



MY STEM LAB

ENTECHRES Labs Private Limited • New Delhi

KAUSHAL BODH

Teacher Manual for the Vikas Lab

Grades 6



Objective



Materials



Learning Outcomes



Description



Procedure



Observations



Conclusion



Exploration



Extended Activities



Aligned to
NCERT Kaushal Bodh
Activity Books

NEP
2020



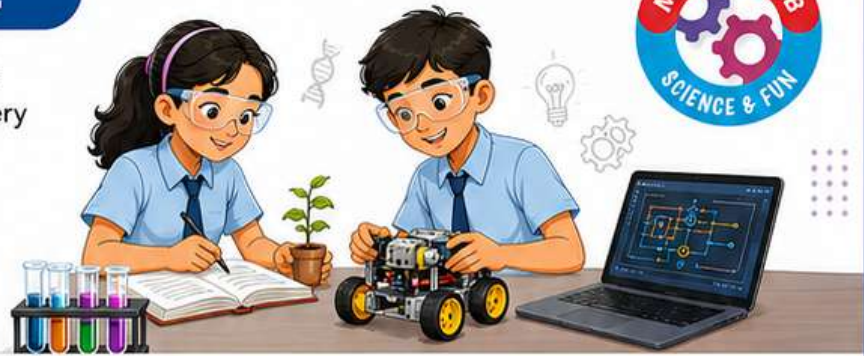
Aligned to
NCF-SE
2023



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HOW TO USE THIS MANUAL

This manual is a complete teaching companion to the **NCERT Kaushal Bodh activity books**. It presents every one of the 6 illustrative projects for Grades 6 — as a self-contained unit that a teacher can pick up and run in the Kaushal Bodh Vikas Lab.



THE NINE SECTIONS OF EVERY PROJECT

Every project in this manual is organised into nine simple and powerful sections.

- 1 Objective**
What the project sets out to achieve.
- 2 Materials Required**
The tools, equipment and consumables needed (matched to the lab's Bill of Materials).
- 3 Learning Outcomes**
What students will be able to do afterwards.
- 4 Description**
The concept, context and idea behind the project.
- 5 Procedure**
The step-by-step sequence of activities.
- 6 Observations**
What students should notice, measure and record.
- 7 Conclusion**
The key understanding the project builds.
- 8 Exploration**
Open questions curious students can investigate further.
- 9 Extended Activities**
Ways to deepen, apply or scale the project, including links to other projects and the Kaushal Mela.

HOW IT FITS THE YEAR



Each project is designed for roughly 30 hours (about 55 periods).



A school runs three projects per grade per year.



This matches the NCF-SE 2023 allocation of about 110 hours.



One from each Form of Work:

Work with Life Forms • **Work with Machines & Materials** • **Work in Human Services**



Field visits and community resource persons are built into the spirit of every project and should be arranged wherever possible.



COLOUR CODING FOLLOWS THE THREE FORMS OF WORK



WORK WITH LIFE FORMS

Understanding and working with living things and nature.



WORK WITH MACHINES & MATERIALS

Creating, making and working with materials, tools and technologies.



WORK IN HUMAN SERVICES

Caring for people and contributing to the community.



A NOTE FOR TEACHERS

- ✓ Treat every procedure as a flexible guide, not a rigid script.
- ✓ Encourage students to plan, make mistakes, and improve — the process matters as much as the product.
- ✓ Safety, supervision of sharp tools and hot work, and continuous assessment through the activity book and portfolio run through all 6 projects.



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Grade 6

Kaushal Bodh – Six Project Units

This grade offers six illustrative projects — two in each Form of Work. A school selects one project per Form (three in the year), or designs an equivalent. Each project below is presented as a complete teaching unit.



