

STEM Education for Innovation: Experimento India

Teacher's Manual: Electricity Part 1

Manual at a glance

This manual is made to help teachers use the Electricity part-1 OERs using the Inquiry-Based Learning approach in classrooms.

Sr. No.	Topic / Concept	Description
1	Introduction	Overview of the package and pedagogical approach
2	OER types included in the package	Overview of resource types (videos, reading material, stories, surveys, questions)
3	How to conduct this package in the classroom?	General guidelines before, during and after the lesson along with safety instructions/precautions
4	Lesson plans	Instructions and detailed lesson plans for each concept/resource

Lesson plans

Sr. No.	Topic / Concept	Resource Name Learning Outcome	Time Required	Textbook Link
4.1	Electric Circuit	Simple Electric Circuit Understand electrical circuit and roles of battery, wires, and bulb.	30–40 min (video + hands-on activity)	NCERT Class 7, Chapter 3, Electricity: Circuits and their Components 

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Sr. No.	Topic / Concept	Resource Name Learning Outcome	Time Required	Textbook Link
4.2	Switch	Electric Switch Understand the working of a switch and its importance in an electric circuit.	30–40 min (video + hands-on activity)	NCERT Class 7, Chapter 3, Electricity: Circuits and their Components 
4.3	Open and Closed Circuit	Open and Closed Circuit Learn about Open and Closed electrical circuits and how to represent them.	30-40 min (Reading card + Play+ discussion)	
4.4	Electric Bulb	How do bulbs give light? Learn about the types of bulb and technical terminologies associated with them.	30 min (video + discussion)	NCERT Class 7, Chapter 3, Electricity: Circuits and their Components 
4.5	Conductors and Insulators	Conductors and Insulators Understand the difference between conductors and insulators, and their importance in everyday life.	30–40 min (video + hands-on activity)	

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Sr. No.	Topic / Concept	Resource Name Learning Outcome	Time Required	Textbook Link
4.6	Electrical Safety Guidelines	Electrical Safety Guidelines Understand basic safety rules of electricity, recognize their importance, and apply them to real-life situations and emergencies.	30 min (Reading card+ discussion)	NCERT Class 7, Chapter 3, Electricity: Circuits and their Components 
4.7	Symbols used in Electric Circuit	Symbols used in Electric Circuit Learn and use standard symbols of electric circuit components to read, draw, and relate circuit diagrams with real-life situations such as home wiring.	30-40 min (Reading card+ discussion)	
4.8	Awareness	Understanding your electricity bill Understand how to read an electricity bill, its key components, and relate electricity consumption to appliance usage and energy efficiency.	30 min (video + discussion)	
4.9	Worksheet or quiz	Worksheet To know the level of our understanding about electricity.	30 min (worksheet)	

Teacher's Manual: Electricity Part 1

1. Introduction

Electricity plays a vital role in our daily lives, from lighting our homes and charging our phones to powering schools, hospitals, and industries. Yet, for many children, electricity is something they use every day without fully understanding how it works. This series is designed to help upper primary students (Class 6–8) build a strong foundation in basic electrical concepts through observation, exploration, and hands-on activities.

This teacher's manual has been designed to support educators of class 6th–8th in using the digital open educational resources (OERs) based on Energy in their classrooms. The OERs can also be used flexibly by parents at home or by students themselves for self-learning. Each resource is self-explanatory and aligned with the NCERT curriculum.

The Electricity Part- 1 OERs are built on inquiry-based learning and constructivist pedagogy. Instead of being passive recipients of information, children actively explore, ask questions, investigate, and build their own understanding. This method encourages curiosity and critical thinking, which are vital for learners to develop independent thinking.

In the inquiry-based model, teachers act as facilitators who guide students to explore real-world problems, gather evidence, and make connections. For example, instead of telling students the principles of evaporation, a teacher might encourage them to design a simple experiment to observe how water disappears under different conditions. This approach not only deepens content knowledge but also develops problem-solving and research skills.

