observations and related information in your biodiversity register.

Before you start writing in the register, list the living organisms you see regularly in the table below. Register them based on where they are found: in water / near trees / on trees / in gardens / in fields. If possible, draw sketches of them or take photographs. This will help you while filling out the biodiversity register and preparing the layout.



Figure 2.2: Recording observations of living organisms in the surroundings

Table 2.1: Identifying places where observations of various living organisms can be made

Living Organism	Name (Try to find names in different languages)	Habitat (Where are they found / seen?)
Insect		
Bird		
Animal		
Worm		

Activity 2 Observation of Biodiversity – Understanding the surroundings under the guidance of experts

Different experts can be invited to gain deeper knowledge about biodiversity. For example, forest officers, bird lovers, animal lovers, farmers, etc. A person working for environmental protection and conservation can be invited. Since such individuals work directly in the ecosystem, their specialized knowledge in their field will be beneficial. Experts who have knowledge about traditional medicinal plants can also be called to provide information. To learn more from these experts, a questionnaire should be prepared. The following types of questions will be helpful for this:

1. Where can various types of plants be found in the surroundings?
2. How can we know whether the trees growing in the area belong to this place or have come from other places?
3. Which animals and birds have their habitat in the surroundings?
4. Do some birds migrate here every year?

5. Which trees are not naturally found in your area?
6. What types of plants should be planted more to conserve biodiversity?
7. Which plants cause harm to biodiversity?

Useful instructions for preparing a Biodiversity Register

Identifying places to visit is the first step to preparing a biodiversity register (to understand changes in different seasons, these places will need to be visited more than once). Planning these visits is also necessary. Based on this planning, we can make entries in our biodiversity register. After that, a presentation will have to be made based on your observations.

Activity 3 Finalizing places for the survey

Decide which places can be visited to record biodiversity.

For example, (1) Area around the school, (2) Area around water bodies, (3) Area near the house, (4) Farms or gardens, (5) Area near the marketplace (Figure 2.3).



Figure 2.3 (a): Pond



Figure 2.3 (b): Forest



Figure 2.3 (c): Farm



Figure 2.3 (d): Garden

Figure 2.3: Places to observe and record biodiversity: Ponds, forests, farms, gardens, water supply locations (rivers - streams)

While selecting places to visit, choose locations that can be reached easily and in less time. This is because taking records at such places will be convenient, and if you need to verify the observations made or information collected, you can easily go back.

The following information will be useful to conduct the survey smoothly.

1. What types of habitats exist in the surroundings (e.g., ponds, forests, wetlands, grasslands, urban areas)?

2. Compared to other areas, is there any nearby area where a larger number of plants are found? Yes / No

3. What types of birds, animals, insects, etc., have been seen in the surrounding environment?

4. Have any special efforts been made for the conservation of specific plants and animals in a particular area? (For example, restrictions on roaming in specific areas to conserve certain species.)

5. Which places are you thinking of visiting? Write them down:

1. _____
2. _____
3. _____
4. _____



Activity 4

Schedule of visits for observing biodiversity

Consider the following points to prepare a schedule of visits for observing biodiversity.

- Take advice from individuals such as local experts, biologists, and environmentalists.
- Form a group of a maximum of 5 students.
- Prepare a plan to visit the selected areas at different times of the school year. This will help record the changes that occur in different seasons. (Take help from teachers for this)

Prepare a schedule of visits and record it in the following Table 2.2:

Table 2.2: Schedule of visits for filling out the biodiversity register

Sr. No.	Location of biodiversity visit	Season
1.		
2.		
3.		

While visiting the planned location, a notebook, pencil, pen, and magnifying glass should be kept along. If an information brochure of that area is available, definitely keep it with you. All these things will make it possible to accurately observe plants, insects, birds, animals, and other living organisms.

Activity 5

Making Entries in the Biodiversity Register

Tables from 2.3 to 2.7 are provided for recording biodiversity. In these tables, note down your responses based on your observations and discussions.

These tables contain multiple rows and columns; try to fill in as many columns as possible. Other related information can also be added after discussing with your teachers and classmates. You can even create a new table related to the living organisms in your surroundings. For example, if you live in a big city, you can find flowering and fruiting trees in a nearby garden and record their information.



Figure 2.4: Observing with naked eyes and with the help of a magnifying glass

While recording observations, keep the following things in mind:

1. Show the recorded observations to each other. If someone else has noted down things that were missed during your first visit to a place, sharing that information will add value to the overall data.
2. Try to gather new information each time you visit a location.
3. Draw sketches or take photographs of newly spotted insects, worms, birds, plants, and animals. Artificial intelligence (AI) tools can be used to identify living organisms.



Figure 2.4: Recording observations

If no information is obtained for a specific section of the table, talk to your teachers before deciding to leave it blank.

1. Observation of biodiversity in crops or plants

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1. Date of observation: _____
2. Location: _____
3. Type of habitat: _____
4. Weather condition: _____
5. Observations: _____

Table 2.3: Description of Vegetable Crops

Sr. No.	Description	(Example)	1	2	3	4	5
1.	Name of the crop	Onion					
2.	Local name	Marathi: Kanda,					
3.	Scientific name	<i>Allium cepa</i>					
4.	Name of variety	Panchganga, Niphad-53					
5.	Method of cultivation	Direct sowing / Tuber / Seeds / Sapling transplantation					
6.	Special information regarding sowing and harvesting season.	Onion sowing and harvesting can be done in different seasons.					
7.	Uses	Daily diet, spice crop, medicinal.					
8.	Sketch / Photograph						

2. Observation of biodiversity in fruit trees

1. Date of observation: _____
2. Location: _____
3. Type of habitat: _____
4. Weather condition: _____
5. Observations: _____

Table 2.4: Description of Fruit Trees

Sr. No.	Description	(Example)	1	2	3	4	5
1.	Name of the crop	Mango					
2.	Local name	Amba					
3.	Scientific name	<i>Mangifera indica</i>					
4.	Name of variety	Alphonso (Hapus), Kesar					
5.	Method of cultivation	Grafting					
6.	Sowing and harvesting season	Fruiting season – Summer					
7.	Special information	King of fruits					
8.	Uses	Pickles, Aamras, Eating raw					
9.	Sketch / Photograph						

Note: Alphonso (Hapus) mangoes have been granted the Geographical Indication (GI) status. This certifies that their production takes place specifically in designated locations like Ratnagiri and Sindhudurg.

3. Observation of biodiversity in fodder plants

1. Date of observation:
2. Location:
3. Type of habitat:
4. Weather condition:
5. Observations:

Fodder plant: A type of grass that is used as food for cattle and livestock.

Table 2.5: Description of Fodder Crops

Sr. No.	Description	(Example)	1	2	3	4	5
1.	Name of the crop	Napier grass / Elephant grass					
2.	Local name	Hatti gavat (in Marathi)					
3.	Scientific name	<i>Pennisetum purpureum</i>					
4.	Name of variety	Pusa Giant					
5.	Method of cultivation	Stem cuttings or slips transplantation					
6.	Special information regarding sowing and harvesting season.	February to March					
7.	Uses	Used as fodder for livestock. Habitat and shelter for insects, birds, etc.					
8.	Sketch / Photograph						

4. Observation of biodiversity in weed plants

1. Date of observation:
2. Location:
3. Type of habitat:
4. Weather condition:
5. Observations:

Table 2.6: Description of Weed Plants

Sr. No.	Description	(Example)	1	2	3	4	5
1.	Name of the crop	Bermuda grass					
2.	Local name	Harali (in Marathi)					
3.	Scientific name	<i>Cynodon dactylon</i>					
4.	Found as a weed in these crops	Sugarcane, cotton, fruit orchards					
5.	Special characteristics	Highly tolerant to heat and drought. It serves as a habitat and food source for various insects and wildlife species.					
6.	Uses	used in playgrounds, sports fields and high traffic area.					
7.	Sketch/ Photography						

5. Observation of biodiversity in insects

1. Date of observation:
2. Location:
3. Type of habitat:
4. Weather condition:
5. Observations:

Table 2.7: Description of Insects

Sr. No.	Description	(Example)	1	2	3	4	5
1.	Name of the insect	Aphid (Mava)					
2.	Local name	Mava					
3.	Name of pest	<i>Melanaphis sacchari</i> (Sugarcane)					
4.	Habitat	Aphids are generally found on the lower side of leaves, as well as on tender shoots of plants.					
5.	Special characteristics (if any)	Both winged and wingless types are found.					
6.	Period / Season of damage	After winter, when the temperature starts rising.					
7.	Sketch / Photograph						

You can also collect information about the following components as per the information in the tables on the previous pages.

Sr. No.	Description	Animal	Bird	Wild Plants
1)				
2)				
3)				
4)				
5)				
6)				
7)				

Activity 6 Searching for unknown things

If you want to find an unknown thing or want more information or any information about it, you can ask an expert or a knowledgeable person in that field. Also, artificial intelligence tools or the school library can be used to get this information.

Use of artificial intelligence tools to collect more information about plants / crops / weeds / insects:

Google Lens is a visual search technology developed by Google.

When you take a photograph of an object, text, or place with a mobile camera, Google Lens searches for its information. This technology analyzes objects, text, signs, etc., captured through the device's camera and provides information about them. Google Lens can recognize objects, read text, translate languages, and scan barcodes and QR codes. Get more information about this under the supervision of teachers or parents.

Google Lens analyzes any photo / picture / object and gives information about



Figure 2.6: Use multiple sources of information to find the required information

it. ...using it, scientific names, diseases, and other useful information about plants / crops / weeds / insects and pests can be easily identified. If a photo of the object is not available, a photo can also be taken with the help of Google Lens, and information about it can be obtained. Use this to perform the following activities.

1. Download the Google Lens app on your smartphone and open it.
2. Look for the Google Lens icon in the search bar and tap on it. This activates Google Lens.
3. Point your camera towards the plant / insect / object you wish to identify and tap the shutter button to search.

By using Google Lens, the required information can be filled into the tables in the biodiversity register.

Activity 7 **Presentation of the Biodiversity Register**

Using the information collected by visiting various places, a presentation on biodiversity can be made. Based on that information, charts can be made, diagrams drawn, models prepared, PowerPoint shows created, and the presentation can be done in various other ways. This presentation will be entirely based on the data collected through direct observations. While presenting, highlight the variation found in different locations and across different seasons. This variation is the true essence of biodiversity.

Make two parts of the presentation:

Part 1 : Prepare a summary of the information you have gathered.

Previously, information obtained during different seasons across various habitats has been filled into the tables. This information will be useful to explain the surrounding biodiversity to someone visiting your area. Summarize the information from those tables.

Some guiding questions are given below to compile this information. Think about what other ways can be used to summarize this information.

1. Which are the various plants growing in our surrounding area?
2. Does any plant grow in all seasons, or does it grow only in a specific season?
3. Do all crops and fruits come in the same season?
4. Do all plants bloom at the same time?
5. Are plants useful to us? If yes, how?
6. Is every type of fodder available throughout the year, or only in some seasons?
7. Do weeds affect all plants?
8. Are some weeds useful? Please name some weeds and describe their uses.
9. Are any insects found on all plants?
10. Is there a greater effect of insects on some plants during certain seasons compared to others?
11. What information did you collect from local people? (e.g., plants used as medicine, fodder, or plants with spiritual importance, etc.)



Figure 2.7: Understanding the presentation on the biodiversity register

Part 2: Taking a deeper look at the compiled information

To understand the biodiversity of the surrounding area in depth, various methods such as diagrams, tables, and explanations with examples can be used in presentations. Think about what can be done to make this presentation more attractive and informative. (Figure 2.7).

Use the following questions for the presentation. Also, consider what other methods can be used apart from these.

1. Were more living organisms found at a particular place compared to others?
2. How many species of plants and insects were observed at the visited location?
3. Were the same types of insects, pests, or worms found at two different locations?
4. Did you use any artificial intelligence tool to know more about a specific item in this project? If yes, which one and how?
5. What other sources were used to collect information?

Present the conclusion/summary derived from this to others through a table, diagram, PowerPoint presentation, or various other media.

What was learned from others

Discussion with experts

Get more information from organizations or experts working on this topic regarding what kind of measures are needed to conserve the biodiversity of the local area. Think about how this information can be utilized for the conservation of biodiversity.

Discussion with other people in the area

Talk to local individuals from whom the biodiversity information of the ecosystem was compiled—such as farmers, nursery workers, city gardeners, or elderly people in rural/urban areas and gather information on how the biodiversity in this area has changed over the last 10–20 years.

Activities of the biodiversity register and the time required for it

It is important to understand how much time it takes for a project to be completed. Make an approximate calculation of how much time you spent on each activity. Mark these on the timeline scale below. If you performed more tasks than the suggested activities in the book, please increase the count and time accordingly.

To collect information, you may need to visit the same place more than once. It is necessary to record the total time taken for all of this. If you have done more activities than the assigned project tasks, record their time on the scale below. This will help determine the total time required for the entire project.

Activity No:	1	2	3	4	5	6	7	8
Time Duration								
(Hours/Days):	—	—	—	—	—	—	—	—



Do you know this?

There are several biodiversity heritage sites (Biodiversity Hotspots) in Maharashtra. E.g., Kaas Plateau, Lonar Lake, Tamhini Ghat.

Biodiversity is found on a large scale in this region. Some species of living organisms are found only in a specific designated area (endemic). It is our duty to protect the biodiversity of this region and preserve the traditional cultural traditions related to the natural environment.

Notable Biodiversity Heritage Sites in India:

- * The Western Ghats, which run parallel to the western coast of India, have been included in the biodiversity heritage sites. The portion of the Western Ghats in Maharashtra is known as Sahyadri.
- * The Nallur Tamarind Grove in Karnataka contains tamarind trees that are more than 400 years old.
- * Gogabil in Bihar is a paradise for bird lovers. More than 90 species of birds migrate here from distant places like Central Asia.
- * Tonglu in West Bengal has trees that cannot be found anywhere else in the world.
- * In Maharashtra, thousands of migratory Greater Flamingos come to the Bhigwan Bird Sanctuary near Pune every year during winter.
- * More than 200 species of birds have been recorded at Aminpur Lake, located right in the middle of Hyderabad city.
- * Majuli in Assam is the largest river island in the world, and its biodiversity is very unique.
- * The Myristica swamps in Kerala contain ancient nutmeg trees; nutmeg is a fruit used as a spice.
- * Kali Tiger Reserve in Karnataka is a protected area for Bengal tigers and other large animals like elephants.
- * Chilkigarh Kanak Durga Sacred Grove (Devrai) in West Bengal is famous for special plants used in traditional medicines; this sacred grove is preserved and conserved by the local people.
- * In the Zero Valley of Arunachal Pradesh, people practice a unique method of integrated rice and fish farming.
- * In Maharashtra, there are many sacred groves (Devrais) traditionally preserved by local people, where an excellent variety of biodiversity is found.
(A forest/jungle reserved in the name of God)

What else can be done to study biodiversity?

Keep observing the biodiversity around your house and at other places you visit. Note down your observations from time to time. Prepare a nature journal or digital scrapbook.

In cities that have adapted to human settlements, kites (birds of prey) are found, and mongooses can also be seen. Such living organisms have begun to be referred to as ‘urban wildlife’.

Observe the birds that come to your house window or courtyard. Note down how they look and their behavior. Find out their local and scientific names and discover as much as you can about birds.

Ask your family members and elderly individuals in the community about the birds and animals they saw during their childhood; through this, changes in wildlife and living organisms over time can be studied.

1. Western Ghats (Sahyadri Mountain Range):

A UNESCO World Heritage Site, this region is one of the 10 most prominent biodiversity hotspots in the world.

2. Kaas Plateau (Satara):

Known as the ‘Valley of Flowers’, this place is famous for rare and endemic plant species.

3. Bhimashankar Wildlife Sanctuary – (Pune):

This is the prime habitat of the ‘Shekru’ (Giant Squirrel), which is the state animal of Maharashtra.

4. Amboli – (Sindhudurg):

This place is known for rare species of reptiles, frogs, and plants. It has been declared a biodiversity heritage site due to the rare fish species ‘Schistura hiranyakeshi’.

5. Tadoba Andhari Tiger Reserve (Chandrapur):

The oldest and largest national park in Maharashtra, it is globally famous as a habitat for tigers.

6. Pench National Park:

This park is recognized for its diversity of tigers and various bird species.

7. Lonar Lake – (Buldhana):

Created by a meteor impact, this saltwater lake is famous for its unique microbial ecosystem.

8. Melghat Tiger Reserve:

Located at Satpura mountain ranges, this forest is extremely rich in biodiversity.

9. Malvan Marine Sanctuary (Sindhudurg):

This is a major marine site in Maharashtra to observe corals and a wide variety of marine life.

10. Mayani Bird Sanctuary:

This is a prominent bird sanctuary located in the Satara district.

11. Nannaj Wildlife Sanctuary:

Also known as the Great Indian Bustard (Maaldhok) Sanctuary. It is the largest sanctuary by area in Maharashtra, spanning an area of 1,229 sq. km.

• Internet Safety:

Take help from your teachers while using the internet. Be cautious and do not upload or download anything without verifying its safety. Do not disclose personal information anywhere.

Think and Answer

1. Which activity did you enjoy doing the most during this project?
2. What difficulties did you face while performing these activities?
3. In what other different ways can these activities be performed?
4. What is the importance of recording biodiversity?
5. What job opportunities are associated with this project?
6. Some examples of professions/jobs related to this project are forest officer, scientist, and environmentalist. Find out what other jobs and service industries could be linked with this project.
7. Write detailed information about the business you are interested in.

Exercise

Question 1: Answer the following questions in one sentence each.

1. What is biodiversity?
2. What is meant by a biodiversity register?
3. Why is a biodiversity register necessary?
4. Which tools are used for recording?
5. Which are the types of biodiversity?
6. Which information is recorded during registration?
7. Observe your surroundings and collect information about biodiversity regarding animals, birds, insects, etc., found there.
8. What will you do to conserve the biodiversity in your surrounding area?

Question 2: Fill in the blanks.

1. Biodiversity means the variety of living organisms.
2. While recording, the name, type, and of the living organism are written.
3. The three main types of biodiversity are plants, animals and

Question 3: Answer in brief.

1. What is biodiversity? Explain its types in detail.
2. Explain the tools used for biodiversity registration and their uses.
3. Explain the precautions (safety rules) to be taken while recording biodiversity.

Take care of our environment and planet Earth



Environment



Green Energy



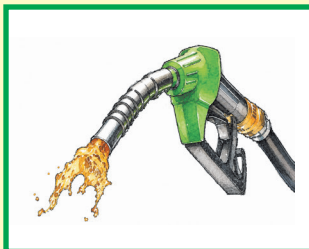
Plants



Planet



Living and
non-living things



Natural resources



Food and shelter



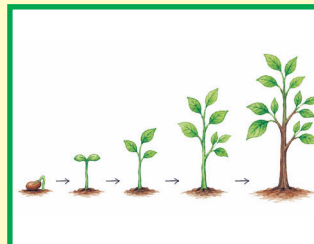
Our home



Earth Protect



Create



Plants Grow



Recycle

Part: 2

Work with Machines and Materials



An important step in human progress is learning how to use tools and machines, from simple ones to modern ones. Humans have made tools and machines to meet basic needs like food, clothing, and shelter, or to satisfy their curiosity and creativity in more difficult things.

In today's modern world, it is necessary to teach students how to use machines and tools so they can do productive work in the future. Subjects that teach these skills are included in Work with Machines and Materials. Under this, projects like working with machines (making skills), animation, and games are included.

A tool that makes our daily work easier is called a machine. We can save our time and hard work by using machines. Many simple machines are used in daily life. We use many simple tools like knives, scissors, nail cutters, sharpeners, needles, tongs, and screwdrivers. Simple machines can be made from materials available around us, and simple faults that happen in these machines can be fixed. For this, the project "Working with Machines (Making Skills)" is included so students can learn by doing things with their own hands.

We play different games during school life. Nowadays, many games are played using mobile phones and computers. In the same way, we are going to learn how to make our own animations and games using computers and animation through this project.



Makers Skills



Through this project, we will learn about simple machines. Simple machines make work easier. Using such simple machines, the skill of making toys will be developed. When two or more simple machines are joined together, a complex (difficult) machine is made. For example, a bicycle.

Through these projects, we will learn about the different simple machines in a bicycle. From this, we will also learn how to maintain and repair a bicycle.

Objectives

Learn about simple machines.

Learning about machines by making toys from available materials using simple machines.

Learn to maintain and repair a bicycle.

Learn about the different simple machines in a bicycle.



(3.1) Make a toy using the available materials

Opening or closing doors and windows with the help of hinges, lifting hot pots in the kitchen using tongs, and tightening or removing a screw with a screwdriver. How do these tasks work? All these things involve simple machines.

Do you know this?

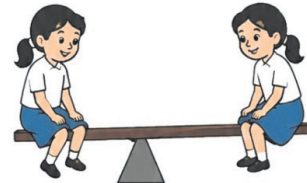
Identify which simple machines are shown in the following pictures. Write down where else they are used.



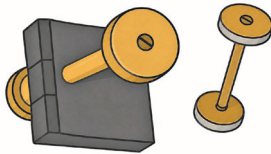
Inclined Plane (Ramp)



Wedge



Lever



Wheel and Axle



Screw



Pulley

(3.2)

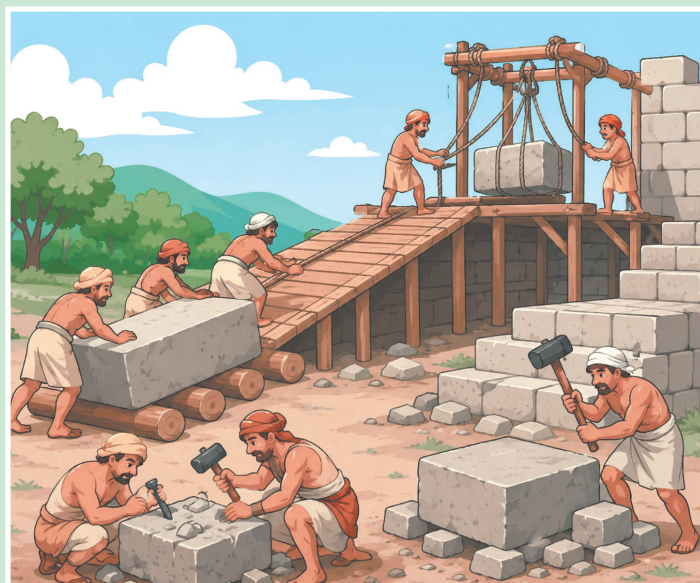
Simple machines help make our work easy. They help us do things that are beyond our normal strength. Things that are not easily possible or are difficult can be done easily using machines. For example: With the help of a wheel, heavy objects can be moved from one place to another, pulleys can lift heavy objects, etc.