Code	Project	Form of Work
G6-1	 School Kitchen Garden	 Work with Life Forms
G6-2	 Biodiversity Register	 Work with Life Forms
G6-3	 Maker Skills – Toys from Trash & the Bicycle	 Work with Machines & Materials
G6-4	 Animation and Games (Scratch)	 Work with Machines & Materials
G6-5	 School Museum	 Work in Human Services
G6-6	 Cooking without Fire	 Work in Human Services

REMEMBER



- ✓ Choose one project from each Form of Work in the year (three in total).
- ✓ Plan field visits and invite community resource persons wherever possible.
- ✓ Document your learning in the Kaushal Bodh Activity Book and portfolio.
- ✓ Present your best work at the Kaushal Mela!



G6-1 SCHOOL KITCHEN GARDEN



FORM OF WORK: WORK WITH LIFE FORMS



OBJECTIVE

To plan, prepare, plant and maintain a productive kitchen garden in the school, and to understand how food is grown, nurtured and harvested.



MATERIALS REQUIRED

- Garden trowel, khurpi and hand cultivator
- Spade, rake and pruning shears
- Watering can and spray bottle
- Gardening gloves (one pair per student)
- Seeds of seasonal vegetables and herbs (e.g., spinach, methi, coriander, radish, tomato, chilli)
- Vermicompost / farmyard manure and neem cake
- Grow bags, pots or raised-bed frames
- Mulch (dry leaves, straw, wood chips)
- Plant labels, measuring tape and a garden diary



LEARNING OUTCOMES

By the end of this project, students will be able to:

- Identify the basic needs of plants — soil, water, sunlight, air and nutrients.
- Prepare soil and beds and select crops suited to the season.
- Demonstrate correct sowing, watering, mulching and weeding techniques.
- Maintain a growth record and interpret changes over time.
- Appreciate the effort, patience and care that food production requires.



DESCRIPTION

A kitchen garden is a small plot where vegetables and herbs are grown for daily use. In this project students convert a patch of school ground, or a set of grow bags, into a living garden they tend from seed to harvest. They learn that healthy plants depend on healthy soil, that different crops have different needs, and that gardening is a cycle of preparation, sowing, care and harvest. The garden becomes a season-long outdoor laboratory where science, patience and teamwork come together.



PROCEDURE

- Survey the available space; note sunlight hours, water access and drainage, and mark out beds or arrange grow bags.
- Prepare the soil: loosen it with a khurpi or cultivator, remove stones and weeds, and mix in vermicompost and neem cake.
- Choose 3–4 seasonal crops per group and read the seed-packet instructions for spacing and depth.
- Sow seeds at the correct depth and spacing; label each row or bag with crop name and date.
- Water gently with a can or spray so seeds are not disturbed; apply mulch to retain moisture.
- Set a watering and observation rota so every group tends the garden through the week.
- Weed regularly, thin overcrowded seedlings, and watch for pests — treat with a neem-based spray if needed.
- Record germination, height and leaf changes in the garden diary every few days.
- Harvest when crops are ready; clean, weigh and share the produce, then prepare the bed for the next cycle.



GARDEN ROTA				
MON	TUE	WED	THU	FRI
	✓	✓	✓	✓
	✓		✓	



Think & Care A little care today, a lot of food tomorrow!



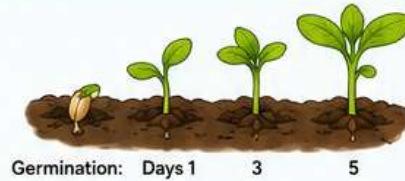
Good soil + Good care = Healthy plants + Healthy life



OBSERVATIONS

Students should record and reflect on:

- Number of days each crop took to germinate.
- Height and number of leaves measured at regular intervals.
- Which crops grew fastest and which struggled, and possible reasons.
- Signs of pests or disease and how the plant responded to treatment.
- Total yield (weight or count) harvested from each bed or bag.