The constructivist approach emphasizes that learners construct knowledge from their experiences. Middle school students bring prior knowledge, beliefs, and everyday experiences into the classroom and teachers build on these foundations. Group work, discussions, projects, and hands-on activities are used to help children learn collaboratively and deepen understanding. This makes learning meaningful and long-lasting.

Together, these approaches help to create classrooms where children are active participants, confident learners, and capable problem-solvers, skills that are essential not only for academic success but also for life beyond school.

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There are several methodologies to implement Inquiry-based learning and the Constructivist approach in the classrooms. Here, we are using a 'Five E methodology'. This manual provides practical and easy-to-follow lesson plans for classroom teaching. It has the following 5 steps:



This manual provides teachers with ready-to-use lesson plans, activity instructions, materials lists, guiding questions, and Learning Outcomes for each OER, so classroom teaching becomes easier, more engaging, and directly supportive of curriculum.

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2. OER types included in the package

This package provides a variety of OERs designed to engage students in learning through observation, inquiry, and hands-on activities. The resources include:



a. Videos

- Short and engaging videos explaining key concepts related to the topic
- Can be shown in class or shared for students to watch in groups or at home



b. Reading material

- Simple, illustrated content to explain the core concepts
- Includes real-life examples and applications for better understanding and to encourage discussion



c. Audio Stories

- Short and engaging audio narratives explaining key concepts related to the topic
- Include real-life examples and prompts for critical thinking



d. Suggested research questions

- Thought-provoking prompts are included in the resources
- Can be used for class discussions, homework, or small projects to extend learning

3. How to conduct this package in the classroom?

a. Before the activity



Form student groups: Divide the class into small groups (4–5 students) to encourage teamwork and peer learning.



Assign roles: Give responsibilities such as material collector, recorder, presenter, or timekeeper.



Share materials list in advance: Provide a simple materials list (low-cost/ everyday items) so students can bring them from home.

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Set up the classroom: Arrange equipment such as a projector/blackboard for videos, or prepare printouts/handouts for reading material and worksheets.

b. During the activity



Introduce the Resource: Show the video, distribute reading material, or explain the task clearly.



Group Work: Ask students to watch, read, or perform the activity in their groups, noting key observations.



Guide Exploration: Circulate among groups, prompt with guiding questions, and encourage them to compare findings.



Record Observations: Remind students to use survey forms or worksheets where provided, or ask them to record observations in the tables given in the particular resource.

c. After the activity



Discussion & Reflection: Facilitate a short group/class discussion where students share their conclusions. Highlight how the concept connects to real-life problems and solutions.



Connect to Key Concepts: Summarize the scientific ideas, clarify misconceptions, and link to textbook content.



Ask Guiding Questions: Use the suggested research prompts in the resources to spark further thinking and discussion.



Feedback & Motivation: Appreciate student efforts and encourage them to explore the concept independently.



Homework/Extension (Optional): Assign follow-up tasks such as simple research, a 1-day observation, or creating a poster/action plan.

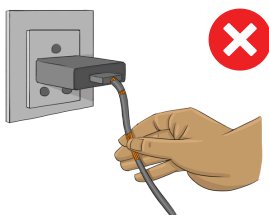
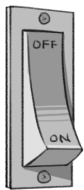
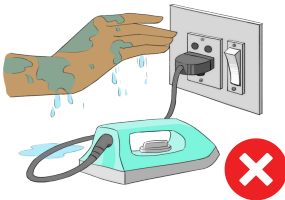
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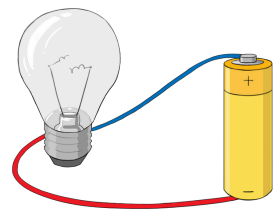
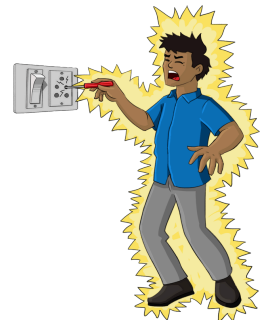
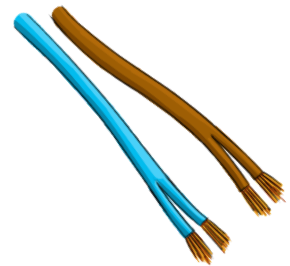
Record observations: Remind students to use survey forms or worksheets where provided, or ask them to record observations in the tables given in the particular resource.