A motorcycle is also made by joining many simple machines together. Like bicycles, toys, etc. simple machines are also used in this.

Ancient Architecture

In ancient India, many big structures were built using simple machines. Large stones were moved from one place to another by using wooden rollers under them. To take the stones to a height, slopes (ramps) were used. To lift them to the upper floors, pulleys were used. To break stones, tools like a chisel were used. To move the stones, a crowbar was used.

All these are examples of simple machines. We still use such simple machines even today.



(3.3)

In this project, we will learn, how to make toys using simple machines. For this, we will first learn how to use simple machines to build toys. This will help us to understand how these machines work. After that, we will find the simple machines inside a bicycle and learn how to maintain it properly.

Objectives

At the end of the project, you will be able to:

1. Make different toys from various materials by using simple machines. You can make toys like a catapult, robotic arms, elastic band, propeller boat, balloon car, rubber band car, etc.
2. Identify the various simple machines that come together to make a complex machine like a bicycle.
3. Identify the main parts of a bicycle and their functions.
4. Identify common problems with bicycles for example, a problem in the brakes or the chain and do the necessary maintenance and temporary repairs

Required Materials / Tools

To make toys from waste, scrap, or available materials by using simple machines, you can use the following items :

- Materials required : Paper, plastic bottles, cardboard, plastic spoons, drinking straws, pliers, ice cream sticks, thread, rubber bands, glue, adhesive tape, glue gun, cello tape, clothes pegs/clips, toothpicks, balloon, paint box, chopsticks (made of wood, plastic, or metal).
- Tools required : Scissors, ruler (measuring tape), and a knife or paper cutter.

For learning about simple machines in a bicycle :

- Bicycles will be needed according to the number of students.
- Required Materials : Oil / grease.
- Required Tools : Spanner set, wrenches, chain brush, tyre levers, and air pump, etc.

To get more information, you will need to visit a bicycle repair shop or invite a skilled bicycle repair expert to your school.

Safety Rules

- ▶ Be very careful while handling cutting tools and other sharp objects. Use hand gloves wherever necessary.
- ▶ Make sure you clean up your workspace and keep it neat after finishing the activity. Put the materials and tools back in their proper places according to your teacher's instructions.
- ▶ Take care that you do not hurt yourself or others while playing with the toys.

Wrench : A flat tool (spanner) used to tighten or loosen nuts and bolts.

Tire Lever : A flat strip tool used to remove or fit a tire.

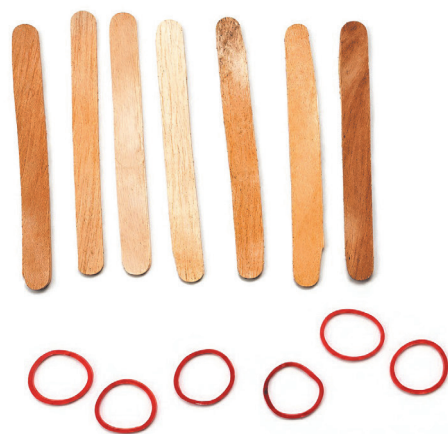
Activity 1 Simple machines around us

Observe the things or tools around you that make your work easy. Find out if they are simple machines or complex machines made of multiple simple machines. Take help from your friends, teachers and family members.

Table 3.1 Simple machines used around us

Sr. No.	Name of the object	Simple or Complex	Its use
1.	Tongs	Simple	To lift objects
2.			
3.			
4.			
5.			

Activity 2 Making a Catapult Using Ice Cream Sticks



Materials : Ice cream sticks, rubber bands, ice cream spoon.



Step 1:

Place five to six ice cream sticks on top of each other and tie them tightly with rubber bands at both ends. Take another four sticks and tie them tightly together with a rubber band at only one end.



Step 2 :

Place the two sets of ice cream sticks across each other as shown in the picture.



Step 3 :

Using a rubber band, attach the ice cream spoon, as shown in the picture.



When you press the spoon down and release it, the object inside the spoon will move far away.

Your catapult is now ready.

3.4 Steps for making a catapult using ice cream sticks and spoon.

Lever



(3.5)

Tongs used in the kitchen, papad-roasting tongs, and a claw hammer used to pull out nails all these things look different, but they all work on the same common system called a lever.

You must have seen a crowbar being used to move big stones. This is also a type of lever. It has three main parts: Effort (Force), Load, and Fulcrum (Support). Based on the position of the Fulcrum, levers are divided into 3 types.

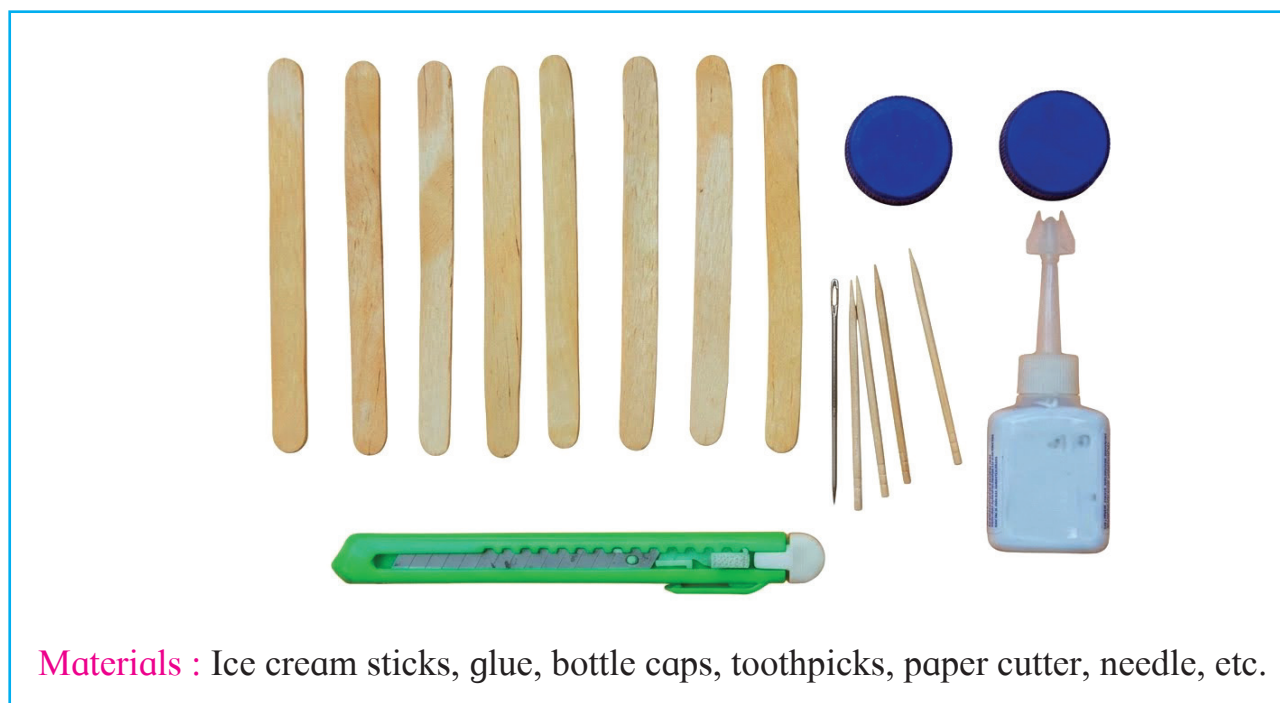
Table No. 3.2

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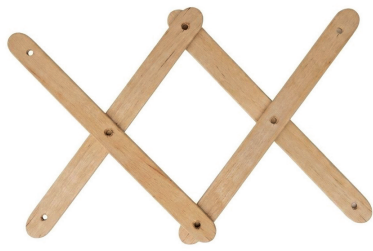
Type	Diagram	Example
First Type Load at one end, Force at the other end, Fulcrum in the middle.		
Second Type : Fulcrum at one end, Effort at the other end, Load in the middle.		
Third Type : Load at one end, Fulcrum at the other end, Effort in the middle.		

Many toys can be made using a lever. For example, a catapult, a robotic arm, etc. A simple catapult uses one fulcrum, while a robotic arm toy uses more than one fulcrum.

Let's Try This **Model of a Robotic Arm**

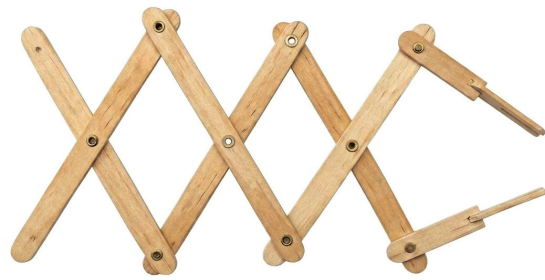


Materials : Ice cream sticks, glue, bottle caps, toothpicks, paper cutter, needle, etc.



Step 1 :

Make a hole with needle in the middle and at both ends of the ice cream sticks. Cut a toothpick into small pieces and push them through the holes to join the sticks.



Step 2 :

Join more sticks together exactly as shown in the picture.



Step 3 :

Use a cutter to cut out the middle part of two bottle caps. This will give you two round, ring-like pieces.



Step 4 :

Glue the cut bottle caps to the ends of the ice cream sticks as shown in the picture.



3.6 Robotic Arm

Activity 2 Making a Catapult Using Ice Cream Sticks



Materials : Ice cream sticks, glue, straws, water bottle caps, and rubber bands.



Step 1 : Glue the ice cream sticks together as shown in the picture.



Step 2 : Use more sticks to give it the shape of a boat.



Step 3 : Make slots in the bottle caps and build a propeller as shown in the picture.



Step 4 : Pass a wire through the middle of the boat as shown in the picture. Attach propellers to both ends of the wire.



Step 5 : Connect the tip of the boat and the middle wire tightly using a rubber band.



Step 6 : Spin the propeller backward so that the rubber band winds tightly around the middle wire.



When you place it in water, the propeller will spin as the rubber band unwinds, moving the boat forward.



3.7 Propeller boat

When blades are attached to the inner side of a wheel, a propeller is made. When the wheel spins, the attached blades turn and push the water backward. This is used in ships and airplanes. In the toys shown above, the simple machine called ‘Wheel and Axle’ has been used.

Examples : Wheel and Axle

The wheel and axle are a simple machine.

It consists of a wheel and a rod (axle) passing through its centre.

When the wheel is turned, the axle turns too. Because the radius of the wheel is bigger than the axle, we can do more work by applying less force. This makes it easy to move, lift, or spin heavy objects.



3.8 Wheel and Axle

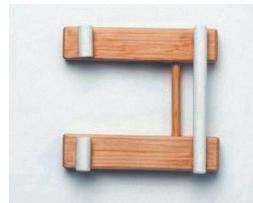


Activity 4

Making a Rubber Band Car



Materials : Wooden clothes clips (pegs), cello tape, chopsticks/toothpick, tubes (straws), glue, rubber bands, bottle caps, scissors, etc.



Step 1 : Cut straws into equal lengths and stick them onto the clips as shown in the picture.



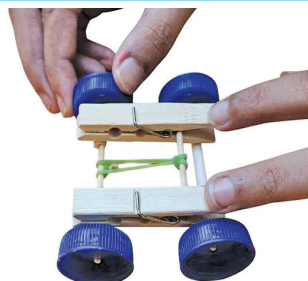
Step 2 : Put the chopsticks inside the tubes (straws) and stick the bottle caps to both ends using glue.



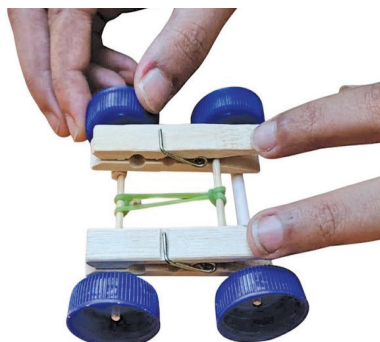
Step 3 : Stick a small vertical stick to one axle; this is the front side of the car. Tie a rubber band to the other axle; this is the back side of the car.



Step 4 : Stretch the rubber band and hook it onto the vertical stick of the front axle.



Step 5 : Turn the back wheels backward to wind up the rubber band and place the car on the ground.



3.9 Rubber Band Car

LO : 4, 5, 6, 7, 8, 9, 10, 11, 12, 18, 19, 20, 21, 22, 23

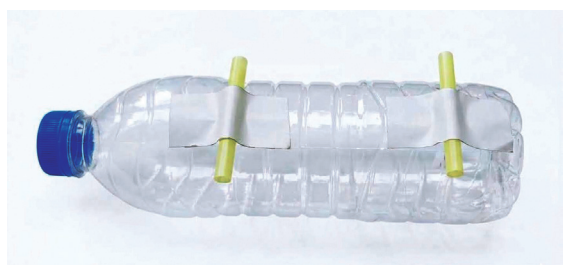


Let's Try This

Making a Balloon Car



Materials : Tubes (straws), chopsticks, an old bottle, glue, water bottle caps, a balloon, cello tape, scissors, etc.



Step 1 : Stick the chopsticks onto the bottle using cello tape, exactly as shown in the picture.



Step 2 : Attach the bottle caps onto those chopsticks to make the wheels, as shown in the picture.



Step 3 : Tie the balloon tightly to the tube (straw) using a rubber band.



Step 4 : Fit the tube (straw) with the balloon into the bottle, as shown in the picture.



Step 5 : Blow air into the balloon through the open end of the tube (straw) and close it tightly with your finger.

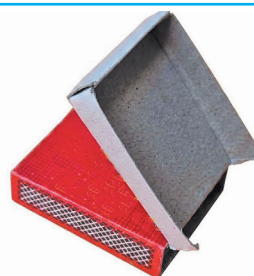


Step 6 : When you take your finger off the tube (straw), the balloon car will start running.

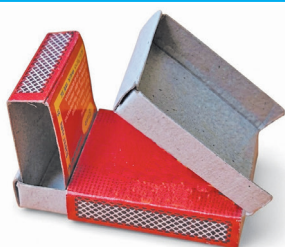
3.10 Balloon Car

Activity 5

Making a Dumper / Tipper



Materials : Matchboxes (2), tubes (straws), chopsticks, toothpicks, water bottle caps, cello tape, scissors, etc.



Step 1 : Cut open and flatten the inner sliding tray of one matchbox, and stick it to one side as shown in the picture.



Step 2 : Use the outer cover of the second matchbox to make the front cabin of the truck, as shown in the picture.



Step 3 : Push two toothpicks through the front part of the truck body, as shown in the picture.



Step 4 : Glue a horizontal toothpick across the two vertical toothpicks at the front, as shown in the picture.



Step 5 : Make wheels for the bottom of the vehicle using tubes (straws), chopsticks and bottle caps. Stick them tightly using cello tape.



Step 6 : When you press down on the toothpick at the front, the back container of the truck lifts up.

3.11

- **Wheels in toys above :** Multiple simple machines like a wheel and axle and a lever are used together.
- **Complex Machines :** A complex machine is made by combining two or more simple machines.

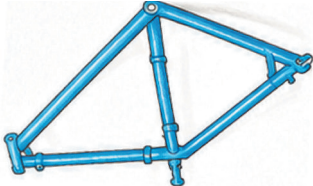
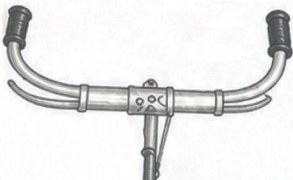
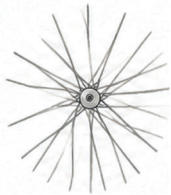
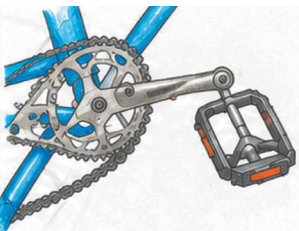
Activity 6

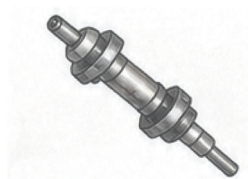
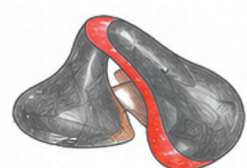
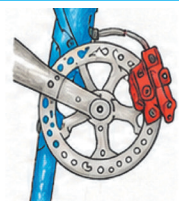
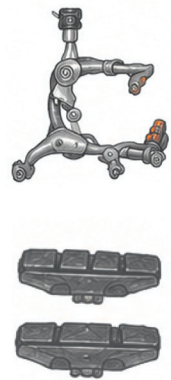
Make a List of Simple Machines in a Bicycle

A bicycle is the best and most environmentally friendly means of transportation. A bicycle is a complex machine made up of many simple parts. A bicycle is made up of many simple parts such as wheels, axles and levers.

Bicycles have many moving parts that work together to make the bicycle wheel turn. All the parts of a bicycle (wheels, gear, pedals, etc.) work together to convert the rider's effort into motion.

Table 3.3 : Parts of a bicycle and their functions

Sr. No.	Part	Function	Picture
1.	(Skeleton) Frame	This is the main support structure of the bicycle. Various other parts are attached to this frame.	
2.	Handlebars	It is used to hold the bicycle while riding and to steer it in different directions.	
3.	Rims	It gives support to the tyres. The brakes rub against it to slow down or stop the bicycle.	
4.	Tyre and Tube	The tire and tube are mounted over the wheel rim. Air is filled inside the tube.	
5.	Spokes	They serve strengthen the rim	
6.	Pedals	The place where you put your feet to apply force and move the bicycle	

Sr. No.	Part	Function	Picture
7.	Hub	This is the middle part of the wheel. It helps the wheel spin easily around the axle.	
8.	Seat	It is used by the rider to sit comfortably while riding the bicycle.	
9.	Chain	When we push the pedals, the power created at the front chainring is carried to the rear gear (sprocket) by the chain.	
10.	Brake Brake Pad	It is used to slow down or stop the bicycle. There are different types like rim brakes, disc brakes, and drum brakes. These rubber strips are fitted next to the metal rim on which the tire is mounted.	
11.	Large Chainwheel	It transfers power from the pedal to the chain.	
12.	Sprocket	The small toothed gear wheel attached to the rear wheel.	
13.	Stand	It helps to keep the bicycle parked upright.	
14.	Reflector	It glows brightly when light falls on it, making the bicycle visible in the dark.	

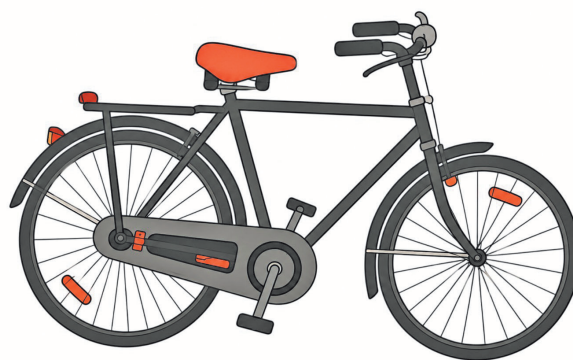
Checking and Repairing a Bicycle

Activity 7 Visiting a Bicycle Repair Shop

To repair a bicycle, when it breaks down, you have to take it to a bicycle repair shop. There are skilled craftsmen who repair bicycles. They can be called to school to provide information on bicycle repair. You can get information on bicycle maintenance and repair from them.

You can learn about the following things from them :

1. What things should be checked every time before riding a bicycle?
2. What should be the correct height of the seat, and how can it be adjusted up or down?
3. How should a bicycle be cleaned?
4. How do you check if the tyre has the right amount of air pressure?
5. How do you fix a tyre puncture?
6. When should you apply oil/lubricant to the chain and other moving parts of a bicycle?
7. How do you repair and adjust the brakes?
8. How do you fix a wheel alignment issue (wheel wobble)?



3.4 Bicycle

Table No. 3.4

Part of the Bicycle	Work	Is it working properly? (Yes / No)	If it is not working properly, what repair was done?
Brakes			
Chain			
Spokes			
Stand			
Handle			
Tyre			



Activity 8 Organizing a Toy Exhibition

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We can make different types of toys by using various ideas from science. An exhibition of these homemade toys can be set up in the school. This will help others to enjoy the toys and understand the science ideas behind them.

Take help from your teachers to plan and organize this exhibition. Use the following guidelines to set it up :

1. Make the purpose of the exhibition clear. It could be to create awareness about toys, show your creativity, or make toys using waste materials.
For example: You can demonstrate your toy-making skills during the exhibition.
2. Fix a theme for the exhibition (e.g., eco-friendly toys, historical toys, or toys based on science topics).
3. Make sure that the toys you made match the theme you selected.
4. Fix a proper place in the school for the exhibition.
5. Design how the stalls will look. Make sure there is enough space for each toy and enough room for visitors to move around easily. Decorate the place according to your theme to make it look attractive.
6. Send invitation cards to parents, local artists, and community members.
7. Set up the toys neatly. Make sure every toy has a small label with the maker's name and a short description of how it works. Ensure all toys are safe to handle and the area is safe for children.
8. Assign student volunteers to guide the visitors and handle any problems that come up.
9. Ask visitors, students and teachers to give written feedback so you can understand what went well and what can be made better.
10. Take photographs and videos to document this event and share the highlights through the school newsletter, social media, or the school website.

Activities and time required while making simple machines

When making simple machines, it is important to understand how much time it takes to turn an idea into an actual working project. Measure the approximate time you spent on each activity. Mark the activity number and time taken on the timeline below. If you have done more activities than what is given in the book, write their number and time in a separate chart.