GARDEN DIARY				
DATE	PLANT	HEIGHT (cm)	NO. OF LEAVES	OBSERVATIONS
5 JUL	SPINACH	3	2	Healthy
10 JUL	SPINACH	8	4	Growing well
15 JUL	SPINACH	12	6	—
5 JUL	CORIANDER	2	2	—
10 JUL	CORIANDER	6	4	Some pests
15 JUL	CORIANDER	9	6	Treated with neem spray



CONCLUSION



Students conclude that growing food is a patient, cyclical process in which soil health, correct sowing, consistent watering and pest care all determine the harvest. They gain first-hand respect for farmers and an understanding that fresh food begins with careful, everyday work.



EXPLORATION — INVESTIGATE FURTHER

Curious students can explore questions such as:

- Compare growth of the same crop in soil versus a grow bag, or in sun versus partial shade.
- Test the effect of different composts (vermicompost vs. kitchen-waste compost) on the same crop.



- Investigate companion planting — do marigolds beside vegetables reduce pests?



- Measure how mulching changes how often the bed needs watering.

WITH MULCH
Water less often

EXTENDED ACTIVITIES



1. Start a small vermicompost bin from the school's kitchen and garden waste and use the output in the garden.



2. Set up a seed bank of saved seeds, labelled and stored for the next season.



3. Create a 'farm-to-plate' link with the Cooking without Fire project, using harvested herbs and vegetables.



4. Build a simple drip or bottle-based self-watering system for holiday periods.

	CROP CALENDAR											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SPINACH												
CORIANDER												
RADISH												
TOMATO												
CHILLI												

5. Maintain a year-round crop calendar showing what to sow each month in the local climate.

TIP Care today, Harvest tomorrow!



Healthy soil + Good care =
Healthy plants + Healthy life



OBJECTIVE

To survey, identify and document the variety of plants, animals and insects in and around the school, and to understand why biodiversity matters.



MATERIALS REQUIRED

- Field notebooks / a bound biodiversity register
- Magnifying lenses (10x) and specimen observation boxes
- Binoculars for birds and distant animals
- Illustrated field guides (birds, butterflies, trees)
- Clipboards and pencils
- Sweep and dip nets for insects and pond life
- A camera or smartphone with identification apps (Seek, PlantNet, eBird, Merlin, Picture Insect)
- Laminated identification charts



LEARNING OUTCOMES

By the end of this project, students will be able to:

- Recognise that living things vary greatly even within a small area.
- Observe, sketch and describe organisms accurately without harming them.
- Use simple keys, guides and apps to identify species.
- Organise findings into a structured register.
- Explain the role of biodiversity and the need for conservation.



DESCRIPTION

Biodiversity is the variety of life in a place. This project turns the school campus and its surroundings into a study site where students become field naturalists. Moving in groups through gardens, walls, ponds and trees, they observe and record the plants, insects, birds and small animals they find, learning to look closely and identify carefully. The result is a school biodiversity register — a lasting record that reveals how much life a familiar place actually holds.



QUICK FIELD TIPS



Look closely



Listen carefully



Be quiet and patient



Observe, don't disturb



Record and respect all living things

PROCEDURE

- 1 Divide the campus into zones (garden, boundary wall, playground, water source, trees) and assign groups.



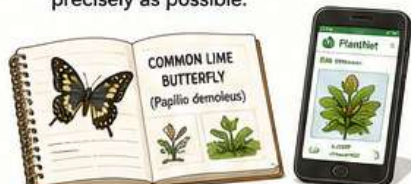
- 2 Agree on ethical rules: observe and photograph, do not capture or harm living things.



- 3 In each zone, spend timed sessions recording every organism seen, with sketches or photographs.



- 4 Use field guides and identification apps to name each organism as precisely as possible.



- 5 For each entry, note the date, location, name, a short description and any behaviour observed.

DATE	LOCATION	NAME	DESCRIPTION	BEHAVIOUR
12 JUL	GARDEN	LADYBIRD BEETLE	Red with black spots	Feeding on aphids

- 6 Use lenses and observation boxes to study small insects closely, then release them where found.