Safety instructions

1. General precautions



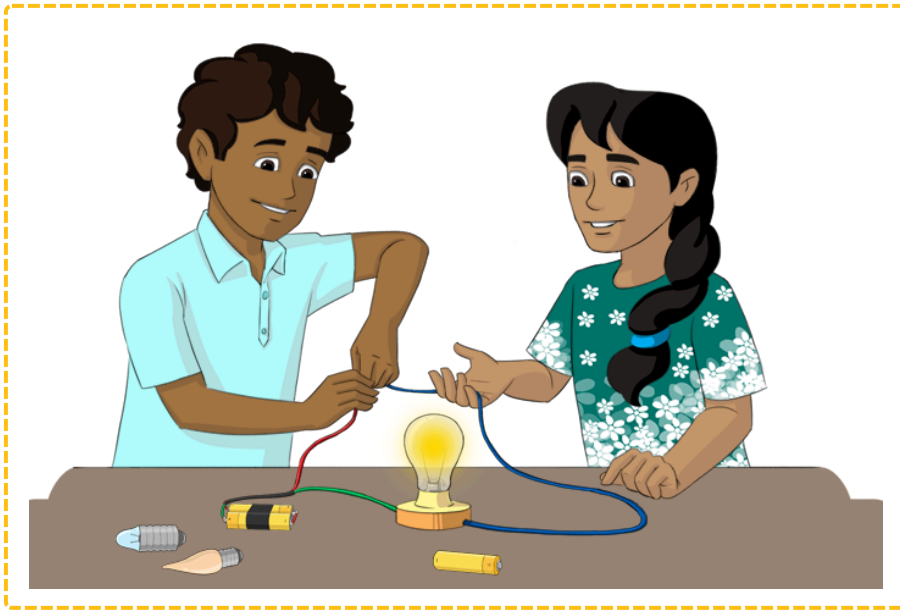
- Avoid touching electrical appliances, switches, or wires with wet hands or a wet cloth
- Avoid touching open wires
- Do not touch the pins while connecting plugs to the electric sockets
- Do not touch the metal portions of the bulb or the holder while fixing an electric bulb
- Do not connect wires connected to the power source to each other. Doing so may cause a short circuit, which may cause a fire.
- Always wear dry rubber footwear while working with electricity
- In case of a short circuit, shut down the power supply immediately
- Always disconnect the wires from the battery or cell when experiments are not being performed. This will prevent the draining of the battery or cell, and the wires will not become hot.
- Use a battery or cell of 9 volts or less when conducting electrical experiments
- Do not throw discharged cells in the waste. Segregate them as e-waste (electronic waste). Give this e-waste to an organization or agency responsible for its safe disposal, or keep it safe with you.



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4. Lesson plans

4.1 Simple Electrical Circuit



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- Develop the habit of questioning and testing hypotheses through simple experiments
- Understand the meaning of an electrical circuit
- Identify the role of battery, wires, and bulb in making a circuit work
- Recognize why a bulb may not glow even if electricity is available

Materials:

- Two 1.5 V cells
- About 20 cm insulated wire (cut into two pieces)
- One LED bulb
- Electrical tape
- Scissors
- Wire stripper
- A piece of cardboard

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5E Lesson plan



Ask:

- Why does a bulb not glow sometimes despite electric current being available?

Let children think and share their hypotheses (switch broken, wire cut, bulb faulty, etc.). Have a small discussion in the classroom.



Show the video till 2.08 minutes to children and ask them to make electrical circuits as shown.

- Provide materials (Children should have brought this as this should have been announced a day before)
- Let them predict the answers of the questions asked in between - like - "Will the bulb glow?" Then test and observe.