Activity	1	2	3	4	5	6	7	8
Time Taken (in hours)	—	—	—	—	—	—	—	—

What else can be done from this?

Apart from these, we can build many types of simple machines using ordinary items found around the house. You can search the internet using the keywords below to learn new ideas and projects.

Example: Simple Machine + chain reaction toy.

Think and Answer :

1. Which activity did you enjoy doing?
2. What difficulties did you face while doing this activity?
3. In what other different ways can these actions be performed?
4. Write down what you learned from your classmates while doing this project/activity.
5. What kind of toys or projects can you make to explain hard topics from other school subjects in an easy way?
6. Can you guess how many times a wheel will rotate to cover a distance of 10 meters?

(Hint : Wrap a string around a bicycle wheel and measure the length of the string).

7. Can using a bicycle affect our health and the environment? Prepare a list of points on this.
8. Find out where your homemade toys or project models are used in real life. Talk to people who work with such real-life projects and learn about their benefits.

Exercise

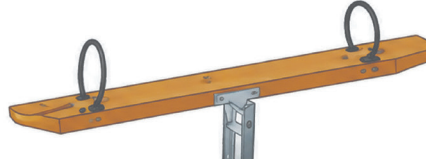
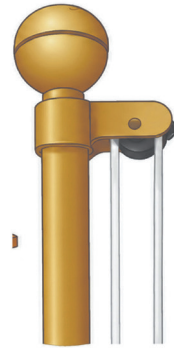
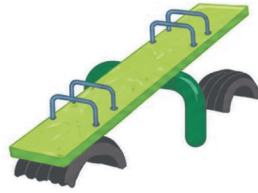
Brain Teasers

1. You want to move a heavy cupboard in your house. Which simple machine can you use?
2. When you open or close a door or a window, check whether you need less force or more force when you push at the hinge, in the middle, or near the handle. Write down what you observe.
3. What could be the reason behind making bicycle brake pads out of rubber?
4. Which simple machines can be used to move heavy objects and lift heavy objects?
5. Make a list of occupations related to this project.

• Internet Safety :

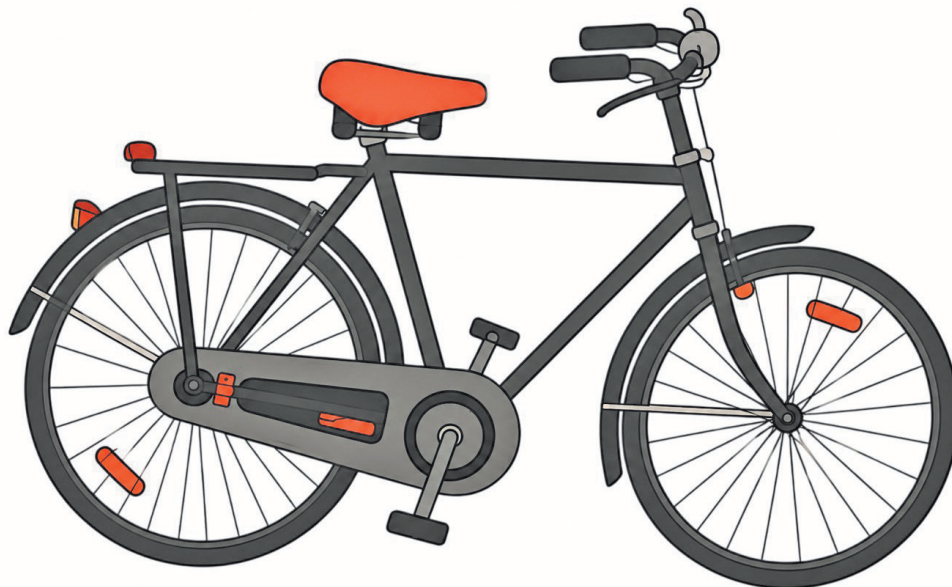
Always take help from your teachers while using the internet. Be careful and never upload or download anything without checking if it is safe and do not disclose your personal information anywhere online.

Guess Who I Am?



Find out about me

Identify the simple machines hidden inside the object given below.
(Picture shown : A bicycle).



Creation / Production

1. Make a list of the names of different parts of a bicycle.
2. Draw a picture of any two simple machines used in your house.
3. Give one example for each of the three types of levers.
4. Create a toy using a simple machine.



Animation and Games



We play many kinds of games during our school days. In today's world, many games are played using mobile phones and computers. In the same way, this project will help you learn how to create your own animations and games using computers.

To make games easily, we use a Visual Programming Language (VPL). This project will teach you how to use this language to create cool animations and fun games.

Objectives

**Communicating
with
devices.**

**Making a
prototype
(rough model)
of an offline
game.**

**Learning
how to use
'Scratch'.**

**Designing an
online game,
testing it out,
and making it
better.**

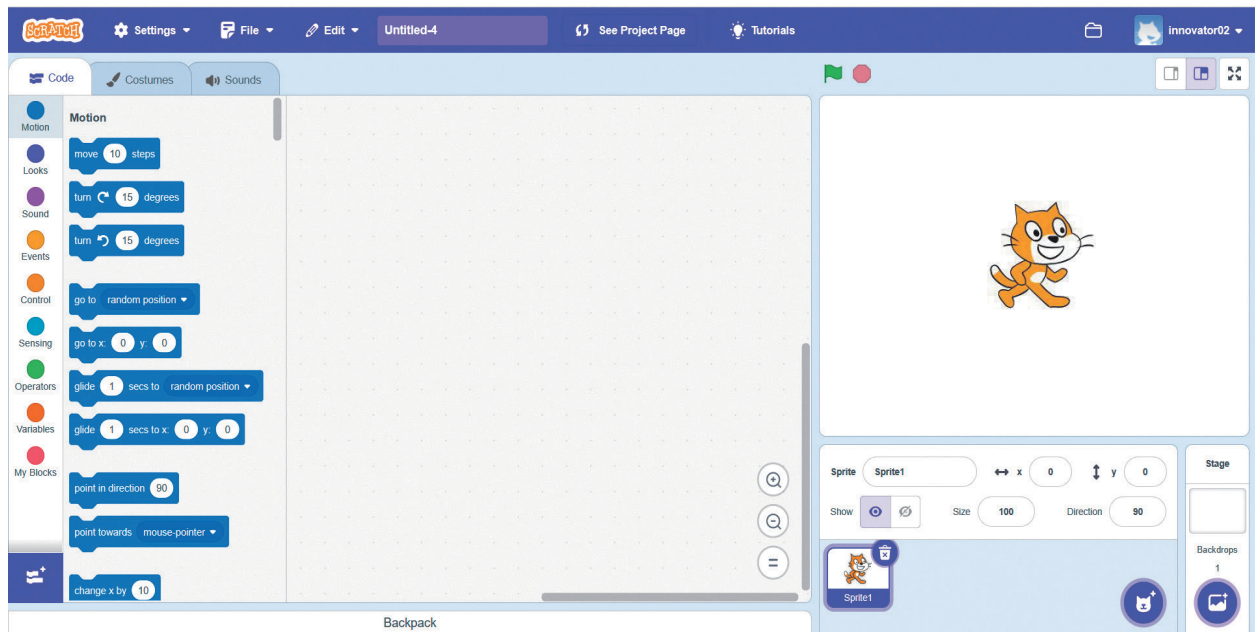
**Creating your
own animations
and games.**

4.1 Objectives

Many types of games are available on smartphones and computers. When we do an action, it acts as an input, and the shapes on the screen move or respond to what we did.

You can also watch animated films and an imojis (animated emojis) on computers and smartphones. To make these moving shapes (like humans, animals, or geometric designs), programmers use 'Coding'. Coding is simply a set of clear, step-by-step commands given to a computer.

This project will help you design online games and animations. Creating games and animations requires both creativity and technology. Before starting the actual work, designers develop their ideas and improve them from time to time. These are created through the teamwork of artists (who make the visual elements or pictures) and programmers (who write the code).



4.2 Introduction to Scratch

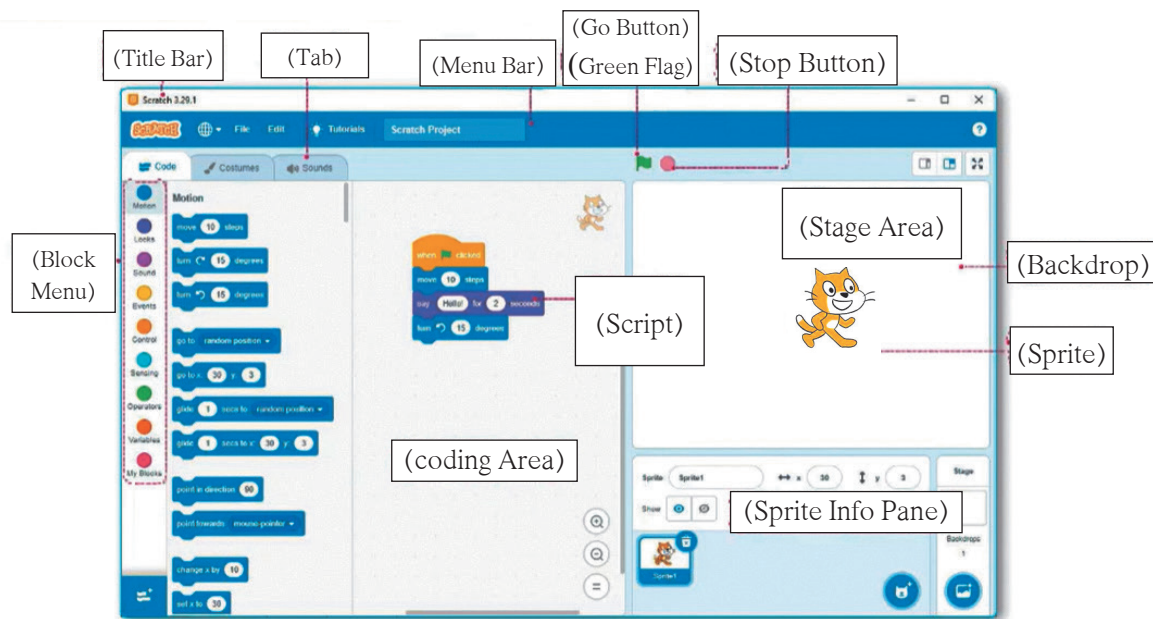
By using ‘Scratch’ (shown in Figure 4.2), we can create animations and games. Just like we use different languages to talk to each other, programmers use programming languages to talk to devices like smartphones, computers, tablets, smartwatches, satellites and driverless cars.

Saritpat

This is an old indoor board game played using pawns (tokens), a board (pat), and dice or cowrie shells. This game was very popular in ancient India. To play this game, you need a total of sixteen pawns- four pawns each of four different colours: yellow, red, green, and black. Along with these, you need a cloth board with four tracks, and 2 dice or 6 cowrie shells.

The modern form of this game can be seen in the game of Ludo today.





Parts of Scratch 4.3

Scratch is very easy to use. Normally, you have to learn difficult languages to write a computer program, which takes a lot of time. But in a ‘Visual Programming Language’, ready-made code blocks are already provided. These blocks give us an easy way to build programs for making animated shapes, designing games, or even creating your own computer wallpapers.

Coding means writing a step-by-step list of instructions that tells a computer exactly how to do a specific task. Coding allows us to talk to computers and smartphones. When we click a button and the computer or smartphone responds, our click is translated into instructions that the machine understands. A series of these instructions given to a computer in the correct order is called a Program.

Languages like JavaScript, Python, and C are visual programming languages. There are many such languages through which we can talk to computers. In Scratch, a series of programming commands are joined together inside ‘Blocks’. Because of this, you can combine different blocks to create a full set of instructions.

Purpose

At the end of this project, you will be able to :

1. Create a simple Scratch project using block programming.
2. Design a game and an animation using Scratch.

Required Materials / Tools

To complete this project, you will need the following things :

A computer or a laptop with an internet connection.

The ‘Scratch’ software (Visual Programming Language) downloaded onto the computer or laptop. A notebook, pen or pencil, loose

Safety Rules

- Always take advice from your teachers and experts while using the internet.
- Make a list of 'dos' and 'don'ts' when using the internet and follow those rules while working.
- Using computers or the internet to play video games is good, but spending too much time looking at a screen is bad for your mental and physical health.
- Include outdoor games and physical exercises in your routine. This will keep your body and mind healthy.
- Only use smartphones and computers for a limited amount of time under the guidance of your teachers or family members.

To do this project, you should know basic computer skills like using a computer mouse and keyboard, checking the internet connection, searching or browsing on a web browser and downloading and installing software.

Activity 1 **Game Design**

There are two main types of games: Outdoor and Indoor. Outdoor games include games like Kho-Kho, Kabaddi, Cricket, Blind Man's Buff, etc. while indoor games include Chess, Ludo, Card games, Carrom, Saritpat, etc.

To get information about games, answer the following questions :

1. Why do we play games?
2. Which is your favourite game?
3. What are the reasons you like this game?
4. How many players are needed to play this game?
5. What are the main rules of this game?
6. Share some interesting or fun facts about your favourite game.

Activity 2

Make a model of your favourite game



4.4 Model

Use craft materials to make a model of your favourite game. For example, if you like Ludo or Snakes and Ladders, use cardboard and colours to make a board. If you like cricket, make a model of a cricket ground.

Activity 3

Play online games and answer questions

Now play some online games. Play different types of games on a smartphone, computer, or laptop and answer the questions below :

Answers after Playing Online Games

1. Do all games have rules? Yes ☐ No ☐
2. Do all games have characters like cartoon or game figures? Yes ☐ No ☐
3. Do characters talk to each other in all games? Yes ☐ No ☐
4. Do all games have music in the background? Yes ☐ No ☐
5. Do games have sound or other audio? Yes ☐ No ☐
6. Did you find any game interesting and challenging?

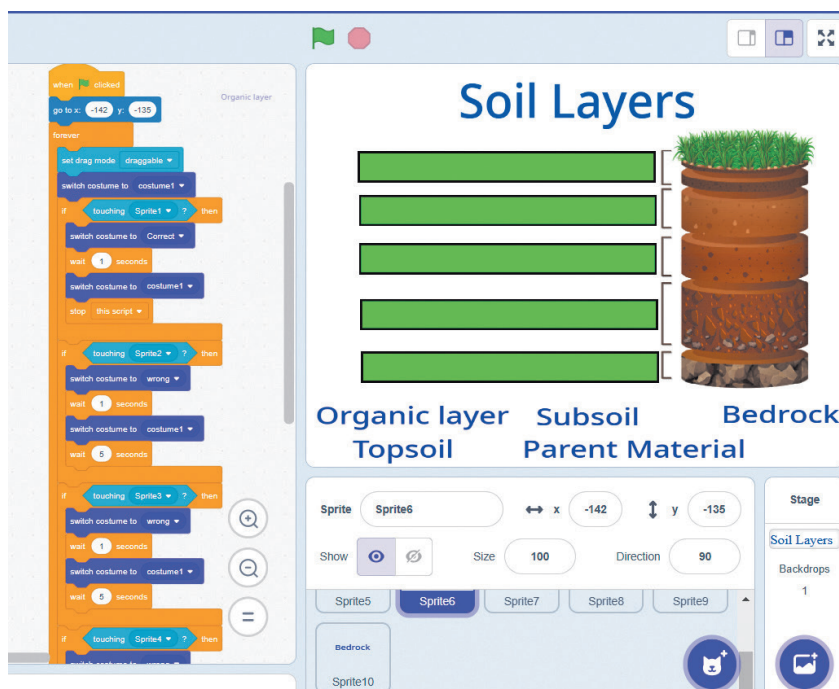
If yes, why? If not, how can you make it more interesting and challenging?

Activity 4 Preparation for your favourite online game

We have learned about online and offline games. We have also learned about rules, players, communication, and design of games.

Online and some offline games have music and background, which make them attractive and interesting.

Now search for some interesting online games and animations made using Scratch.



4.5 “Match the Pair” Game

You can use the following keywords to search for games and animations :

1. Animation games made using Scratch.
2. Educational Scratch games for school students.
3. Scratch games for practicing maths skills.
4. Creative Scratch games with music and sound.
5. Scratch games for learning history or geography.
6. Adventure games made in Scratch.

Creating an Account on Scratch

To create an account, you need to log in to the Scratch website.

You can use your email ID or your teacher's/family member's email.

Click on the "Create" button to make your account.

You will find tutorials to make animations and games using Scratch.

Search using these keywords :

- Scratch game tutorials for beginners
- How to make a maze game in Scratch
- Interactive storytelling in Scratch
- How to make multiplayer games in Scratch

Now you can start using Scratch.

Tell :

1. Did you face any difficulty while creating a Scratch account?

Yes

☐

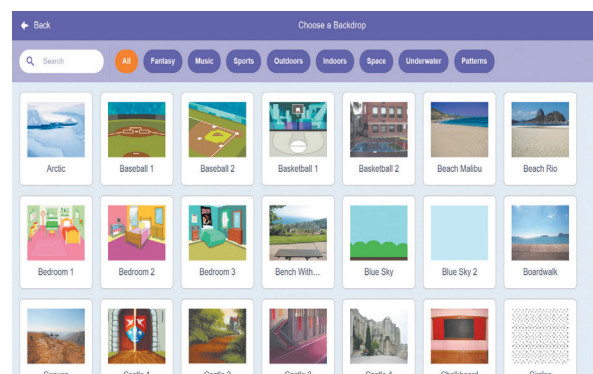
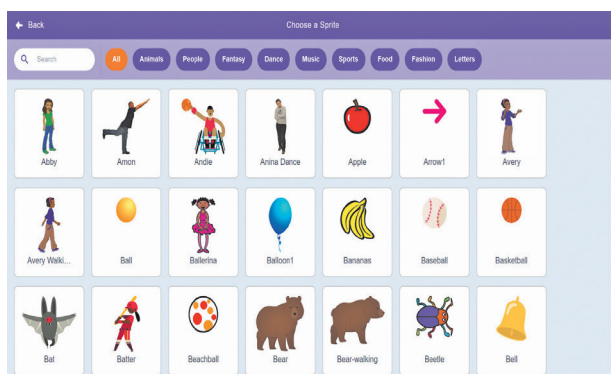
No

☐

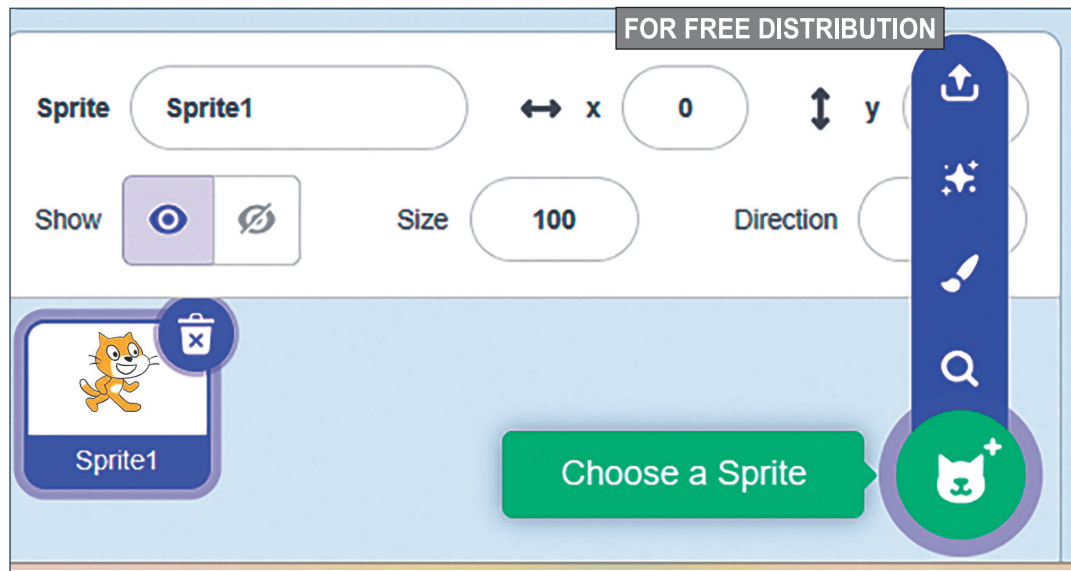
2. If yes, how did you solve it?

Activity 5 Create Characters, Objects and Background

Try different options in Scratch. Figures 4.6 to 4.10 show items seen on the screen. Answer the questions while starting Scratch. These will help you later.

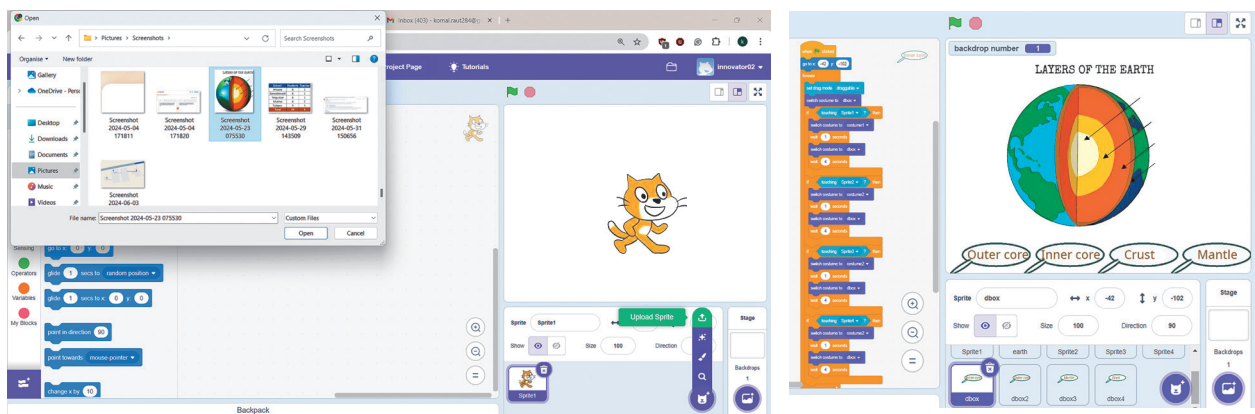


4.6 Backgrounds and Characters (Sprites) in Scratch



4.7 Select and upload a Character

1. Can you select and import a sprite (character)? Yes ☐ No ☐
2. Did you use ready-made characters, internet images, or your own drawings?
Or both? _____
3. Did you try to create your own character?
Yes ☐ No ☐
4. Can you change the costume of the selected character?
Yes ☐ No ☐
5. Can you import objects into Scratch?
Yes ☐ No ☐
6. Can you choose a suitable background for your character?
Yes ☐ No ☐



4.8 Upload Sprite on Computer

Use of Artificial Intelligence (AI) to Create Images

You can create your own images using AI image generators.