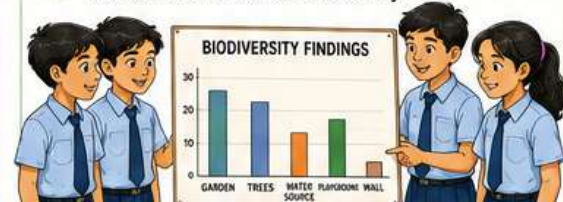
- 7 Compile all group entries into a single, organised biodiversity register.



- 8 Group organisms by type (plants, birds, insects, others) and count the species in each group.

PLANTS	BIRDS	INSECTS	OTHERS
36 species	18 species	28 species	12 species

- 9 Present the register and discuss which zones were richest in life and why.



DID YOU KNOW?

Even a small patch of green can be home to hundreds of different kinds of life!



BIODIVERSITY TODAY FOR A BETTER TOMORROW!





OBSERVATIONS

Students should record and reflect on:

- Total number of different species recorded across the campus.
- Which zone held the greatest variety of life.
- Interactions observed — pollinators on flowers, birds feeding, ants trailing.
- Time of day when animal activity was highest.
- Any species that appeared to be rare or seen only once.

SAMPLE OBSERVATION RECORD

DATE	ZONE	SPECIES (PLANT / ANIMAL)	DESCRIPTION / BEHAVIOUR	SKETCH / PHOTO	NOTES
12 JUL	GARDEN	Honey Bee	Visiting marigold flowers		Pollinator
12 JUL	POND	Common Kingfisher	Perched on branch and caught fish		Seen twice
13 JUL	PLAYGROUND	Ant	Trailing along crack in the wall		Many
13 JUL	TREES AREA	Indian Rose-ringed Parakeet	Feeding on neem fruits		Heard calling
14 JUL	BOUNDARY WALL	Common Garden Lizard	On wall basking in the sun		Seen once

TOTAL SPECIES RECORDED
48



BINOCULARS



MAGNIFYING LENS



FIELD GUIDE



NET



CAMERA / PHONE APPS



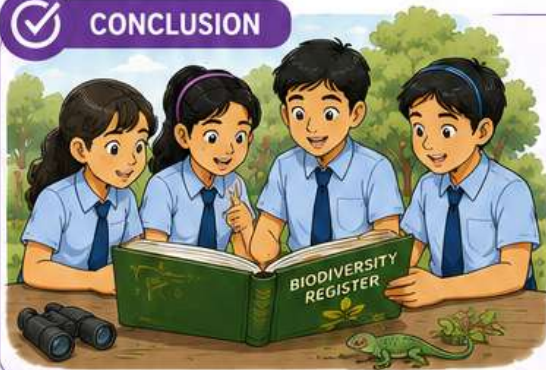
NOTEBOOK

TOOLS WE USE

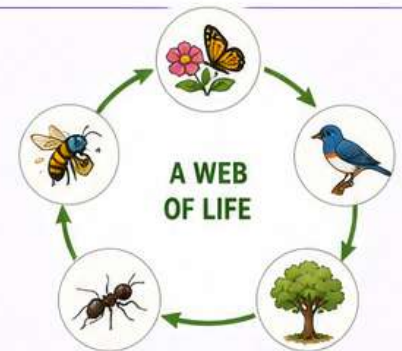
SPECIES BY GROUP (EXAMPLE)



CONCLUSION

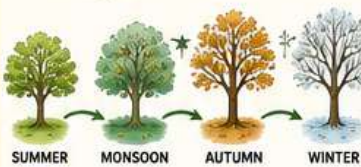


Students conclude that even a small, familiar space supports a surprising web of interdependent life, and that careful observation reveals what a casual glance misses. Documenting biodiversity builds the habit of noticing, and the understanding that every species has a role worth protecting.



EXPLORATION — INVESTIGATE FURTHER

- Track how the register changes across seasons — which species appear or disappear.