Explain

Show the children the explanation part of the video (from 2.09 minutes to 2.23 minutes) and let them try to understand the concepts on their own.

- Ask a couple of children's groups to explain and demonstrate the concepts with the scientific terminologies in front of the whole class. Help them wherever needed.
- After this children should know about - Circuits, various components of circuits, Complete/unbroken circuits and broken circuits, etc.



Elaborate

Pose the questions from the video from 2.25 minutes to 2.47 minutes

- What happens if you remove one wire?
- What if you connect the wires wrongly?

Ask children to do these things and observe what happens
Encourage them to draw a circuit diagram in their notebooks.
After this discussion show the complete video.

Add some more questions

E.g. How will you check if a wire is defective in the circuit?
How will you test if a cell is dead?



Evaluate

Ask quick oral questions - What are the main parts of a simple circuit?

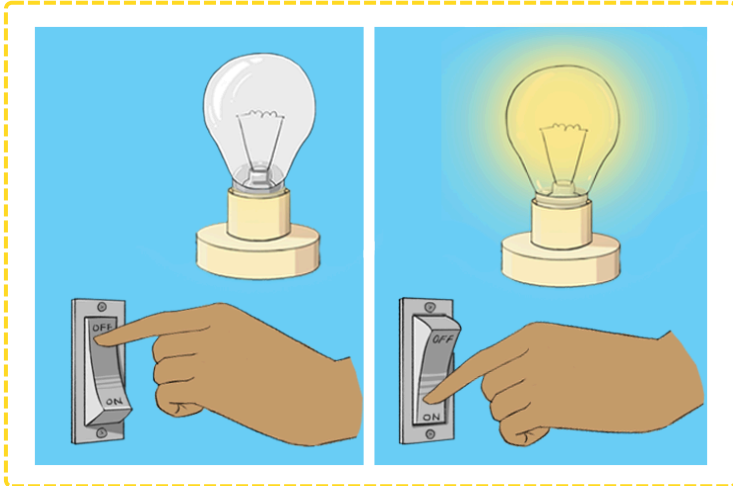
- Why did the bulb not glow in Maya's case?

Show question number 1 from the worksheet and encourage the students for the answer. Then show question number 5 and do the same.

Homework: Draw the circuit diagram neatly in notebooks and write two situations when a bulb may not glow.

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4.2 Electric Switch



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- Demonstrate how a simple switch opens and closes an electric circuit with a simple experiment
- Recognize the role of switches in conserving electricity and ensuring safety
- Identify different types of switches used at home and their purposes

Materials:

- 30 cm insulated wire (cut into 2 small and 1 large piece)
- 1 LED bulb
- Two 1.5 V cells
- 2 allpins
- 1 safety pin
- Electrical tape
- Scissors
- Wire stripper
- Piece of cardboard

5E Lesson plan



Engage

Ask:

- What happens when you press the switch of a bulb or a fan?
- What if there were no switches at all - what would happen to your devices?

Let children share their ideas (electricity wastage, devices always on, safety issues, etc.), and discuss in the groups.

Also, you can have a small discussion in the classroom around this.

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Explore

Show the video till 2.12 minutes to children and ask them to carefully observe how the safety pin switch is made.

Provide materials (students should have brought them in advance). Guide groups to build their own simple circuits with a switch using the given instructions.

Let them test: What happens when the safety pin touches the allpin? What happens when it moves away?



Explain

Play the explanation part of the video from 2.13 minutes -3.12minutes and let children understand the working of a switch.

Ask: 1-2 groups to demonstrate their switch model to the class and explain what is happening using scientific terms like circuit complete/incomplete, flow of current, open/closed switch.

Reinforce that switches help operate devices safely and avoid wastage of electricity and other concepts.



Elaborate

Pose questions:

- Why do you think we need switches for every device?
- What happens if the circuit is always connected without a switch?
- Ask them to draw the circuit diagram with a switch in their notebooks
- Why does a bulb stop glowing when the switch is in the Off position?