AI image generators understand given keywords (called text prompts) and create matching images.

Steps to Create AI Images :

1. Choose an AI image generator (take help from teacher if needed).

2. Write your idea in simple words.

Example: “A flying cat in the sky.”

3. Try different styles and see changes.

4. Make improvements by changing the description.

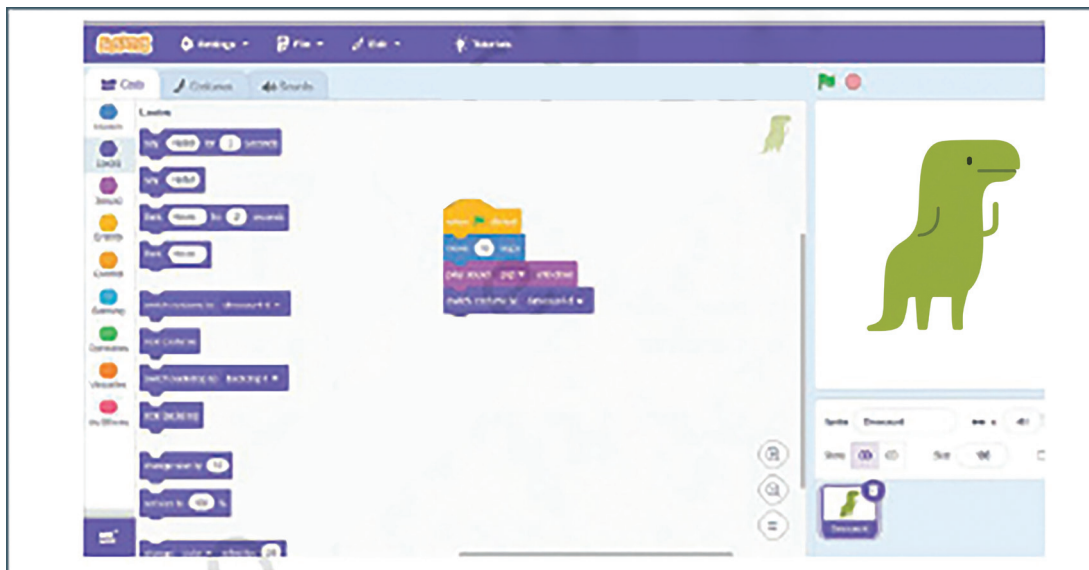
Example: “Make the cat smaller” or “Change background to forest.”

5. Download or save the image on your device.

Now you can use it for whatever purpose you want.

Activity 6 Programming Characters and Objects

Animate the Character



4.9 Select a character and drag it into the code block window so that it works according to instructions.

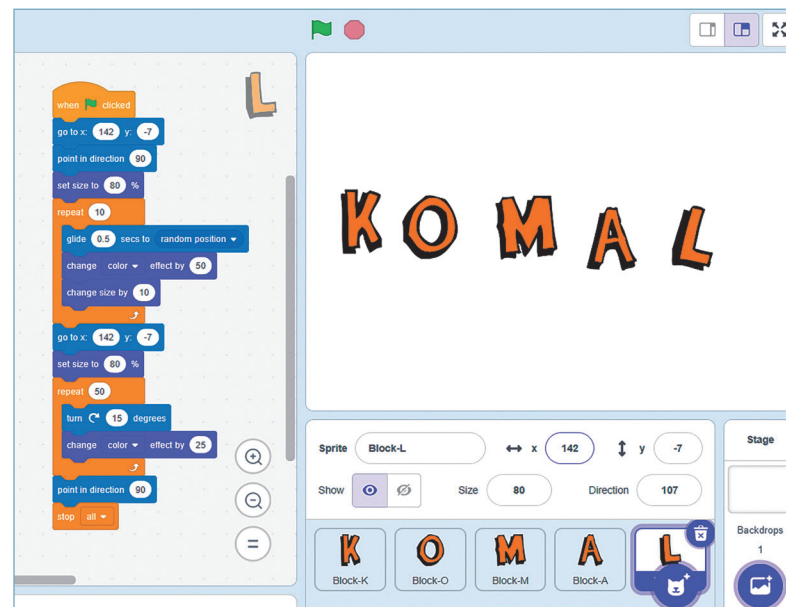
The following questions will help you think about what else you can do and will be useful for your future work.

Questions :

1. Were you able to animate the character using the **Motion** and **Looks** Looks blocks together?
Yes ☐ No ☐
2. Were you able to animate the character by using the **Control** and **Events** Events blocks?
Yes ☐ No ☐
3. Were you able to add music to this animation?
Yes ☐ No ☐
4. Were you able to choose more than one character?
Yes ☐ No ☐
5. Were you able to change their costume?
Yes ☐ No ☐

Activity 7 Creating an animated birthday card for a Friend

Create an animated birthday card for a friend using their name and a picture.



4.10: You can create animations in Scratch; letters are animated in this window.

Answer the following questions. (These questions will guide you and help you with your future work)

1. Were you able to import and use a photo of your friend as a character (sprite)?
Yes ☐ No ☐
2. Were you able to create an animated birthday message along with your friend's sprite by combining **Motion** **Looks** **Control** and **Events** blocks?
Yes ☐ No ☐
3. Were you able to use your friend's favourite song as background music for the animated card?
Yes ☐ No ☐

4. Were you able to save the card and share it with your friend? Yes ☐ No ☐
5. Did you face any problems while creating this animated birthday card? Yes ☐ No ☐
- If yes, how did you solve them? _____
6. Have you tried to make anything else using Scratch? _____

After completing the steps in the project above, you can try creating a game.

Activity 8 Designing a game

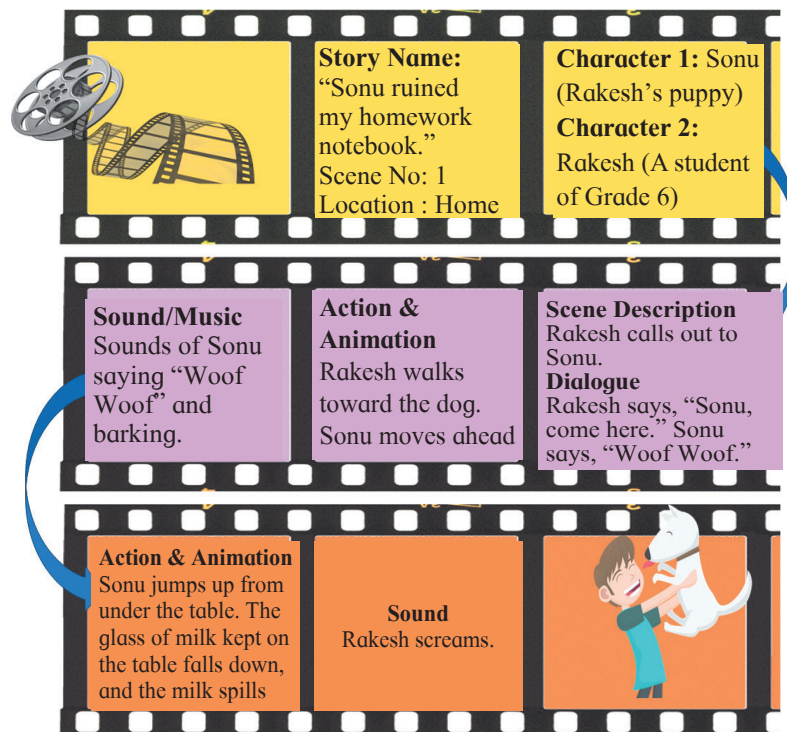
To create a game, you first need to plan out all the details of the game. This planning is called creating a ‘Storyboard’ (Figure 4.11).

Storyboard :

A storyboard is a plan drawn up in advance to show what your game or animation will look like on the screen. It is like a roadmap. You can design it on paper or outline your project details on a computer.

Your storyboard should include the following points :

- Sketches (drawings) of your characters.
- A description of how they will respond to commands.
- The sequence of actions
- All the ideas you have in your mind.



It is important to create a storyboard because it helps you prepare a detailed plan for your game or animation. This way, you don't have to keep rethinking your ideas while actually making the game.

The following story is told in the storyboard above.

Rakesh is sitting near his study table, and a glass of milk is kept on the table. He calls out to Sonu by saying 'Uu Uu'. Sonu jumps toward Rakesh. Because of this, the glass on the table falls over, and the milk spills onto the notebook.

Present your game idea to your classmates

Storyboard Example for an Animation :

- Did you present your game concept to your classmates? Yes ☐ No ☐
- Did you get any suggestions from them? Yes ☐ No ☐
- If yes, how did you use those suggestions? _____

Activity 9 Coding the Game

With the help of your teacher or other people, write the code for the game you planned (in Figure 4.11) :

- Create the Characters and Scenes.
- Animate the Characters.
- Create different events using Dialogue and text.
- Trigger different events by using **Events** blocks.
- Add background music by using **Sound** blocks.

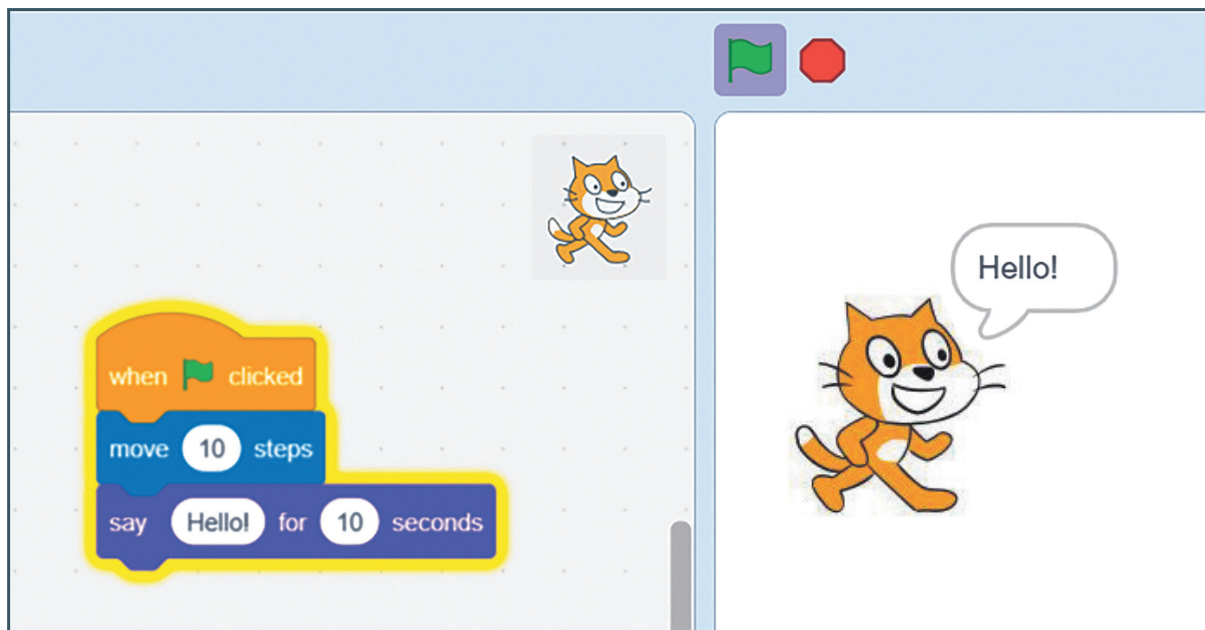


Figure 4.11 : In this code, when you click ‘Start’ (the green flag), the cat will move 10 steps forward and say “Hello!”.

1. Write the script (code) for the game you designed in Activity 5.

Use built-in blocks like **Motion** **Looks** **Sound** **Events** **Control** **Sensing** **Operators** **Variables** etc., along with Loops and Conditional Statements.

2. Design a logo for your game’s name and paste its photo in your notebook.

Check if you can do the following things :

(A) Setting the Stage

- Did you select a background (Backdrop) for the game or import an image? Yes / No
- Did you design or import a character? Yes / No
- Did you design or import an object? Yes / No

(B) Coding the Sprite

- Did you program the movement of characters using **Motion** and **Looks** blocks? Yes / No
- Did you use code blocks to control the movements, conversations, animations and game logic? Yes / No

(C) Applying Game Mechanics

- Did you set the rules of the game using **Control** blocks? Yes / No
- Did you create interactive features using **If-else** conditions, loops, variables, and **Sensing** Sensing blocks? Yes / No
- Did you trigger actions for specific occurrences using **Events** Events blocks? Yes / No
- Did you add background music using **Sound** blocks? Yes / No

- (D) Did you face any problems while making the game?** Yes / No
If yes, how did you solve them?

Activity 10 Trying it out

Check if the game runs properly.

1. Click on the **Share** button in Scratch to make it available for others.
2. Ask students from other groups to play your game.
3. Is there a need to remove any errors (Bugs) so the game runs smoothly? Yes / No

Activity 11 Sharing the Game

When making your finished game available to others, you must first introduce them to the game. You will need to provide them with some basic instructions and share any rules. For this, you can prepare an audio/video clip or an information leaflet.

Questions :

1. What is the name of the game?
2. What are the different components/parts of the game?
3. What are the rules or instructions for playing the game?

Discuss

What did you learn from others, and how did you use it?

(Watch Scratch videos and discuss them with others.)

1. Did you watch any tutorials or observe how others wrote their code?
.....
2. Did you work on any project with your classmates? What did you learn from them?
.....
3. Did you ask for help or advice from your teachers or friends? Which advice was the most useful?
.....
4. What new techniques or blocks did you discover with the help of your classmates?
.....
5. Did learning from others help you include new ideas or features in your project?
.....
6. Did you get a chance to help or teach Scratch to others? What did you teach them, and how did it help you understand it better?
.....

Time Required for Learning Animation and Games

It is important to understand how much time it takes to complete an activity. Count how many periods (hours) you spent on each activity and record it on the Timeline below. If you did more activities than what is given in the book, write their numbers and the time taken too.

How well did you understand?

Activity	1	2	3	4	5	6	7	8	9	10	11
Time Taken (in hours)	—	—	—	—	—	—	—	—	—	—	—

Time Taken
(in hours)

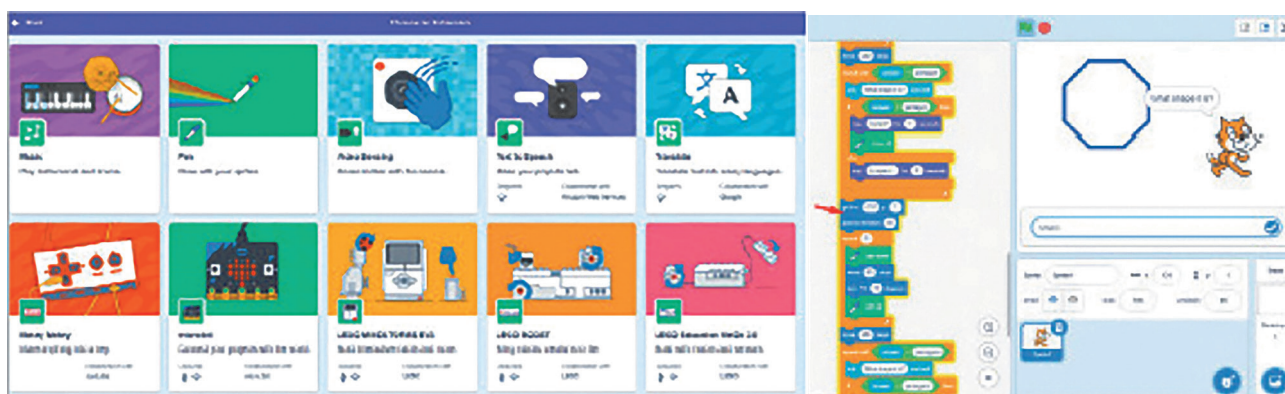
What else can you do?

1. You can create a game or an animated story related to your daily life. For this, you can use photographs of people and things around you. (Make sure to take their permission first).
2. Discuss popular folktales with family members or senior citizens in your community. Prepare a storyboard containing the characters, storyline, and important scenes of that tale and turn this story into an animation in Scratch.

How?

- * By creating characters and scenes.
- * By animating characters.
- * By using dialogues and text.
- * By using Event blocks to start different actions.
- * By using Sound blocks for background music.

You can use Scratch Extensions to create different games. For example, by using the Pen Extension, you can draw your own shapes and patterns.



4.12 Scratch Extensions

Think and answer

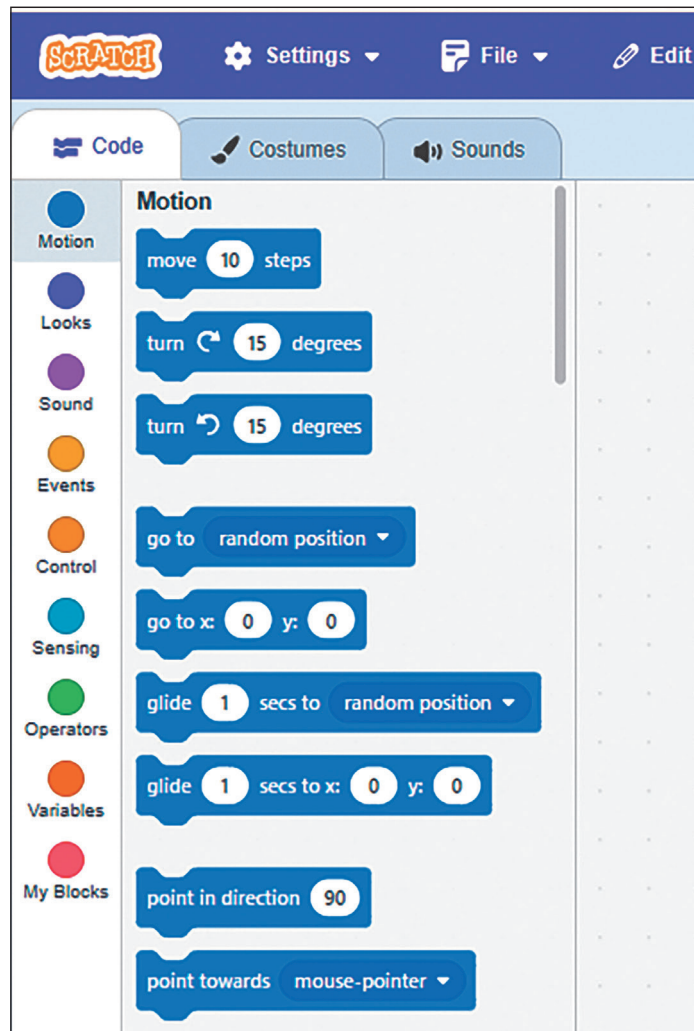
1. What did you like making more- animations or games?
2. What difficulties did you face while doing this?
3. What else could you do differently in this project?
4. Compare online games and offline games. Clearly explain the advantages and disadvantages of each.
5. What kinds of jobs/professions are available related to this project? Find out more details. (For example- programmer, software developer, game developer, 3D animator, etc.)
6. Search for other apps similar to Scratch that can be used to create games, and try using them.

Exercise

Use Your Brain Power!

1. Is there a difference between an animated movie and an animation game?
2. Write down the steps required to grow a plant from a seed as an animation project. (Storyboard)
3. Explain where the use of animation can help you in your school studies.

Guess who I am?



Study the Scratch screen and solve the following questions.

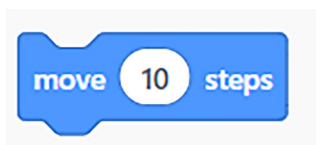
1. Fill in the details of the Scratch blocks in the table below :

Colour	Name	Use

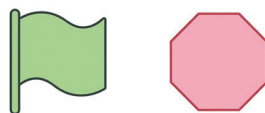
2. Identify the sprite animal shown below.



3. Why is a notch/groove provided in this block?



4. What are the names and uses of these two buttons?



Get to know me

1. Fill in the list of indoor and outdoor games in the table below:

Sr. No.	Name of the Game	Outdoor / Indoor	Number of Players
1.			
2.			
3.			

2. Write the names of characters from different cartoon shows broadcasted on TV:

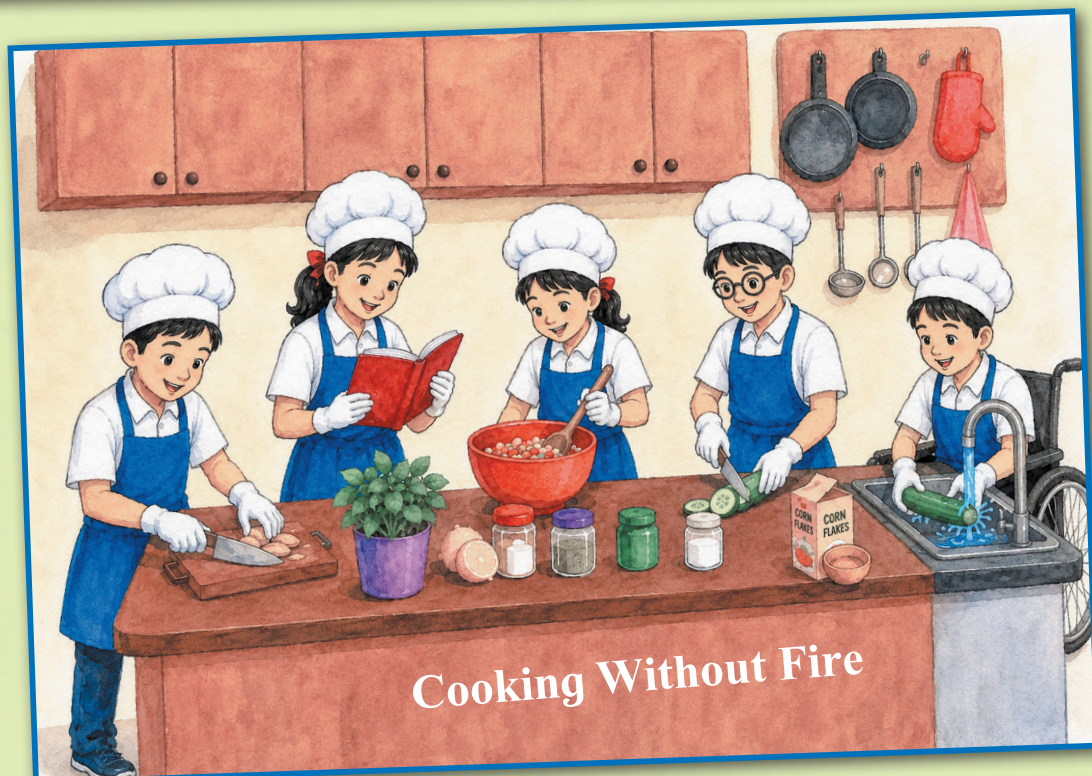
Sr. No.	Cartoon Show	Character
1.		
2.		
3.		
4.		
5.		