- Map where pollinators concentrate and relate it to the flowering plants nearby.



- Compare biodiversity in a maintained garden versus an undisturbed corner.



- Investigate one 'indicator' species (e.g., a butterfly) and what its presence says about the environment.



- Food availability
- Clean air
- Healthy plants
- No pesticides

EXTENDED ACTIVITIES

Design and put up habitat features (bird baths, insect shelters) and record new visitors — linking to the Grade 7 Habitat Garden.



Contribute observations to a citizen-science platform such as iNaturalist or eBird.



Create illustrated field guides or posters of the school's own species for younger classes.



Hold a 'biodiversity day' where the register is displayed at the Kaushal Mela.



Repeat the survey annually to build a multi-year record of campus biodiversity.



Every observation matters. Every species has a story. Protect it!

"Look closely. Record carefully. Protect always."



OBSERVE



RECORD



RESPECT



PROTECT



OBJECTIVE

To build simple toys and working models from waste materials using basic tools, and to learn the parts, maintenance and puncture repair of a bicycle.



MATERIALS REQUIRED

- Maker consumables — bottle caps, ice-cream sticks, straws, wheels and axles, rubber bands, small motors, battery holders, hobby wire
- Screwdriver set, combination and long-nose pliers, junior hacksaw
- Glue guns and craft cutters with mats
- A training bicycle and a bicycle repair stand
- Puncture repair kit, tyre levers, foot pump
- Spanner set (6–22 mm) and chain lubricant
- Safety goggles and work gloves



LEARNING OUTCOMES

By the end of this project, students will be able to:

- ✓ Handle basic hand tools safely and correctly.
- ✓ Turn waste materials into functional toys and models.
- ✓ Name the main parts of a bicycle and explain their function.
- ✓ Perform routine bicycle maintenance and repair a puncture.
- ✓ Value reuse, repair and self-reliance over throwing things away.



DESCRIPTION

Making and mending are core life skills. In the first half of this project students become makers, using simple tools to turn everyday waste into toys and moving models — learning measurement, cutting, joining and problem-solving as they go. In the second half they meet a real machine, the bicycle: they identify its parts, keep it running smoothly, and fix a puncture themselves. Together these activities build tool confidence and the satisfying discovery that broken things can be repaired.



PROCEDURE

- 1** Introduce each tool, its use and its safety rule; practise safe handling with goggles on.



- 2** Sketch a toy or model to build and list the waste materials needed.



- 3** Measure, mark and cut materials; join them with glue, wire or fasteners.



- 4** Add movement where possible — wheels and axles, a rubber-band motor or a small electric motor.



- 5** Test the toy, identify what fails, and improve the design.



- 6** Move to the bicycle: identify frame, wheels, tyres, brakes, chain, pedals and gears.



- 7** Practise maintenance — oil the chain, check brake pads, adjust and inflate the tyres.



- 8** Remove a tube, find the puncture in water, patch it, refit and inflate to the right pressure.



- 9** Test-ride safely to confirm the repair and smooth running.



SAFETY FIRST

- ✓ Wear goggles and gloves.
- ✓ Use tools only as shown.
- ✓ Keep the workspace clean.
- ✓ Ask before using any tool.



TOOLS, CARE, CONFIDENCE

Good makers handle tools with care. Good riders keep their bicycles in good shape.



THINK • MAKE • REPAIR • RIDE

Make something useful. Repair what is broken. Be self-reliant and kind to the planet.





OBSERVATIONS

Students should record and reflect on:

- Which joining method held best for each material.
- How adding wheels or a motor changed the toy's movement.
- The effect of tyre pressure on how the bicycle rolls.
- How chain lubrication changed the effort needed to pedal.
- Where the puncture was and how it was located.

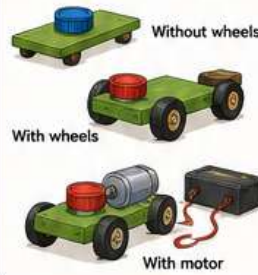
JOINING METHODS TEST

Which held best?