Creation

Take a science concept and create a game based on it using Scratch. Think about what other school subjects you can create a game for.

Part – 3

Work in Human Services



We have created various services ranging from trade and transport to mass media and entertainment. Due to this, we have got an opportunity to go beyond our personal relationships and cooperate with each other. In this era of global exchange, it is necessary to develop the capacity to work in human services. The businesses coming under this category have been included within the scope of human services work. To develop capability regarding this, information has been provided about school museum and fireless cooking projects. A museum is an important hall that preserves our rich heritage, where a collection of historical coins, old weapons, manuscripts, and objects of ancient culture is maintained.

Fireless cooking is a very important and healthy concept of modern times, in which the natural vitamins, proteins, and important minerals in food are preserved. This method is not only excellent for health but also helps in protecting the environment. Similarly, this initiative creates a feeling of self-reliance.

Thus, both fireless cooking and historical heritage prove to be important for our overall development.



School Artifact Museum



A museum means collecting important, old, and historical objects, arranging them attractively, and introducing them to the people. A school artifact museum means collecting objects as possible for students, arranging them in the school, and through this project, information about the museum will be gained, and it will be possible to collect artifacts, describe them, and create one's own attractive museum.

Objectives

Information about museums and artifacts will be obtained.

An actual museum or a virtual museum can be visited.

Introduction to artifacts can be done and replicas can be prepared.

An introduction to one's own history and culture will be made.

An exhibition of artifacts can be organized.

Feedback can be taken from visitors.



Figure 5.1 School Artifact Museum

To understand history and culture in the Social Sciences subject, many objects and things are studied. From ancient objects, artifacts, paintings, idols, inscriptions, utensils, etc., made by humans, we get information about our historical heritage and cultural life.

Museums help in understanding history and culture. Interesting information about many things like the attire of people in ancient times, their types of work, the artifacts prepared by them (e.g., paintings and sculptures), their script, and the manuscripts written by them is obtained and an introduction to the past is made.

Knowing the types of museums

1) Historical Museum

In a historical museum, old objects, coins, weapons, idols, inscriptions, and paintings related to history are kept. Through these mediums, information about the lifestyle of the people of that time is obtained.

2) Art Museum

In an art museum, paintings, sculptures, handicrafts, folk art, and manuscripts are preserved. This provides an introduction to ancient culture.

3) Science Museum

In a science museum, there are objects providing information about scientific experiments, replicas, machines, space, and energy. This helps in understanding science in a simple way.

4) Environment Museum

An environment museum contains information regarding plants, seeds, forests, water conservation, animals, birds, and pollution. This creates awareness about nature conservation and the environment.

5) Culture Museum

A culture museum includes festivals, traditions, public life, clothing, ornaments, food items, and written matters in spoken dialects. This offers a glimpse into folk culture.

6) Technology Museum

A technology museum contains information about computers, mobiles, robots, drones, and digital tools. This fosters a friendship with technology.

7) Rural Life Museum

A rural life museum means a collection of farming tools, bullock carts, utensils, and rural lifestyle. This provides an introduction to rural life.

8) Urban Life Museum

An urban life museum contains information on matters like buildings, industries, transport, ultra-modern means of transport, municipal corporations, etc. This provides an introduction to urban life.

9) School Museum

A school museum can include objects related to various subjects (prepared in school). This can include manuscripts, script samples, and documents collected by students, teachers, and parents in the types of museums.

Types of Museums



5.2 (a) Historical Museum



5.2 (b) Art Museum



5.2 (c) Science Museum



5.2 (d) Environment Museum



5.3 (e) Culture Museum



5.3 (f) Technology Museum



5.2 (g) Rural Life Museum

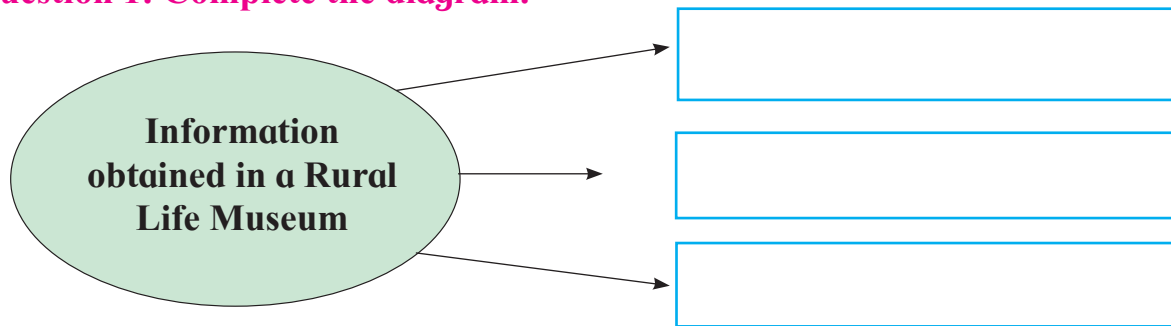


5.2 (h) Urban Life Museum

Museums help in learning about the culture and work of people from various groups in the country and the world, as well as they display artifacts related to art, tradition, architecture, and science.

Exercise

Question 1: Complete the diagram.



Question 2: In which museum can the following objects be included?

Objects: Ornaments, radio, utensils, paintings, plant seeds, computer, binoculars, means of transport, Paithani, globe, handicraft items, farming tools, etc.

Object	Type of Museum
Ornaments	Culture Museum

List of Major Museums in Maharashtra

In Maharashtra, there are historical, artistic, cultural, and archaeological museums in cities like Mumbai, Pune, Chhatrapati Sambhajinagar, Nagpur, etc. For example, Chhatrapati Shivaji Maharaj Vastu Sangrahalaya (Mumbai), Raja Dinkar Kelkar Museum (Pune), Soneri Mahal (Chhatrapati Sambhajinagar), and Ter Museum (Dharashiv) are some of the major museums in Maharashtra.

Major Museums in Maharashtra (Urban and Rural) and Their Features

- **Mumbai:**
 - Chhatrapati Shivaji Maharaj Vastu Sangrahalaya (formerly Prince of Wales Museum) – Architecture and art objects
 - Dr. Bhau Daji Lad Museum, Ranicha Bagh – History of Mumbai
 - Reserve Bank's RBI Monetary Museum (Fort) – History of coins
- **Pune:**
 - Raja Dinkar Kelkar Museum – Historical and personal collection
 - Joshi's Museum of Miniature Railway (Kothrud) – Small railway models
- **Chhatrapati Sambhajinagar:**
 - Soneri Mahal (Dr. Babasaheb Ambedkar Marathwada University Campus) – Named Soneri Mahal because it previously had gold plating on the walls, ancient sculptures, coins, historical weapons, etc.
- **Nagpur:**
 - Ajab Bangla of Nagpur – Ancient idols, fossils, natural history.
- **Other Important Museums:**
 - Ter Museum (Dharashiv) – Archaeological objects from ancient Ter village
 - Paithan Museum – Paithani sarees and cultural objects
 - Sindkhed Raja Museum (Buldhana) – History of Jijau



Do you know?

- **Museum on Wheels:** The mobile bus of Chhatrapati Shivaji Maharaj Vastu Sangrahalaya travels to rural areas and holds exhibitions.

Chhatrapati Shivaji Maharaj Vastu Sangrahalaya

Located near Gateway of India in South Mumbai, Chhatrapati Shivaji Maharaj Vastu Sangrahalaya (CSMVS) is an important cultural center not only in Maharashtra but in India. Therefore, we are going to learn about this museum of Maharashtra in detail.

1. Historical Heritage

- **Establishment:** The foundation of this museum was laid in 1905 and it was opened to the public on 10 January 1922.
- **Former Name:** This was formerly known as 'Prince of Wales Museum of Western India'. In 1998, its name was changed to 'Chhatrapati Shivaji Maharaj Vastu Sangrahalaya'.
- **Use:** During the First World War (1914–1918), this building was used as a military hospital.



Figure 5.3: Chhatrapati Shivaji Maharaj Vastu Sangrahalaya

2. Architecture

- **Style:** This museum is an excellent example of Indo-Saracenic architectural style. A beautiful confluence of various unique architectural styles can be seen here.

3. Major Departments in the Museum (Galleries)

There are more than 60,000 artifacts here, which are mainly divided into four departments:

- **Archaeology Department:** Clay pots, ornaments from the Indus Civilization (Harappa and Mohenjo-daro), and ancient idols and inscriptions from the Maurya and Gupta periods.
- **Art Department:** Indian miniature paintings, costumes, ivory ornaments, and ancient idols and inscriptions from the Maurya and Gupta periods.
- **Natural History:** Preserved specimens of various types of animals, birds, and (stuffed) reptile remains.
- **Weaponry Department:** Personal weapons from the era of Chhatrapati Shivaji Maharaj can be seen here.

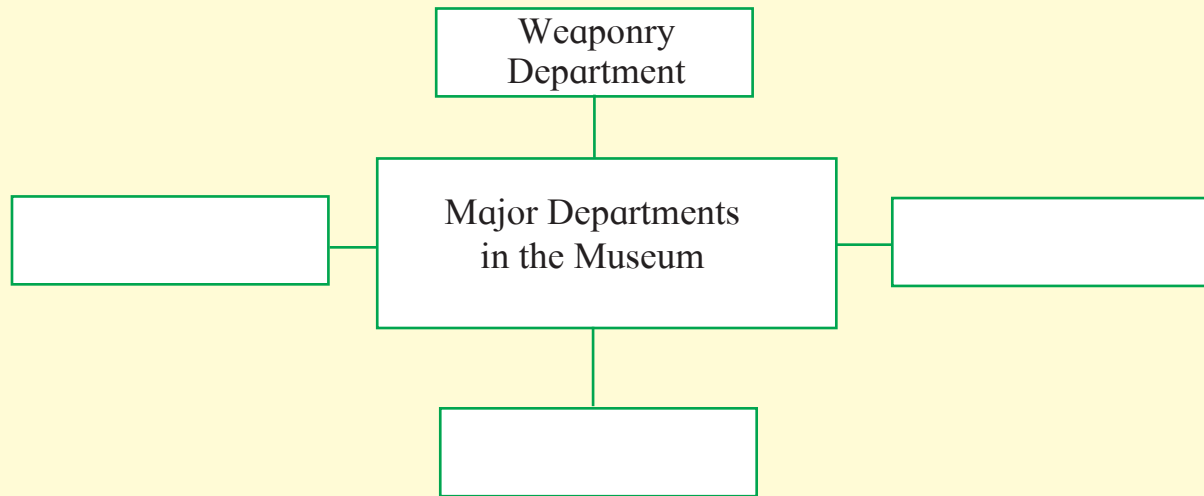
* **Indo-Saracenic Architectural Style :** A unique architectural style developed in India during the British colonial period. This style was used for public buildings, railway stations, palaces, and government offices. Learn more information about other such architectural styles.

4. Special Attraction for Students: Children's Museum

Mumbai's first independent museum specifically for children has been set up here, where various activities are organized to give scope to children's imagination.

Exercise

Question 1: Complete the diagram.



Question 2: Tell me, where am

1. Soneri Mahal: _____
2. Ranicha Bagh: _____
3. Paithani Saree: _____

Question 3: Give information about a museum you have visited.

Question 4: What is the use of a museum to us?

Activity 1 Creating a School Museum

'School Museum' means a specific place in the school where a collection of various ancient objects, pictures, replicas, and information about these objects is kept. Through these objects, it helps in understanding history, culture, science and social life.

Since the classroom museum is a students' project, care should be taken that it does not incur much expense and does not go beyond the students' reach. Students should request and bring old historical or other types of unique objects from their homes or from people they know, or they should take photographs of them.



Figure 5.4: School Museum

Necessary Preparation Before the Project

1. Observe the home and the surrounding area.
2. Make a list of at least 5 artifacts that seem old, unique, and interesting. For example: old coins, notes, utensils, phones, tickets, stone inscriptions, statues, tape recorders, manuscripts, old objects, old books, traditional clothes, etc.
3. If possible, gather information about old objects by using various media.

Importance of the Project?

- Understood what a museum means.
- Different objects in the museum can be identified.
- Understood what the objects are used for.
- The difference between rural and urban life is understood.
- We can create a small museum in our classroom.
- Information boards and information cards can be written.
- Information about objects can be given to friends and guests.
- Experience of working in a group is gained.
- Confidence increases.

Required Materials and Tools

FOR FREE DISTRIBUTION

Photographs of old unique objects, pictures, and artifacts available at the local level/surrounding area, empty box, display box, scissors, glue, colored paper, marker, sketch pen, brush and cloth to clean objects or pictures, equipment and materials for presentation, computer, mobile, and projector.

Important safety instructions

Our heritage is a source of pride and honor. It is everyone's duty to preserve it. Artifacts should be taken care of and handled carefully so that no damage occurs. While visiting a museum, avoid direct contact with artifacts (picking them up from their place, touching them, etc.). Because they are made from sensitive materials.

Please follow all instructions on the notice board in the museum.



5.5 Notice Board

Information on Necessary Matters Before the Project

Observe the home and the surrounding area. Make a list of at least five unique artifacts that seem old or interesting. For example: old coins, telephone, utensils, stamps, wooden carvings, furniture, stone carvings, inscriptions, caves or carvings on building stones or walls, ancient manuscripts, religious manuscripts, statues, radio, gramophone, camera, spectacles, sticks, ancient books, traditional clothes, etc. Visual Series: A group or series of visuals appearing one after another.

Activity 2 **Field Visit**

What is field visit?

A field visit is an activity in which we visit a place and gather information about its geographical, Cultural and Social aspects. We also observe and record important details during the visit.

Visiting a Museum

Visiting a museum can help us understand how to set up a School museum. If it is not possible to visit a museum in person. We can visit its website and explore the exhibits online. Some museums also offer virtual tours, which can be used for learning.

Virtual Tour : A series of connected views or scenes that allows us to explore a place digitally.

1. Preparation Before Visiting

- Planning: Finalizing the place of visit, time, and travel route, and taking prior permission (parents).
- Gathering Materials: Notebook, pen, pencil, scale, camera, and water bottle, etc.
- Questionnaire: Preparing questions beforehand to gather information from the museum. For example, "Which period do these objects belong to?" or "How are these preserved?"

2. Points of Observation

- Students should pay attention to the following aspects in the museum:
- Classification of Objects: Separate departments for coins, weapons, utensils, costumes, and pictures.
- Antiquity: The time period of the objects and which metal or material they are made from.
- Preservation and Conservation: What arrangements (e.g., temperature, light control) are made so that old objects do not get ruined.

3. Rules to Follow

- Follow the instructions of teachers or guides.
- Do not touch the objects in the museum, because they might get damaged due to it.
- Do not litter the premises and maintain silence.
- Keep a first aid kit along for sudden emergency situations.

4. Report Writing

After the visit, a report should be prepared based on the gathered information according to the following points:

- Name and address of the museum, date and time of the visit.
- List of important objects seen.
- Historical and geographical importance of the museum.

- General information about the museum.
- Photos or pictures of the museum, if possible.

5. Nature of Field Visit

A field visit is an important study method in geography and history. By visiting a museum, we can directly observe ancient objects, coins, weapons, and various artifacts. Because of this, it becomes easy to understand the topics learned in the classroom.



Figure 5.6 (a) Weapon's Museum



Figure 5.6 (b) Weapon's Museum

Activity 3

Our Area Our History

"Children, have you ever looked closely at an old banyan tree in your village, or a tree, or the fortification wall of an ancient building? It might feel to us that this is just a building of stone and soil, but in truth, it is a 'living proof' of history.

History is not just in the stories of kings and emperors in text books, it is also hidden in the old objects of our house, the copper-brass utensils preserved by grandparents, an ancient structure in our village, or even in an old well. Just like we celebrate our birthday and find information from birth till today through photos, exactly like that, our area also has a 'birthday', its own journey. Finding its information means studying the history of our area in a true sense.

A) Our Area: Come on then, today let's become a 'Little Historian' of our area and find out how our area was yesterday? And how it has changed today?

* Example: Pune City - It is known for its rich historical heritage and cultural diversity. Pune city's historical and cultural features are given below as an example:

1. Historical Features

Ancient Period: Pune's oldest period is found in the 8th century during the reign of the Rashtrakuta dynasty as 'Punyak' or 'Punya-Vishay'. Pataleshwar Cave is an excellent example of the architecture of this period.

Establishment of Swarajya: Chhatrapati Shivaji Maharaj and Rajmata Jijau laid the foundation for the development of Pune. The Maharaj's childhood was spent in Lal Mahal here.

Peshwa Period: In the 18th century, Pune became the center of power of the Maratha Empire. Shaniwar Wada, built by Bajirao Peshwa, is a symbol of the Peshwas' grandeur.

Freedom Struggle: Pune's contribution to the Indian freedom struggle is significant. Mahatma Gandhi was kept under house arrest at the Aga Khan Palace here. Also, Pune was the field of activity for freedom fighters like Lokmanya Tilak and Gopal Krishna Gokhale.

2. Cultural Features

Home of Scholars: Due to many renowned educational institutions, Pune is called the 'Oxford of the East'. Savitribai Phule Pune University is a major center among them.

Festivals and Celebrations: Lokmanya Tilak started the public Ganeshotsav festival from Pune. Even today, Pune's Ganeshotsav is world-famous.

Art and Music: Pune is a center of Indian classical music. Every year, the Sawai Gandharva Bhimsen Mahotsav is organized here.

Center of Social Reform: Through Mahatma Jyotirao Phule and Savitribai Phule, Pune witnessed a revolution in women's education and social reform. The first school for girls was started here at Bhide Wada. Social reformers like Agarkar and Karve have also worked here.

Important Historical Places :

Sinhagad Fort: Witness to the bravery of Tanaji Malusare.

Vishrambaug Wada: An excellent example of wooden carving work from the Peshwa period.

Raja Dinkar Kelkar Museum: A museum containing a treasure trove of rare objects.

B) Knowing the history of our family and locality

Understanding the history of our family and locality means the journey of our ancestors and the area where we live. Use the following guiding principles to understand our cultural and historical heritage.

1) History of the family :

Every family has a unique story. Do the following things to know the history of your family.

- **Dialogue with elders:** Talk to your grandparents or other elder individuals. Ask them about their childhood memories, past lifestyle, and family traditions to gather information.
- **Family Tree:** Create a family tree with names starting from your great-great-grandparents down to today's generation. This will give you information about your generations.
- **Old documents and objects:** Study old letters, photos, costumes, or old utensils used in the house. These objects give a glimpse into the culture of that time.

2) History of the locality :

Understanding the history of the village or city where we live is very interesting and enjoyable.

- **Historical places:** Visit forts, places of worship, wells, wadas, or monuments in your area.
- **Name of the locality:** Find information about how your village or area got its specific name.
- **Interviews:** Gather information about important events in the area from old and knowledgeable individuals living in the locality.

Exercise

1. Discuss the historical facts and cultural features of your village. Prepare wallpapers (posters).

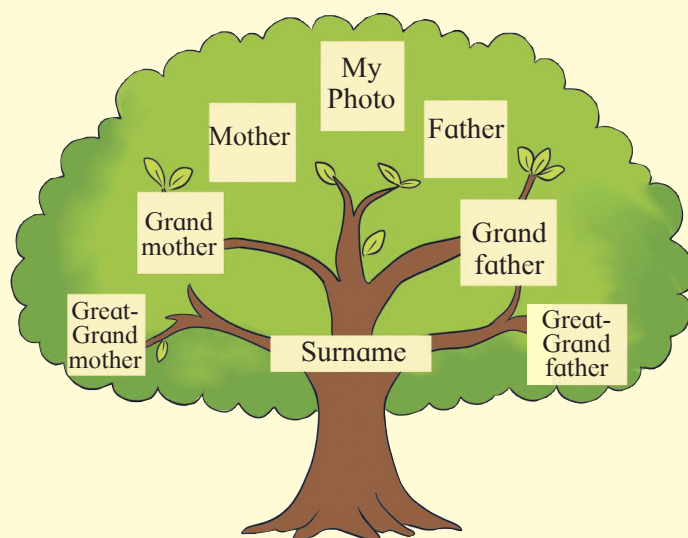


Figure 5.7: Prepare a Family Tree

2. Project: Prepare a family tree. (Paste photos and write full names.)

3. Gather information about heritage sites in your area. Prepare wallpapers / Collect pictures / Write stories.

4. Visit historical heritage sites in the district or taluka with teachers or elder family members and prepare a report.

Internet Safety: Take guidance from your teachers while using the internet. Stay alert and do not upload or download anything. Do not display any personal information on public platforms.

Remember: While visiting a museum, observe the layout of the museum and things carefully. Read information boards carefully. If possible, discuss your observations with experts (experts in the museum) and ask questions.

Identify the artifact and learn about it through technology

Using Google Lens

By using AI tools like Google Lens, you can search for information about objects as well as monuments. Just by focusing on them with a smartphone camera and using Google Lens, information about historical structures and famous places can be obtained, as well as art and culture can be understood. (Other apps can also be used to get knowledge related to virtual museum tours or old stamps and coins.)



Select one object for display in the school museum.

1. Prepare a timeline showing the history and developmental journey of this object.
2. Include in this which period that object was used in and if it is still being used today, then what it is used for.
3. Important events related to this can also be noted down. For example, grandparents brought it as a gift on some occasion and it was the first object of its kind in the village (for example, an old radio or camera).



Figure 5.8 An Old Radio

Virtual Museum Tour

You can take a virtual tour of museums in India on the website of the Ministry of Culture, Government of India (you can search using keywords like 'ministry of culture' + 'virtual museums'). An image of the website run by the Ministry of Culture, Government of India is shown here. To find more information about the museum's collection, use tools like Google Lens or similar Optical Character Recognition (OCR) tools.

Briefly explain how Google Lens helped in this tour.

Exercise

Question 1: Identify the artwork given in the picture using Google Lens and gather information based on the following points.



1. Name of the artwork:
2. Place/Location:
3. Style:
4. Subject/Theme:

Question 2: Guess who am I?

1. I am an old object used for giving light. I require kerosene as fuel. I am lit by lighting a wick.
2. I am an old object used for cooking. I require cow dung cakes, firewood as fuel.
3. I am an old tool used for grinding grain. I am made from two circular stones.

Question 3: Find out the history of ancient structures in your area by using Google Lens.

Activity 4

Selection of Artifacts for the Museum and Their Importance

When we think of a 'classroom museum' at the school level, deciding which objects should be included is a very important and responsible task. While selecting objects for the museum, we cannot select them just because they look nice; it is necessary to know the characteristics of that object.

When a group of students selects five objects for the museum, those objects should be such that something can be learned from them or they provide information about our culture. For example; if we select an old copper utensil, it gives information about the lifestyle of our ancestors. If a handicraft or painting is selected, the art and craftsmanship of that period can be understood from it. While selecting objects, it is important to discuss with classmates how old it is, what it is made of, and why it is important in today's times.

After selecting each object, giving its 'explanation' along with it is the most important step in this process. Because of the explanation, the visitor viewing it understands the context of that object. This should include where the object came from, what its name is, and why it is kept in the museum, explained in simple words. In short, a selection done with proper planning and care can transform an ordinary museum into a rich knowledge center. This makes us feel proud of our heritage and gives us the inspiration to preserve it.

Selection of Artifacts for the Museum

Form a student group to select artifacts in the group. Select objects in the group. Decide the set of objects for exhibition with classmates. Remember, you will have to select the objects carefully, and once the objects are selected, an explanation for them is necessary.



Figure 5.9 Old Coins

Every artifact is important, and even if all selected artifacts cannot be included in the final exhibition, we still learn something valuable about local history and culture.

Old Lantern of Railway



In earlier times, these lanterns were in the hands of guards or station masters. They were used to give signals for stopping the train or for proceeding ahead.

Figure 5.10: (a)

Old Mobile Phone



The journey of mobile phones is a huge miracle of technological changes. In the beginning, these phones were used only for voice conversations.

Figure 5.10: (b)

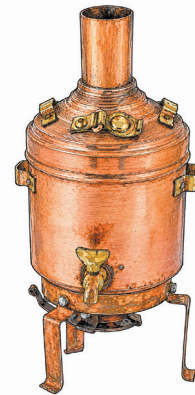
Camera from 1950



In 1950, memory cards did not exist, so roll film was used inside the camera.

Figure 5.10: (c)

Old Water Heating Boiler (Bamb)



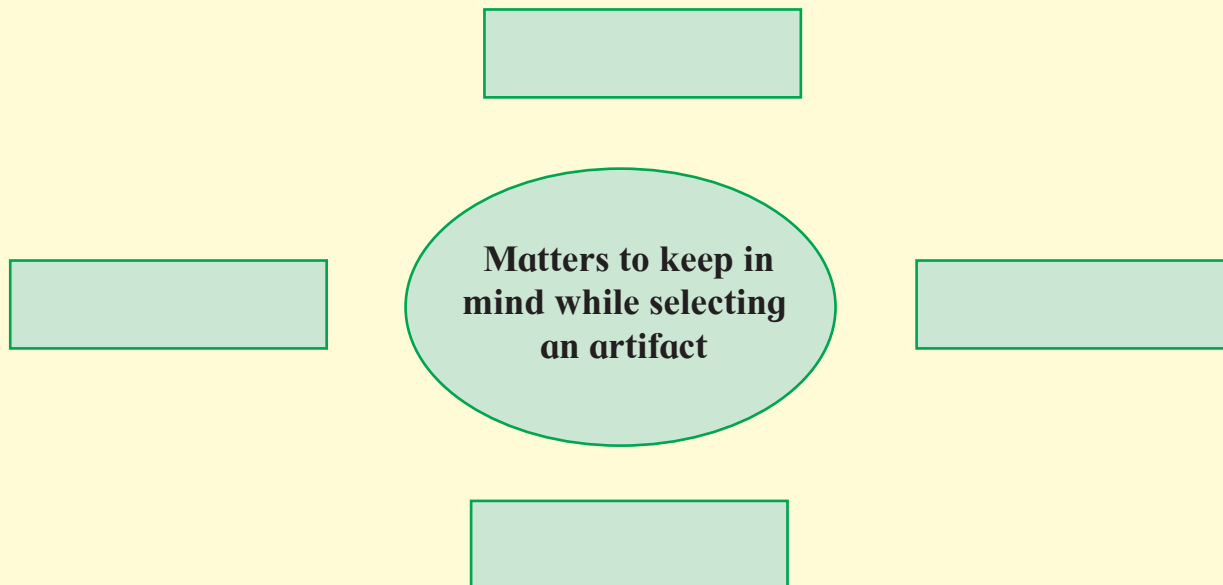
Before the arrival of electric geysers, this heavy, cylindrical device made of copper and brass was used for heating water.

Figure 5.10: (d)

Figure 5.10

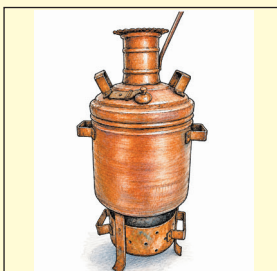
Exercise

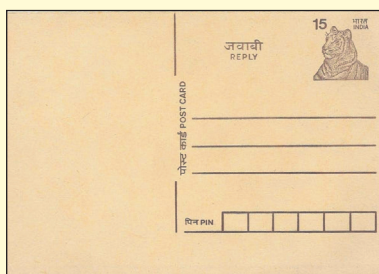
Question 1: Complete the chart.



Question 2: Identify the following objects and write their use.







Project: Collect old stamps, coins, and postcards and compile information about them.



Artifacts and objects kept in the school museum introduce us to our past history and culture. Therefore, it is necessary to keep those objects clean and safe. If proper care is taken, these objects last for a longer time and many things can be understood from them.

While cleaning objects, it is important to exercise caution. To prevent dust from accumulating, they should be wiped from time to time with a soft and clean cloth using gentle hands. While cleaning delicate objects, too much pressure should not be applied. Using water or chemical substances on certain objects is not appropriate, hence it is necessary to use the right method of cleanliness.

Arrangement of objects kept in the museum also needs to be well-organized. Giving a proper place to each object makes it easy for visitors to view them and also helps in protecting them better. To avoid the possibility of breaking, fragile or delicate objects must be kept in a safe place.

When objects in the museum are taken care of, they remain safe for the future period. Moreover, we get information about history, tradition, and culture through them. Therefore, cleanliness and safety, both these things, prove to be extremely important for the museum.

For example; it is necessary to clean copper and brass objects. A soft brush should be used to clean dust on wooden objects, and if there is an artifact like cloth, it should be hung carefully in a safe place, and it should be kept away from nails or any sharp objects. Photographs should be kept carefully inside an envelope of the right size, so care should be taken that they do not bend or go out of shape.

**Figure 5.11**

An old object made of brass and wood.

**Figure 5.12**

An old hand-made fan which is made from reused wool and cloth.

Exercise

Why should it be done like this? Tell.

- To clean objects in the museum, a brush or soft cloth should be used.
- Objects in the museum should be cleaned using the right method.
- Objects in the museum should be kept clean and safe.

Reading Old Documents or Translating Them

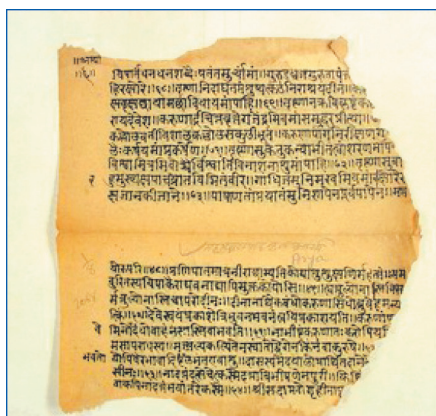


Figure 5.13 Old Document

AI tools like Google Lens, Microsoft Office Lens, Text Fairy, and Adobe Scan use Optical Character Recognition (OCR) technology to read text from pictures. These tools can be used to read old documents or to translate documents into a language you understand.

("This will help you if you need to add old documents to the museum collection.")

Follow these steps for this purpose:

1. Download and open Google app on your smart-phone.
2. Search for the Google Lens icon in the search bar and tap on it. This will activate Google Lens.
3. Place the camera over the text you want to read. Take care that the text appears clear and prominent. Use the highlighters that appear for selecting the required part.
4. Work according to your requirement.
 - **For reading:** Google Lens will automatically try to recognize the text and show it on your screen. This will help you easily understand the written text.
 - **To copy text:** Once the selected text is highlighted, select the **Copy** option. Tap on 'Copy' and the text will be copied to your clipboard. Later, you can paste it into other apps like Notes or Documents.
 - **For translation:** Tap on the Translate option at the bottom of the screen and select the language. Lens will show the translated text along with the text in the original language.



Figure 5.14 A photo showing text being read using a mobile phone.
A photo used for Modi script translation.

Do you know?

Text Fairy: This app is used to scan and edit text, and internet connection is not required for this.

Activity 6

Presentation Based on Artifact

Every artifact has a story or history behind it, and it is necessary to present it to every person visiting the museum. For this purpose, we should find out the story or create a story based on what we have gathered from people about the artifact. For this, we can make a video (especially for objects that we cannot bring to school, such as an interview with someone speaking about the history of the object) or a slide presentation can be prepared. Similarly, charts and colored pens can be used to make posters describing the artwork.



Translating Your Own Presentation

Various AI tools can be used to prepare audio presentations in other languages (For example: Bhashini Translate and Google Translate).

Bhashini Translate: Bhashini Translate is a suite of AI tools that can translate spoken words from one language to another language. It helps in translation, transcription, and writing in Indian languages. It enables users to communicate, obtain information, and create content in their preferred Indian languages.

Google Translate: Google Translate is a tool that instantly translates words, phrases, and web pages from English into more than 100 other languages.

Translating Your Own Presentation

Bhashini Translate

Activity 1: Access Bhashini:

Open a web browser on your computer or tablet.

Type 'Bhashini' in the search bar and press enter. Click on the Bhashini website link to access the tool.

Activity 2: Select your language:

Look for a section that gives you an option to select languages. Bhashini can translate many languages, so select the language you want to speak and the language you want to translate into.

Google Translate

Activity 1: Access Google Translate:

Open a web browser on your computer or tablet.

Type 'Google Translate' in the search bar and press enter. Click on the Google Translate website link to access the tool.

Activity 2: Select your language:

Just like Bhashini, select the language you want to translate from and the language you want to translate into.

Activity 3: Enter your text:

Find a space where you can write your sentence or you can speak. If you find typing more convenient, use the keyboard. If you wish to speak, make sure a microphone is available on your device and look for the microphone symbol.

Activity 4: Translate and listen:

Once you have entered your text, click on the translate button. If you are using voice input, wait for Bhashini to process your spoken words. After that, Bhashini will show you the translated text on the screen. If available, you can also listen to the translated version by clicking on the speaker symbol.

Activity 5: Experiment and explore:

Do not be afraid to try out different sentences and languages. Use Bhashini to see how it works in various situations. Explore different available features like changing the language direction or adjusting settings.

Activity 3: Enter your text:

Type or copy the sentence that we want to translate. There is also a microphone icon in Google Translate for voice input.

Activity 4: Translate and listen:

Click on the translate button to view the translated text. You can also listen to the translation by clicking on the speaker icon.

Activity 5: Search for additional features:

Google translate provides features such as conversation mode, which allows users to listen to translate conversations

Activity 6: Practice and have fun:

Practice translating sentences and enjoy discovering how these tools can open up the world of languages.

Exercise

Question 1: What can be done?

1. Translation needs to be done, but internet is not available.
2. Text needs to be read, but the language /text in it is not understood.
3. Found information needs to be saved.



Question 2: With the help of Google Lens, translate content from your mother tongue into other languages.

Activity: After visiting historical places, take photos of the script and manuscripts there and translate them.

Activity 7 Organizing an Exhibition of Artifacts

1. Under the guidance of teachers, organize an exhibition of artifacts in your school along with your friends. Fix a proper date and place for it. Ensure that the space is sufficient and large.
2. Work in groups with your classmates and take responsibility for five objects for the museum. Discuss how to describe each



Figure 5.13 Exhibition of Artifacts

- object briefly and then decide on the descriptive information boards for them. Discuss where their labels will be placed near the objects. (e.g., Will they be pasted on the display board or on charts near the objects?)
3. Arrange tables, stands, and exhibition boards properly. Ensure that the objects are displayed safely and are labeled.
4. Prepare posters, flyers, and social media posts to publicize the exhibition.
5. Send invitations to parents, relatives, friends, school staff, and community members. Invite your friends and families.
6. Organize the exhibition of artifacts as planned and collect feedback from guests, students, and teachers to understand what went well and what can be improved.

Keep a guest book for feedback and notes related to your presentation, about the artifacts in the exhibition, and for any feedback.



What did I learn from others?

- Planning to pay a visit to a museum.
- How to make a collection of artifacts?

Learning from Experts

Discuss with an expert person or a person working in a museum, and write down at least 3 things learned from it.

Watch a short talk or short film based on artifacts. This helps in understanding the life of people in ancient times.



What else can I do?

Discuss this project with your relatives in different cities or villages. Gather information about some unique artifacts in their homes or local area. If possible, bring an artifact or photograph to set up in your classroom museum.

Think and Answer

1. What did you enjoy doing?
2. What challenges did you have to face?
3. What different thing would you like to do?
4. How do museums help us in understanding our heritage and history?
5. What are the career opportunities related to this project? Discuss with teachers and parents and write your answer. (Some examples of work related to the tasks you recently performed include Archaeologist, Historian, Museum Curator, and Tour Guide.)

Time Required for the activities :

While collecting information for the school objects Museum, it is important to understand how much time each activity takes. You may need to visit the same place more than once. Estimate the time spend on each activity and record it in the table below. If you have completed more activities than those suggested in the book, add them along with the time taken in the table.

Activity	1	2	3	4	5	6	7	8
Time (in hrs)	—	—	—	—	—	—	—	—



Fireless Cooking



Fireless Cooking

This project helps in learning fireless cooking. Because of this, you will read various recipes and prepare delicious dishes using proper equipment and ingredients in the kitchen. Preparing food without using any fuel cooking without fire. (fireless cooking).

Objectives

Cooking without fire.

Deciding on an appropriate recipe.

Managing waste properly.

Preparing beverages.

Using tools and equipment, measuring ingredients, and preparing food items.

Organizing a food fair.



6.1 : Boys and girls working in the kitchen

When we think of cooking, the things that come to our mind are a gas stove, a charcoal stove, a traditional mud stove (chulha), or an electric stove. Preparing food using these tools produces smoke, ash, etc., which can cause irritation. However, preparing food to be equally tasty, nutritious, and attractive without using fire at all—how exciting is this concept!

We all enjoy eating food. Some people also love working in the kitchen. Cooking involves actions like boiling, steaming, baking, roasting, and frying. Because raw food is cooked, its color changes, germs within it are destroyed, the texture of the food items improves, and the food becomes easier and tastier to eat.

Many times, vessels or different types of stoves are used for cooking. Food is cooked because of the heat. Some dishes are prepared without cooking. Apart from raw fruits, some raw vegetables are also eaten, because it is not always necessary to cook them to make them edible. For example: cucumber, carrot, beetroot, radish, onion, fenugreek, and coriander can be eaten raw. Raw vegetables retain their nutritional value. When it comes into contact with heat, its nutritional elements can get destroyed. Raw vegetables are highly important for our health.

Preparing food without using fire or heat is an important method for a healthy diet. In this method, various food items are prepared using uncooked ingredients. This includes salads, smoothies made from fresh fruits, various recipes, as well as sweet dishes.

Similarly, awareness about food science increases and the habit of a balanced diet is formed. As a result, it helps in developing a healthy and robust lifestyle. Cooking by yourself brings joy and a sense of pride.

You must have learned about the various components, nutritional values, balanced diets, and related concepts of food in your science subject. Food that contains essential nutrients especially food obtained from raw fruits and vegetables helps keep the body and mind healthy.

Objectives

- Preparing fireless food items.
- Following hygiene rules.
- Preparing simple dishes.
- Proper management of waste.
- Working together in groups.

This project will help you understand the following things :

1. Using basic kitchen tools, utensils, and vessels properly.
2. Preparing tasty food items without using fire/fuel.
3. Arranging dishes properly to make them look attractive.
3. Disposing of the waste generated while preparing food in an eco-friendly way. For example: Soak pit, separate wet and dry waste.

Exercise:

Question : In the picture below, some children are seen working in the kitchen. Write the tasks to be done in the kitchen inside the circles.

Sorting/Cleaning
vegetables



My tasks in the kitchen

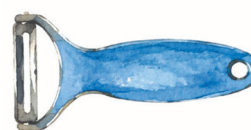
Let's identify the methods of cooking:



Boiling

Activity 1 Identification of Kitchen Tools

- **Chopping (Cutting) Board :** This is a flat-surfaced tool used for chopping vegetables and cutting fruits. Because of this, the kitchen platform does not get damaged, and the sharpness of the knife also lasts longer.
- **Measuring Cups and Spoons :** These Cups and spoons of various sizes are used to measure the required ingredients for food items in accurate proportion.
- **Grater :** This is a very useful tool in the kitchen. It is a perforated iron or steel kitchen tool used for finely grating vegetables, fruits, or other food items.
- **Peeler :** A peeler is a tool used for removing skins. It is a small kitchen device used to peel vegetables and fruits. Compared to peeling with a knife, work gets done very quickly with a peeler.
- **Whisk (Mini Mixer) :** This is a traditional wire tool used to blend ingredients together. It is used to whisk coffee, eggs, or curd in a small cup or bowl.



6.2 : Kitchen Tools

Handle tools carefully and safely

The correct use and handling of kitchen tools not only enhances the experience of cooking but also creates an awareness of safety and cleanliness. For example: handle sharp knives carefully, use a chopping board while cutting, always cut vegetables/fruits keeping them away from the body and keep fingers away from the knife blade while cutting.

To make a recipe successful, measuring cups and spoons must be used accurately. To avoid accidents, appliances like blenders and mixers must be operated under adult supervision. Just as cleaning the kitchen after cooking is important, properly cleaning the used tools is equally essential.



Precautions to be taken while preparing food items

1. Always wash your hands properly with soap before and after handling food.
2. Clean all the tools, fruits, and vegetables required for the recipe.
3. Wear an apron and a hair cap to cover your hair.
4. Exercise extreme caution when using sharp/pointed tools.
5. Do not rush or create a mess while cooking.
6. If any water or liquid spills on the floor while cooking, wipe it up immediately. Classify wet and dry waste and dispose it of properly.

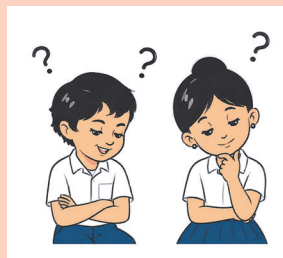


6.3 : Apron and Haircap

Exercise

FOR FREE DISTRIBUTION

- Swaraj finely chopped the coriander to be used for the salad and then put it in water. What was his mistake? State the correct method.
- Siya spilled water on the floor while cooking. What should she do?

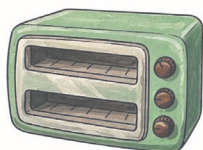


What is my use ? And what precautions should be taken while using me?









Find out the information

Talk to the elders in your home to find out what alternative kitchen tools were used when the modern appliances shown above were not available. (Example : Mixer – alternative tool was the grinding stone / Pata-Varvanta).

Activity 2 Recipe



A recipe means a set of rules that gives organized information about the ingredients and procedure required to make any specific food item. It includes the quantity of ingredients, the method of cooking, the time required, and some tips. By following a recipe, food can be prepared correctly and taste delicious.

1. Important things to do before choosing and making a recipe.

- Decide first which food item is to be made.
- Understand at what time a particular dish is usually eaten. For example: breakfast, lunch/dinner, sweet dish.
- Make a list of all the ingredients required for the food item.
- Decide how much of each ingredient will be needed.
- Check which tasks need to be done first. (For example: washing vegetables, chopping).
- Keep the necessary utensils and tools ready for preparing the food item.
- Estimate how much time it will take to make the food item.

Some easy methods can be used for preparing a recipe. Those methods are as follows:

- **Spreading soft ingredients:** Spreading butter or cheese on bread, as well as spreading chutney, sauce, ghee, or jam in a chapati roll; soft substances are spread evenly in this method.
- **Preparing food items by mixing ingredients:** Items like Bhelpuri, sprouted pulses chaat, Koshimbir (salad), various beverages, etc., are prepared by mixing different ingredients together.



6.4 : Simple methods of making recipes

Internet (Antarjal) Safety

While using the internet, take help from your teachers and parents. Take care that nothing is uploaded or downloaded without checking for safety. Do not share personal information anywhere.





2. Reading a Recipe :

A recipe includes ingredients and instructions for preparing a food item. A few recipes are given here. You can also search for recipes in recipe books or on the internet.