Material	Glue	Tape	Rubber Band	Screws
Plastic	✓	✓		✓
Cardboard	✓	✓		
Wood	✓			✓
Bottle Cap			✓	

WHEELS OR MOTOR

changed the movement



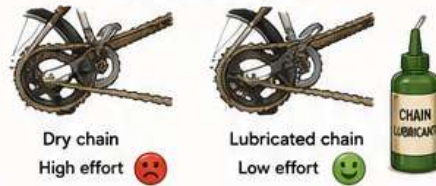
TYRE PRESSURE EFFECT

How the bicycle rolls



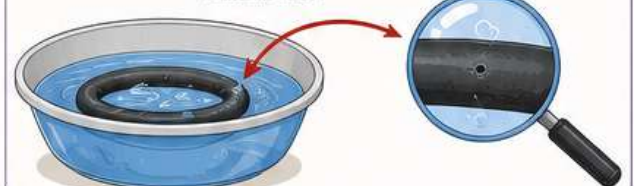
CHAIN LUBRICATION

Effort needed to pedal



PUNCTURE LOCATION

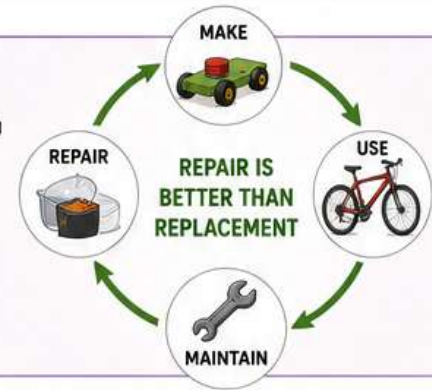
Found in water



CONCLUSION



Students conclude that with a few tools and some ingenuity, waste can become something useful and broken machines can be restored. They leave able to maintain a bicycle and confident that repair is often better than replacement.



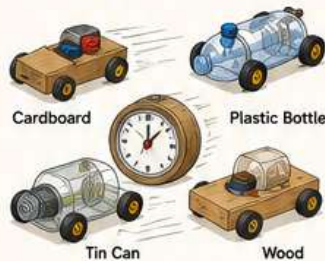
EXPLORATION — INVESTIGATE FURTHER

Investigate how gear ratios on the bicycle change the effort of pedalling.

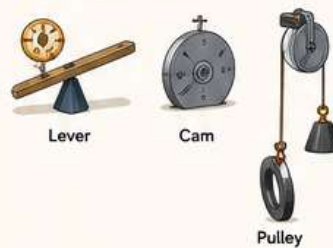


Gear	Effort to pedal
Low gear	High effort ■
Middle gear	Medium effort ■
High gear	Low effort ■

Test which recycled materials make the strongest or fastest toy vehicle.



Explore simple mechanisms — levers, cams, pulleys — in the models they build.



Find out what causes most punctures and how they can be prevented.



EXTENDED ACTIVITIES

Run a 'repair café' where students service classmates' bicycles and mend small items.



Design a toy that teaches a science concept and demonstrate it to younger classes.



Build a mechanical automation or wind-up toy as a group challenge.



Link with Home Automation (Grade 8) by adding sensors or lights to a model.



Organise a toys-from-trash exhibit at the Kaushal Mela with a 'how it's made' display.



SAFETY FIRST

- ✓ Wear safety goggles and gloves.
- ✓ Use tools only as shown.
- ✓ Keep the workspace clean.
- ✓ Ask before using any tool or machine.

TOOLS CARE

- Clean tools after use.
- Return to the right place.
- Handle with care so they last longer.

THINK • MAKE • REPAIR

- Be creative.
- Be careful.
- Be responsible.
- Be resourceful.

MAKE • MEND • MOVE

BUILD SKILLS FOR LIFE!