Before starting a recipe, it is essential to learn how to read it. Before starting, read the entire recipe from beginning to end, and ensure you have the correct proportions of all ingredients. Gather the required tools, appliances, and utensils. Complete each step according to the given order. If you come across an unfamiliar word, look it up in a dictionary or ask your teachers. How a food item looks is just as important as how it tastes.

Use some good tips to make the food look appealing. Use colorful ingredients to make the food item attractive. For example, if you are making a fruit salad, use fruits of different colors.

Arrange the prepared food items neatly. Do a little decoration (garnish). For example, garnish a plate of Bhelpuri by adding a little shav and fried peanuts, or decorate buttermilk by adding mint leaves. This will make it look wonderful and attractive.

You can search for photos of beautifully decorated food on the internet. For this, you can use the following keywords :

‘presentation + beautiful + dishes + food’ and

‘presentation + beautiful + dishes + food + Indian’.

Maharashtra’s food culture is tasty, nutritious, and full of diversity. It includes dishes with various flavors, among which Vada Pav, Misal Pav, Poha, Puranpoli, Modak, Thalipeeth, Bhakri, etc., are prominent. The use of grains like Jowar, Bajra, Wheat, and Rice, along with coconut, peanuts, and kokum, are also characteristic features of this culture.



6.5 : Food Items

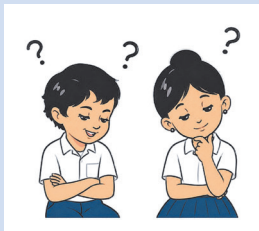


Paste a photo of a decorated recipe



Nutritious Diet, Healthy Thoughts

Exercise



1. Question: What should be done?

(1) Mother is going to be late coming home and you are hungry. Available ingredients: Farsan (savory snack mix), onion, tomato, puffed rice (Murmure), etc.

(2) The ingredients required to make a food item are given, but their quantities/proportions are not mentioned.

2. Question: Your grandmother knows how to make a specific dish very well. Why is it important to write down her recipe?

3. Question: Write a fun experience about the first dish you ever prepared!

My Recipe: A Unique Experience

4. Question: Find out what nutrients are present in this food item (Kairiche Panhe).

Name of the food items :

Nutritional contents :

Read and understand the given recipe carefully.

Recipe: Kairiche Panhe (Raw Mango Drink / Sherbet)

Ingredients: 2–3 glasses of water, 2 medium-sized raw mangoes, 1 cup sugar or jaggery, mint leaves, 1 tea spoon cumin powder, 1/2 tea spoon black salt, 1/4 tea spoon cardamom powder, ice cubes (as required).

Method: First, wash the raw mangoes thoroughly and peel off their skin. Grate the raw mango using a grater. Extract the juice from the grated raw mango, strain it using a strainer, and mix it into the water. Stir this mixture well. In the prepared mixture, add finely chopped mint leaves, sugar or jaggery, and black salt (to taste). Mix all the ingredients together thoroughly until completely dissolved. Place ice cubes in a glass and pour this tangy sherbet over them. Garnish the panhe with mint leaves and serve it to everyone.



Activity 3 Preparing Beverages

Beverages include various other drinks besides water, such as lemonade (limbu paani), buttermilk (taak), jaljeera, lassi, and kokum sharbat, etc. These drinks are mainly consumed to quench thirst, provide energy to the body, or to feel refreshed.



Recipe 1 – Making Buttermilk (Taak)

Curd is a naturally formed food item that has existed for thousands of years. It became popular primarily for its nutritional value and its long shelf-life, and gradually its consumption spread across the world.

Ingredients	Method
2 cups curd 2 cups water 1 teaspoon roasted cumin powder, salt to taste, mint leaves (if available)	- Combine curd, cumin powder, salt, and water in a deep container. - Churn continuously until it becomes a smooth, thin liquid. - After this, pour it into a glass and garnish by adding mint leaves.

Recipe 2 – Making Jaljeera

Find out information about various traditional beverages of Maharashtra and note them down. E.g., Konkan-Solkadhi.

Ingredients	Method
2 teaspoons jaljeera powder 4 cups cold water 1 teaspoon lemon juice 1 teaspoon finely chopped mint leaves 1 teaspoon finely chopped coriander 	- Take a deep vessel and combine the chopped mint leaves, coriander, jaljeera powder, and lemon juice in it. Mix all of these well together. - Add 4 cups of cold water to the large vessel and keep stirring until all the ingredients are instantly mixed. Use a blender for stirring. - Pour this mixture equally into glasses. Serve immediately for drinking.

Recipe 3 – Making Kokum Sharbat



Kokum (*Garcinia indica*) is a fruit found on the western coast, especially in Konkan. It tastes sour and sweet and is used in juices and various food items. It has antioxidant properties, and its many benefits include reducing body heat in summer, aiding weight loss, improving digestion, and benefiting the skin.

Ingredients	Method
• 10–12 dried kokum rinds • 4 cups water • Sugar or honey to taste • Cumin powder (if available)	• Soak the kokum rinds for 2–3 hours. • Strain the soaked kokum water into a glass. • Add sugar or honey to taste and keep stirring until completely dissolved. • Add cumin powder for extra flavor. • (Optional) Keep in the refrigerator to cool before serving.

Recipe 4 – Preparing Lemon Sharbat

Lemon is an excellent source of Vitamin C and antioxidants, which boosts immunity, improves digestion, and maintains good skin health. It also improves iron absorption.

Ingredients	Method
• 4 cups water • 1 lemon • ½ cup sugar (to taste) • Salt / Rock salt (to taste)	• Cut the lemon and squeeze out its juice. • In a container, add water, lemon juice, sugar, and salt, and stir until the sugar dissolves. • (Optional) Cool in the refrigerator for a while before serving.



Exercise

Tell my importance in the diet



Guess who I am?

- The pride of Ratnagiri is unique,
Wonderfully sour, astringent, and sweet,
A cooling companion in the summer heat,
As if it is a knot of divine nectar.

Activity 4 Sprouting Pulses

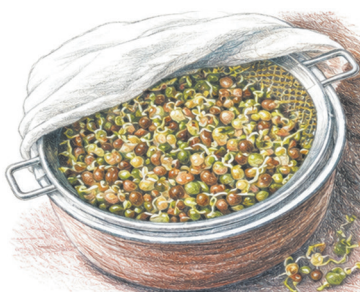
We soak some pulses (e.g., moong, matki, chana, masoor) and eat them after sprouting. Sprouted pulses are called ‘germinated grains’. This is a very simple process, and it increases the nutritional value of the grains.

- Sprouting pulses increases their protein and vitamin content. Due to the germination process, complex nutritional components are converted into simpler components. This makes the pulses easy to digest. ‘Vitamins’ required by the body are obtained in abundance from sprouted pulses.
- Three things are required for seed germination: water (moisture), air, and appropriate temperature (warmth). Because there is no water in dry pulses, their dormant state does not end. When we soak them, only then does the chemical process start, and germination takes place.
- Germination is a biological process; it requires a specific warm temperature. In winter, because the temperature is low, this process slows down, whereas in summer or the rainy season, pulses sprout quickly due to the warm climate.

Pulses can be sprouted by using any of the following tools or methods.

1. Cotton Cloth :

Keep the soaked pulses loosely tied in a wet cotton or muslin cloth. This cloth should be kept in a warm place or in an empty container.



6.8



6.7

2. Steel Strainer / Sieve :

Spread the soaked pulses in a steel strainer and cover it with a wet cloth or a plate. This keeps the air circulating and prevents the pulses from becoming sticky.

3. Sprout Maker :

This 3–4 compartment plastic device is available in the market. Water is kept in its bottom section, and soaked pulses are placed in the upper compartments. In this, different types of pulses can be kept for sprouting at the same time.



6.9

4. Glass Jar :

Fill the glass jar with soaked pulses and tie a thin cloth over its mouth with a rubber band. Keep the jar lying horizontally.



6.10



6.11

5. Casserole or Hotpot :

In winter, when sprouts do not appear quickly, wrap the soaked pulses in a wet cloth, place them inside a 'hotpot', and close the lid. Due to the warmth inside, sprouts appear quickly.

Tell

- 1) What if we use another cloth instead of a cotton cloth for sprouting?
- 2) Is a sprout (plumule) a root or a leaf?



Activity: 1 Sprouting Pulses

Materials	Method
• $\frac{1}{2}$ cup available pulses (e.g., green gram, moth bean, chickpeas, black gram) • Water • Cotton cloth	• Clean and wash the pulses with water. • Keep different pulses in separate containers. • Take water in the containers and soak the pulses overnight. • Place the soaked pulses on a damp cotton cloth. • Sprinkle a little water on it. • Cover the pulses with the cotton cloth and keep them in a container. Cover it loosely so that there is free air circulation for sprouting. • Check the cotton cloth from time to time. If it feels dry, sprinkle a little water so that it remains damp. • It will take at least 12 hours for the pulses to sprout. You will see small sprouts emerging from each soaked pulse. • Once the sprouts appear, keep them in a pot. They are now ready to be used in your salad.

Sprouted pulses contain an abundance of proteins, fibrous substances (fiber), vitamins (especially folate), and minerals, which improves digestion. Weight remains controlled. Blood sugar levels are regulated. Immunity increases, and heart health remains good. Due to sprouting, pulses become easier to digest, and the body absorbs nutrients much better.



6.12

Exercise

1) Think about it :

- Sameer soaked green gram (moong) and kept them in a container, but he placed that container inside the refrigerator. Will the green gram sprout the next day? Explain why or why not.
- Reina's sprouted pulses became sticky the next day and started emitting a strong, unpleasant foul odor. What mistake might she have made in the process? What should she have done to avoid this?
- Are sprouted pulses 'living or non-living'? If we dry the sprouted pulses again, will they germinate/grow again? Explain.

2) Word Puzzle of Pulses :

- A white-colored pulse with small black eyes.
- A highly nutritious green pulse used for making khichdi.

Do the following activity.

- Study the process of sprouting pulses, observe the changes, and keep a record of your observations.

Activity 5

Chopping and Mixing : Preparing a recipe that does not require cooking



Now let's make food items that only require chopping and mixing. Ready-to-eat fruits and vegetables can be chopped and mixed with salt, lemon juice, and other ingredients to make delicious food items!

Remember: The more finely vegetables and fruits are chopped, the greater the surface area exposed to air. As a result, vitamin C and vitamin B may be destroyed by oxygen present in air.

Recipe 1 – Making Salad

Ingredients	Method
• 3 cup of any available chopped vegetables. • 1/4 cup oil • 2 teaspoons lemon juice • 1 teaspoon honey • Salt and black pepper powder to taste	• Wash all vegetables and chop them into small pieces. • Chop cabbage leaves into small pieces. • In a small bowl, mix oil, lemon juice, honey, salt, and black pepper powder together. • Blend the mixture well, check the taste, and adjust the ingredients according to taste. Mix the vegetables and the mixture together in a large container. 



6.13

Recipe 2 – Making Fruit Chaat

Ingredients	Method
• 3 cups of locally available fruits (e.g., apple, grapes, orange) • 2 tablespoons lemon juice, honey and sugar (if available), chaat masala to taste 	• Wash the fruits and cut them into small pieces. • Put the chopped fruits into a large container, sprinkle lemon juice on them so that their color does not fade, make it sweet by adding honey or sugar, and spread chaat masala over the prepared mixture according to taste. • To mix well, blend gently using a light splash of water.

Fruits provide essential vitamins, minerals and fiber to the body. This improves digestion and boosts immunity.

Recipe 3 – Making Bhel

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Ingredients	Method
• 2 cups puffed rice (murmure) • ½ cup finely chopped onions • ½ cup finely chopped tomatoes • ¼ cup finely chopped coriander • ¼ cup sev or roasted peanuts • Chaat masala to taste • Salt to taste • Farsan as required • Tamarind-jaggery chutney • 2 teaspoons mint chutney (optional)	• Wash and chop the onions, tomatoes, and coriander. • In a large container, mix the puffed rice, farsan, chopped onions, chopped tomatoes, and chopped coriander together. • Add chaat masala and salt, and check the taste. • Add tamarind-jaggery chutney and mint chutney to the bhel as per requirement (optional). • Blend all ingredients well together. • Before serving sprinkle the sev or roasted peanuts.

Recipe 4 – Preparing Sandwich

Ingredients	Method
• 8 sandwich bread slices • 2 tomatoes • 2 cucumbers • 2 teaspoons butter • Salt and black pepper powder • Tomato sauce • Mint chutney 	• Clean and wash the tomatoes and cucumbers, and cut them into thin, round slices. • Apply butter, tomato sauce, and mint chutney on all the bread slices. • Arrange the slices of tomato and cucumber to make layers according to preference. • Sprinkle salt and black pepper powder to taste. • Cover with another slice of bread. • Cut the sandwich into your desired shape.

Do you know?

To make bread, a soft mixture is first prepared by mixing water, yeast, salt, and a little sugar into maida (refined flour) or wheat flour. When this mixture is thoroughly kneaded (and kept in a warm place for some time), the dough rises beautifully due to the action of the yeast. After that, this risen dough is given the desired shape, placed into bread molds, and allowed to rise again for a short time. Finally, these molds are baked in an oven at a specific temperature. Because of this, the bread gets a golden color on the outside and a soft, porous texture on the inside.

Exercise

1. Question : Brain Teaser

1. If vegetables are chopped very finely while making a salad, does it affect their nutritional components or not?
2. There are red, green, yellow, and purple colored vegetables in your salad bowl. Learn about the nutritional components according to each color.

2. Question: Salad and Fruits Word Puzzle

T	O	M	A	T	O
C	A	R	R	O	T
G	R	A	P	E	S
L	E	M	O	N	B
A	P	P	L	E	V
W	A	T	E	R	M

3. Question: Guess who I am?

- I am red in color and sweet in taste, who am I?

.....

- I provide essential vitamins and minerals to the body, who am I?

.....

4. Question: Interview a bhel puri vendor in your locality and prepare a report.

Activity 6

Combining various food ingredients to prepare a dish.

After the actions of chopping and mixing while preparing a recipe, the next step now is to ‘combine’ ingredients. Combining ingredients means taking ready-to-eat food components and preparing a distinct dish from them.

The dishes prepared through this activity of combining are as follows: Koshimbir, sprouts chaat, bhel puri, coconut chocolate balls, types of raita, and sandwich etc.



Recipe 1 – Preparing Koshimbir

Ingredients	Method
• 1 cup soaked moong dal • ½ cup grated carrot • ½ cup cucumber cut into small pieces • 1–2 finely chopped green chilies • Finely chopped coriander • Salt, lemon juice, sugar to taste	• Wash and soak the moong dal for 30 minutes. • Wash the vegetables to be used cleanly. • In a bowl, combine the soaked moong dal, grated carrot, finely cut cucumber, green chili, and coriander. • Add salt, lemon juice, and sugar to taste, and mix well together.



Recipe 2 – Preparing Shrikhand

Ingredients	Method
• 3 cups thick yogurt • 2 cups powdered sugar • ½ teaspoon cardamom powder • Saffron (optional) • Cashew and almond slices for decoration (optional)	• Tie the yogurt in a cotton cloth so that excess water drains out (after about half to an hour). • In a bowl, mix the hung curd, powdered sugar, and cardamom powder until completely smooth and well combined. • Add saffron for flavor. • Decorate with cashew and almond slices before serving.

Recipe 3 – Making Ladoo from Coconut and Chocolate

Ingredients	Method
• 1 cup grated or scraped coconut • ½ cup thick condensed milk • 3 tablespoons cocoa powder • ½ teaspoon vanilla extract • Extra grated coconut or cocoa powder for rolling (optional) • Bowls for mixing and serving	• In a bowl, combine the grated coconut, thick milk, cocoa powder, and vanilla extract. Mix all ingredients well to form a sticky mixture. • Divide the mixture into small portions and roll them into round ladoos between your palms. You can make them into any shape you want, but generally, they should be small. • If desired, roll the ladoos in extra grated coconut or cocoa powder to coat them evenly. • Place the coated, prepared ladoos on a plate or tray. • Keep the balls at room temperature for at least 1–2 hours. This will make them slightly firm and easier to handle. • Once they dry, your coconut chocolate ladoos are ready!



Do you know?

Chocolate is a popular food item made from cocoa beans. It is used in candies, sweets, and beverages. Its history lies in ancient Mesoamerica. Dark chocolate contains antioxidants and energy-boosting properties. This can be beneficial for sleep and concentration. However, eating dark chocolate that has more cocoa and less sugar is beneficial.



6.14: Chocolate

Exercise

Question 1: Brain Teaser

1) Guess who I am :

- I am made from milk and am used to prepare Shrikhand, who am I?
- I am a bean used in chocolate, cocoa is made from me, who am I?
- I am soaked and used to prepare chaat, who am I?

Question 2 : Rearrange the following scrambled letters to identify the correct name :

1) L A S A D -

2) D N A H K I R S H -

3) T U N O C O C -

4) T A L O C O H C E -

5) T O R R A C -

• Additional recipes for extra information :

- 1) Dahi Pohe
- 2) Peanut Ladoo
- 3) Dates and Dry Fruits Mix
- 4) Carrot Stick Salad

Find the recipes and try making them:

Various types of Raitas, for example: Boondi Raita

Did you know?

Have you noticed thick and thin black lines on the back of any food packet?

This is called a bar code. This code contains information that can be read by automated machines. Mobile apps like Google Lens can be used to scan and read this bar code to quickly find information related to the ingredients, nutritional values, and expiry dates of the food item.



Activity 7 1. Kitchen Measurements

You might have discussed standard and non-standard units of measurement in your science class.

While cooking, both standard and non-standard units are commonly used to measure ingredients. Understanding these measurements will help maintain accuracy in your culinary preparations. For example, a pinch of sugar (non-standard measurement) and 10 grams of flour (standard measurement).

If a weighing scale or measuring cups are not available in the kitchen, common kitchen items like cups, tablespoons, and teaspoons are used to estimate the quantity of food ingredients.

Some examples of measuring the volume of liquids are given below:

- A cup can hold about 250 ml of liquid.
- A 1-liter drinking water bottle can be used to estimate one liter of any liquid.



6.15 : Spoons

While preparing a recipe, it is good to have a brief idea of how much volume (liters) or weight (grams) an ingredient can fit into a cup or a small spoon. Cups and kitchen weighing scales are used to measure various types of ingredients (liquids and solids).

Using a kitchen weighing scale to measure the quantity that can fit in a cup, tablespoon, or teaspoon helps in choosing the ingredients in the correct proportions.



6.16 : Traditional tools for measuring grains



6.17 : Weighing Scale

Exercise

Question 1: Guess who I am? (Unit or Measurement)

1. I am the smallest unit of measurement in the kitchen. I am used to measure chili powder, salt, and turmeric. Sometimes I am small, and sometimes I am large.
2. I do not need weight to be measured, I only need a number. When you ask for 12 bananas or 12 eggs together, you address me.

Question 2: Learn about me



Question 3 : Measure the ingredients in the table below and complete the table.

Ingredient	Quantity in grams/liters	1 Cup	1 Spoon (Teaspoon)	1 Table Spoon
Honey				
Lemon juice				
Finely chopped cucumber				
Flour (Atta/Maida)				

Activity : 7.2 Food Storage

To preserve various food items, different cleaning and storage methods are required. Proper storage is essential to keep food items fresh and prevent them from spoiling. For example, grains must be dried and stored. To save grain and peanuts from pests and moisture, they must be kept in airtight containers. Similarly, spices and medicinal plants must be kept away from heat and light in airtight containers. If you have many items, you can apply labels to them to avoid confusion.

In India, traditional (clay granaries, gunny bags, bamboo baskets) and modern (silos, metal containers, warehouses) methods are used for storing grains. The grain is protected from insects and fungi through measures such as mixing dried neem leaves in it, drying it in the sun, and maintaining cleanliness. Farmers use these methods at the household level.

Traditional Methods :

- **Neem** : Dried neem leaves are mixed into grains; these have natural insecticidal properties.
- **Clay Bins** : In rural areas, rectangular or circular clay bins are used.
- **Gunny Bags** : Storage is done in jute or plastic-lined gunny bags.
- **Bamboo and Wooden Structures** : Structures built on bamboo or wooden pillars (e.g., Bukhari, Morai, Granary) are used for grain storage. Being elevated from the ground, they protect against moisture and pests.
- **Underground Storage** : In some places, underground storage of grain is practiced.



6.18: Traditional means of storing grains

Traditional Methods of Preserving Food (Food Preservation)

Method	Example	Features
Drying	Dry chilies, dried fish, dried vegetables, kurdya, papad	By drying in the sun, moisture content is reduced, which makes food last longer.
Using salt	Pickles	Salt prevents bacterial growth.
Using sugar	Jam, muramba, jelly	Sugar keeps food safe.
Storing in oil	Mango pickle, lemon pickle	Oil reduces the effect of air and germs on food.
Smoking	Fish or meat	Smoke helps food last for more days.

Table 6.1

Modern Methods

- **Metal Containers / Silos** : Steel and aluminum containers and large silos are used for grain storage. These are fire and moisture resistant.
- **Cover and Plinth Storage** : Grain bags are kept on an elevated platform above the ground and covered with polythene.
- **Government Warehouses** : The Food Corporation of India (FCI) and Central/ State Warehousing Corporations store grain on a large scale.

Modern Methods

Method	Food Item	Features
Refrigeration	Fruits, vegetables, milk	Food is stored at a low temperature in the refrigerator.
Freezing	Meat, ice cream, frozen vegetables	Food is frozen at a very low temperature.
Canning	Fruit juices, soup	Food is packed and sealed airtight in cans.
Bottling	Sauces, syrups	Food is packed and sealed airtight in cans.
Vacuum Packing	Papad, dry fruits	Food is preserved by removing air to create a vacuum packaging.
Use of Preservatives	Biscuits, beverages	Chemical substances are used to make food last for a longer duration.

Table 6.2

Exercise

Questions:

1) Understand the difference:

Packets of food items available in the market are filled with air. On the other hand, we store homemade papads and vadis in containers. Which air/gas is present in those market packets, and what is its purpose?

2) Think and tell:

In summer, your mother makes raw mango pickle. What ingredients does she use to preserve this pickle for the whole year? Why doesn't the pickle spoil because of these ingredients?

3) Why is grain dried thoroughly in harsh sunlight before storing? What will happen if the grain remains damp or wet?

Activity 8 Waste Handling and Management

Sorting kitchen waste into different dustbins is an effective way to responsibly manage and dispose of kitchen waste. Organic waste can be collected separately and used for composting to make nutrient-rich soil for gardening or vermicomposting. Alternatively, various composting systems can be set up for its independent disposal. Local guidelines and rules must be followed for waste segregation and disposal. Bottles, jars, and other food trays (reusable after checking) should be disposed of separately as empty items. Clean cardboard, newspapers, magazines, and paper packaging can also be reused or recycled.



6.19

Plastic recycling symbols consist of a triangular symbol made of three arrows with a code from 1 to 7 inside it. This indicates the type of plastic and whether it is suitable for recycling. For example, 1 (PET) and 2 (HDPE) are highly recyclable, whereas 7 (Other) is usually not. This symbol helps categorize waste for proper processing, e.g., plastic bottles (PET), plastic containers (HDPE) etc.

Types of Symbols and Meaning:

1. **(PET/PETE - Polyethylene Terephthalate)** : Used for soft drinks, water, and food bottles. This is the most highly recyclable type.
2. **(HDPE - High-Density Polyethylene)** : Used for milk, detergent, and shampoo bottles. This is also suitable for recycling.
3. **(PVC - Polyvinyl Chloride)** : Used in pipes and window frames. Recycling this is difficult.
4. **(LDPE - Low-Density Polyethylene)** : Used for plastic bags and bottles. Recycling these is possible in some places.
5. **(PP - Polypropylene)** : Found in yogurt cups, straws, and medicine bottles. This can be recycled.
6. **(Ps-Polystyrene)** : It is used in products such as thermocol and disposable cups. Its recyclability is limited.
7. **(Other : Other mixed plastics)** : Baby's plastic milk bottles, mobile covers recycling these types of plastic is extremely difficult.



Wet Waste



6.20: Types of Symbols



Dry Waste

Exercise

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Questions:

1) Observe the waste in your house and complete the table below.

Type of Waste	Source (Where did it come from?)	Proper Method of Disposal
Vegetable stems, fruit peels	Kitchen	Composting by digging a pit in the garden
Empty medicine bottles		
Damaged mobile		
Eggshells		

2) Prepare slogans on the topic of 'Waste Management'.

Did you know?

Compost fertilizer means natural and high-quality fertilizer prepared by decomposing organic waste from agriculture (e.g., dry leaves, vegetable remains, cow dung) with the help of microorganisms. It increases soil fertility and can be easily made at home or on a farm at low cost. The process of preparing this fertilizer is called '**composting**', in which waste is managed and converted into nutrients.

What is Compost Fertilizer?

- **Definition** : Compost fertilizer means fertilizer prepared by decomposing agricultural dry leaves, cow dung, straw, vegetable remains, and other organic waste with the help of microorganisms.
- **Process** : This process is called composting, in which the decomposition of organic matter takes place with the help of oxygen (aerobic).

Activity 9 Organizing a Food Fair

A school food fair is an event organized for students, teachers, and parents where stalls featuring various types of dishes, traditional items, and nutritious food are set up. This provides students with practical knowledge and financial awareness, along with a glimpse into different culinary cultures. These programs are also known as 'Bal Anand Mela' (Children's Joy Fair) or 'Food Festival'. In this event, students experience the process of financial transaction by making and selling food items themselves.

Preparation Before Organizing a Food Fair :

1. Planning:

- Deciding the date, time, and venue of the fair.
- Deciding which food items to make and sell.

2. Forming Groups:

- Forming groups of students.
- Assigning the responsibility of making different food items to each group.

3. Making a List of Materials:

- Making a list of all required materials like tables, vegetables, spices, plates, spoons, etc.

4. Expense and Budgeting:

- Estimating the cost required for each food item.
- Fixing the price.

5. Pre-arranging Cleanliness:

- Arranging clean utensils, drinking water, and proper management of waste generated during the fair.
- Keeping the food clean and safe.

6. Stall Setup:

- Arranging tables, banners, or nameplates.
- Displaying food items in an attractive manner.

7. Promotion (Advertising):

- Informing people about the fair through posters, notices, or announcements.

8. Distribution of Responsibilities:

- Dividing work appropriately, such as handling sales, distribution, and cleanliness during the fair.



6.20

Learning from Experts

- Meet an expert or visit food shops in your locality and observe how they work. Write information about at least three food items you learned about from them.
- Visit local food fairs or exhibitions.
- Watch talk shows or short films related to food and culture. This helps in understanding the lifestyle and food habits of people in earlier times.



What Else can I Do?

Discuss this project with your relatives living in different cities or villages. Gather information about unique recipes prepared in their homes or regions. If possible, try preparing one of those recipes yourself.

Think and Answer

1. What did you enjoy doing the most?
2. What challenges did you face while carrying out the activities?
3. Which recipe would you like to prepare for guests visiting your home?
4. What are the benefits of learning how to prepare recipes?
5. Find out about the occupations and jobs related to this projects.

Time Required for the Activities

While learning recipes and collecting information, it is important to understand how much time each activity takes.

You may need to visit the same place more than once.

Estimate the time spent on each activity and record it in the table below. If you have completed more activities than those suggested in the book, add them along with time taken.

Activity	1	2	3	4	5	6	7	8
Time (in hrs)	—	—	—	—	—	—	—	—

- **Internet Safety**

Take your teacher's help while using the internet. Be cautious and do not upload or download anything without verifying its safety, and do not disclose your personal information anywhere.

Exercise

Questions:

1) To ensure that the maximum number of children buy 'Nutritious Bhel or other recipes' from your stall, prepare an attractive advertisement banner.

2) Where can we use the following lines? Think about it.



Clean hands, a delicious bite,
Health will flourish bright.

Say no to plastic,
Connect with nature.

Filled with love in every
taste, A healthy,
nutritious body is made.

Moth bean (Matki) bhel, a
perfect match with health.

Thanda thanda, cool cool,
Lemon sharbat is beautiful.

3) Write about your experience regarding the food fair organized in the school.

4) Prepare an expenditure budget for selling food items at the food fair organized in the school.

APPENDIX 1

Sample Project Outline

Accurate planning to achieve the objectives of the selected project, proper understanding of the objectives, and activities that keep students engaged while reaching those objectives are extremely important. Such a project is not just limited to books, but connects to the real life of students.

While designing a project, the following points must be included :

1. The specific objective of the project and what will be achieved through it must be known.
2. What is the importance of the project? And its relationship with the real world.
3. Are the required materials, tools, instruments, and raw materials easily available?
4. What safety rules must be followed while preparing the project?
5. Keeping records of surveys and field visits conducted during the project.
6. Completing the given activities systematically and in groups.
7. Interacting with individuals concerned with the subject or experts.
8. Properly evaluating the things learned from the project.

Project Name and Its Brief Introduction

The project name should be simple and attractive. The outline of the project's objective should be apparent from that name.

1. Importance of the project.
2. Explain the correlation of the project with the students' daily life, education, or community.
3. Elaborate on the benefits of the project.
4. Explain how the project will be useful in solving problems of everyday life.
5. Elaborate on the practical application and potential impact of the project.

What can I do?

For each project, objectives aligned with the curricular goals, class-wise competencies, and learning outcomes must be determined. Activities should be designed to fulfill these objectives.

Define two or three objectives in simple words that students can understand. These objectives indicate what the students will be able to do at the end of the project. Students should be able to answer the following questions :

1. What will you be able to do at the end of the project?
2. What will you learn?

Requirements

The materials and tools required for the project must be easily available from the surrounding environment. Students must understand what is required for the project.

Students should be able to state the basic information about the materials, tools, and implements required for this.

Safety of Self and Others

Safety is an extremely important part of the project. This section should include all safety measures to be taken during the project, which also includes cyber security and internet safety measures. Students should wear appropriate clothes while doing agricultural work / outdoor activities in nature, e.g., full-sleeved clothes, pants, and sturdy boots.

Safety measures related to the use of tools, materials, equipment, and the internet must be explained clearly.

Students should be able to answer the following questions :

1. How will you keep yourself and others safe during the project?
2. What will you do to ensure that no one suffers physical or mental harm?
3. How will you take care of the safety of plants and animals as required?
4. How will you maintain privacy? (Meaning, not giving anyone's information to others without their permission.)
5. What will you do to keep yourself safe on the internet?

What do I need to know?

Before starting a project, it is necessary for students to acquire some prior knowledge. It is essential to explain the proper use of tools and materials through practical activities, study the environment, and develop basic skills related to the project.

Clearly define the roles and responsibilities of all participants, and give everyone their work. explain what it is and how they are participating in the project.

Students should be able to answer the following questions :

1. Do you need to learn anything before starting the project?
2. Do you need to meet an expert to learn how to do the activities related to the project?
3. Is there a need to gather some information related to the project in your area?
4. Before starting the project, will you have to conduct a survey, a field visit, or something similar?

What will I need to do?

To complete the project, it is necessary for students to complete various activities. Prepare questions that prompt thinking about what needs to be done for the activities to be completed successfully, and then record the information related to the project.

Students should be able to do the following things :

1. Work according to the project plan and complete the task according to the given schedule.
2. Use appropriate tools while working, observe others to understand their techniques and skills, and grasp proper and effective methods of work.
3. Check progress regularly and make changes as necessary.
4. Keep a record of all activities and the difficulties encountered during them.
5. Keep records of experiences, success, and difficulties encountered while working. The reference of these records will be useful while working in the future.

While completing each activity, students can be asked the following questions :

1. Which materials did you use and how did you use them?
2. Which tools did you use and how did you use them?
3. Which process did you follow? For example, selection of materials/ tools, sequence of tasks, and how did you complete each task?
4. If you have collected information/items, describe them and clarify why they are useful.

5. If you have prepared something, include its photo or sketch.
6. If you have planted a sapling, keep a record of its growth.
7. What safety measures did you take while performing the activity?
8. Did you use any AI tools? If yes, which ones did you use and how did you use them?
9. Did you share the results of your project with people outside the school? Describe the planning of your work and how you implemented it.
10. Did you do anything to keep the environment clean or to recycle waste? Record its details.

What did I learn from others?

Learning from others is an important part of a project. Therefore, students should reflect on what they learned from others. This will improve their life skills, broaden their understanding, and help increase the overall success of the project.

Interacting with others develops communication skills in students, allows them to present ideas, and enables them to work in coordination with others. Various perspectives and ideas come forward, which allows students to learn from others' viewpoints. This helps them look at problems in a new way and increases their creativity and problem-solving skills.

Receiving more information about that particular field from workers, experts, professionals, etc., in the field of work helps improve their way of working.

Students should be able to identify what they learned from field visits, online and offline interactions with experts, family and friends, people in society, and other sources. They should be able to answer the following questions :

1. What did you learn from the field visit, interaction, video lectures, or experts?
2. What did you learn from your friends? Did you help them in any way?
3. What did you learn from family members, siblings, and elders in society?
4. What did you learn from the people in society?

What did I do and how much time did it take?

To develop the ability to plan work according to a schedule, it is necessary for students to consider each task they performed and the time taken for it while doing the project. While working, students must keep a record of the sequence of activities and the time taken for each activity. This task can be done while performing the activities or at the end of the project.

Students should be able to answer what they did and how much time it took to plan and implement the activities.

What else can I do?

Students should think about how they can apply the learning gained from the project in other places, especially outside the school. For example, students can participate in workshops, coding classes, exhibitions, or fairs. They can use the knowledge and skills learned while completing the project at home and in the outside world.

They will be able to participate in celebrating cultural heritage week, international days, or multicultural festivals. They will acquire the skill to organize cultural programs, culinary events, skill exhibitions, etc. Also, through interdisciplinary projects like the reconstruction of history, integration of science and art, and presentation of literary programs, they will experience various subjects collectively.

Students should be able to answer the following questions :

1. What else can you do to apply the learning gained from the project?
2. Do you see any opportunity to expand the current project? How?

Think and Answer

We should reflect on what we learned while completing the project. Teachers should prepare a questionnaire/set of questions to find out how well the students have understood the important components of the project and various concepts in the curriculum.

Some questions are as follows :

1. What did you like doing?
2. What difficulties did you face?
3. Various questions related to the project.
4. List the businesses related to the activities you just performed. What other tasks are complementary to this project?

Activity-wise Related Learning Outcomes

School Kitchen Garden

Subject	Activities	Learning Outcomes
Activity Based on Living Things	What can I do? What will I need?	LO - 1, 2, 3, 4, 5
	How will I keep myself and others safe?	LO - 5, 10, 12, 18
	Visit to a Farm / Garden / Nursery	LO - 2, 3, 4, 5, 6, 7, 8, 13, 14, 15
	Preparation of Kitchen Garden	LO - 22, 23, 24, 25, 26, 27
	Protection of the Garden	LO - 16, 17, 18, 19, 20, 21
	Watering Schedule	LO - 16, 17, 18
	Making a Fence	LO - 12, 16, 17, 18
	Preparing Organic Pesticide	LO - 9, 10, 11, 12, 19, 20, 21
	Using Mulching	LO - 9, 10, 11, 12, 19, 20, 21
	Preparing Vermicompost	LO - 6, 7, 8
	Observing Plant Growth	LO - 6, 7, 8, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27
	Observing Results	LO - 6, 7, 8, 9, 10, 11, 12, 19, 20, 21
	What did I learn from others?	LO - 24, 25, 28, 29, 30
	What did I do and how much time did it take?	LO - 7
	What else can I do?	LO - 28, 29, 30
	Think and Answer	LO - 3, 9, 14, 15, 19

Biodiversity Register

Subject	Activities	Learning Outcomes
Activity Based on Living Things	What can I do? What will I need?	LO - 1, 2, 3
	How will I keep myself and others safe?	LO - 5, 10, 12, 18
	What is around us?	LO - 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15
	Meeting with Experts	LO - 2, 3, 4, 5, 6, 7, 8, 13, 14, 15, 16
	Survey of the Surroundings	LO - 2, 3, 5, 6, 7, 8, 13, 14, 15
	Preparation for Recording Biodiversity	LO - 9, 10, 11
	Recording Biodiversity Data	LO - 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 28, 29, 30

Subject	Activities	Learning Outcomes
Activity Based on Living Things	Understanding unfamiliar biodiversity	LO - 6, 7, 8, 15, 17, 18
	Presentation of the biodiversity register	LO - 6, 7, 8, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27
	What did I learn from others?	LO - 24, 25, 28, 29, 30
	What did I do and how much time did it take?	LO - 7
	What else can I do?	LO - 3, 9, 14, 15, 19
	Think and give answers	LO 27, LO 28 , LO29

Makers Skill

Subject	Activities	Learning Outcomes
Working with Machines and Materials	What can I do? What will I need for it?	LO - 1, 2, 3, 4, 5
	How can I keep myself and others safe?	LO - 5, 10, 12, 18
	Simple machines around us.	LO - 1, 2, 3, 13, 14
	• Making a robotic arm using levers. • Making a boat using a propeller. • Making toys using wheel and axle. • Rubber band car. • Making toys using more than one simple machine – Dumper / Tipper. • Parts of a bicycle. • Simple faults in a bicycle.	LO - 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 28, 29, 30
	• Visiting a bicycle repair shop. • How does a bicycle work?	LO - 2, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30
	Planning a toy exhibition.	LO - 5, 6, 7, 8, 9, 10, 11, 12, 19, 20, 21, 22, 23, 24, 25, 26, 27
	What I learned from others and how I use it.	LO - 24, 25, 28, 29
	What I do and how much time it takes for me.	LO - 7
	What else can I do?	LO - 28, 29, 30
	Think and give answers.	LO - 3, 9, 14, 15, 19

Animation And Games

Subject	Activities	Learning Outcomes
Working with Machines and Materials	What can I do? What will I need for it?	LO - 1, 2, 3, 4, 5
	How can I keep myself and others safe?	LO - 5, 10, 12, 18
	Which games do we play, making a model of my favorite game, trying out online games, primary preparation for creating your own game using animation.	LO - 6, 7, 8, 9, 10
	Making characters, components (Object), and background (backdrop); programming your characters and components (Object); making an animated birthday card for your friend; preparing a blueprint for your game; coding your game; testing the completed game; sharing the completed game with others, and making necessary improvements to it.	LO - 4, 6, 7, 8, 9, 10, 11, 12, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27
	How can I keep myself and others safe?	LO - 24, 25, 28, 29
	What did I learn and how much time did it take me?	LO - 7
	What else can I do?	LO - 28, 29, 30
	Think and give answers.	LO - 3, 9, 14, 15, 19

School Museum

Subject	School Museum	Leasrning Outcomes
Human Service Work	What can I do? What items will I need?	LO - 1, 2, 3, 4, 5, 9, 13, 14, 15
	How do I keep myself and others safe?	LO - 5, 9, 10, 11, 12
	Visiting a museum, your own history.	LO - 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30
	Identifying objects and gathering information about them.	LO - 2, 3, 9, 10, 11, 12
	Finalizing the collectible items. Keeping the collectible items safe. Preparing a presentation of the object collection. Organizing an exhibition in a skill fair or school event.	LO - 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 15, 16, 19, 20, 21, 24
	What did I learn from others and how did I use it?	LO - 24, 25, 28, 29
	What did I do and how much time did it take?	LO - 7
	What else can I do?	LO - 28, 29, 30
	Think and give answers.	LO - 3, 9, 14, 15, 19

Cooking Without Fire

Subject	Cooking Without Fire	Learning Outcomes
Human Service Work	What can I do? What items will I need?	LO - 1, 2, 3, 4, 5, 6, 7
	How do I keep myself and others safe?	LO - 5, 10, 12, 18
	Reading recipes, Selection of recipes, Measurement and storage of food ingredients, Waste management.	LO - 2, 4, 6, 8, 9, 10, 11, 12, 19, 20, 21, 28, 29, 30
	Preparing beverages, Preparing food items using the processes of chopping and mixing, Chopping and combining food ingredients.	LO - 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 19, 20, 21
	Organizing a fair.	LO - 6, 7, 8
	What did I learn from others and how did I use it?	LO - 24, 25, 28, 29
	What did I do and how much time did it take?	LO - 6, 7, 8
	What else can I do?	LO - 23, 24, 28, 29, 30
	Think and give answers.	LO - 3, 9, 14, 15, 19

Sample Projects for Classes 6 to 8

The projects given below can be conducted for pre-secondary level
(Classes 6 to 8) students in connection with vocational education.

Based on Living Things	Working with Machines and Materials	Human Service
1. Keyhole Garden	1. Coding for Creating Animation and Games	1. Food Fair : Preparing dishes without cooking / boiling
2. School Kitchen Garden	2. Basic Mechanical Skills (Simple Machines)	2. Food Fair: Preparing food items cooked on gas or stove
3. Hydroponics	3. Making Guards for Trees	3. Selling Food in School or Market
4. Grow What You Eat	4. Seating Area for the Garden	4. Taking Care of One's Own Health
5. Hydroponics using Nutrient Film Technique	5. Making Items from Bamboo	5. My Health and My Family's Health
6. Small Flowering Plant Nursery in School	6. Making a Bamboo Stool	6. Healthy Mind and Healthy Body
7. Nursery in Polyhouse	7. Working with Electronics	7. Classroom Museum
8. Preparing a Terrarium	8. Working with Microcontrollers	8. Preparing a Comic Book
9. Biodiversity Register	9. Making Your Own Robot	9. Visiting Historical Sites / Old Houses
10. Image Recognition : AI Model	10. Pottery	10. Family Budget Manager
11. Use of AI to Identify Plant Diseases and Pests	11. Sewing and Embroidery	11. Applying Mehndi on Hands
12. Study of Animal Behavior	12. Making a Wooden Stool	12. Beauty - Basic Care
13. Survey of Medicinal Plants, Grasses, Ornamental / Flowering Plants, and Spices	13. Automating Domestic Water Connection / School Water Tank Lights	13. Dissemination of Ancient History
14. Mushroom	14. Fashion and Textile Production	14. Preparing Podcasts
15. Beekeeping	15. Weaving an Embroidered Table Mat on a Loom	15. Processing and Selling Various Fruits and Vegetables
16. Organic Compost	16. Food Preservation by Organic Techniques	16. Gathering information about historical or tourist areas in the village/city and explaining it to tourists / people
17. Plant Extract	17. Making a Wooden Stool / Shoe Rack	17. Providing health information to citizens at clinics, hospitals, and old age homes
18. Useful Microorganisms	18. Making a Pad / Photo Frame / Pen Stand	18. Advertising and selling items from the school shop
19. Producing, using, and selling vermicompost	19. 3D Printing	19. Selling items required for various festivals
20. Preparing a profit and loss statement for a dairy production business	20. Making a school orchestra / musical instruments from waste	20. Selling fruits, vegetables, pulses, etc.
21. Preparing a profit and loss statement for a poultry farming business	21. Use of Artificial Intelligence	21. Studying business setup by providing training in exercise, yoga, and sports to locals
	22. Painting a school room and preparing a cost estimation sheet	
	23. Making, selling / exhibiting an electric board	
	24. Creating and displaying educational YouTube Reels	

Hello Children!

If you feel uneasy about someone touching you inappropriately, you should not keep quiet. You must :

1. Not blame yourself.
2. Tell someone whom you trust.
3. You can also inform National Commission for Protection of Child Rights through the **POCSO e-box**.

When you get an unsafe touch, you may feel bad,
confused and helpless.
You need not feel “bad” because it’s not your fault.



Press This Button

POCSO e-box available at ncpcr@gov.in

If you are below 18 years of age, and are troubled or confused
or abused or in distress or know some other child who is...

*Call 1098...because some numbers are good!
They change lives!!!*



CHILDLINE 1098 - a national 24 hours toll free
emergency phone service for children in distress is an
initiative of CHILDLINE India Foundation supported
by Ministry of Women & Child Development.



Provide students age-appropriate guidance on recognizing and understanding
good touch and bad touch, ensuring their physical and emotional well-being.



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