Extend: Show different types of switches used in homes (e.g., fan regulator, button switch) and discuss their uses.

- What is the function of a switch in the circuit?
- Have you seen fan regulators and dimmer switches?
- Are they types of switches too?



Evaluate

Quick check:

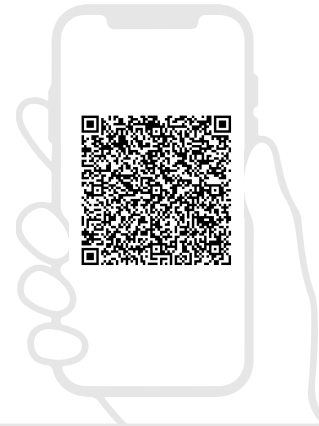
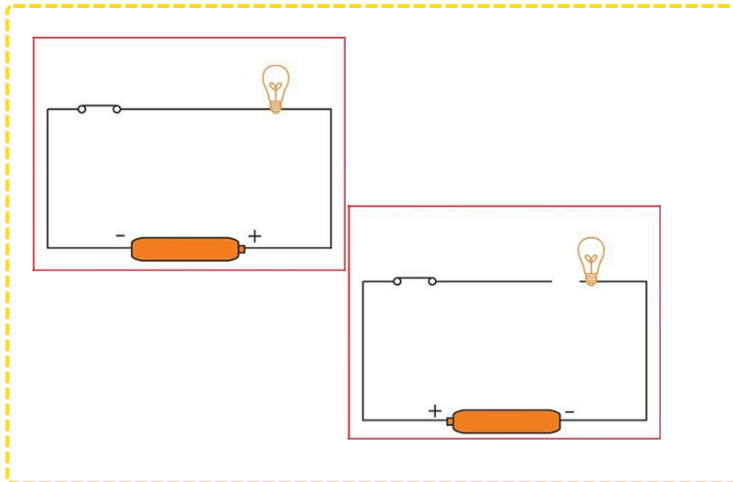
- Oral questions
- Why is a switch important for safety?

Homework:

- Find out how the design of switches has changed over time
- Explore why two switches are sometimes used for operating one bulb at home (staircase wiring)

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4.3 Open and Closed Circuit



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- Explain the difference between an open circuit and a closed circuit
- Demonstrate how a continuous path allows current to flow, while a break stops it
- Draw and label circuit diagrams for open and closed circuits
- Relate the concept to real-life examples at home (switches, toys, appliances)

Materials:

- 10 marbles or small stones
- Tags labeled Battery, Switch, and Bulb
- Badges or strings to wear the tags

5E Lesson plan



Engage

Ask:

- If electricity is there in the house, why does a fan or bulb sometimes still not work?
- Can you guess what might be happening in the circuit?

Encourage children to share ideas like - broken wire, switch off, etc. You can also have a small discussion in the classroom around this.

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Explore

Ask children to read the instructions from the resource and play the marble game in teams. Images given will help children to understand the instructions.

Team 1: Closed circle (Battery, Switch, Bulb tags) → marbles flow successfully.

Team 2: Open circle (Switch steps aside) → marbles don't circulate.

Observe what children are doing and facilitate only if needed.



Explain

Ask children to carefully read the explanation given in the resource.

Let them connect their own activity experience (marbles depict current, circle depict circuit) with the written explanation of open vs. closed circuit.

Invite a couple of groups to explain the concepts in their own words to the whole class. Teacher helps with key scientific terms if required.



Elaborate

Pose questions: -

- What happens if you add a buzzer instead of a bulb in this circuit?
- Can you think of real-life examples of open and closed circuits at home?(TV, toys, fridge, light switches)
- If the circuit of a lamp has a switch in the Off position, what type of circuit do you have?
- Name 2 examples of open circuits in appliances used at home

Ask them to draw open vs. closed circuits in notebooks.

Then draw them again using symbols of components.



Evaluate

Quick check-

Oral Qs:

- When is a circuit open? When is it closed? with respect to switch
- Why did the marbles not return in Team 2?

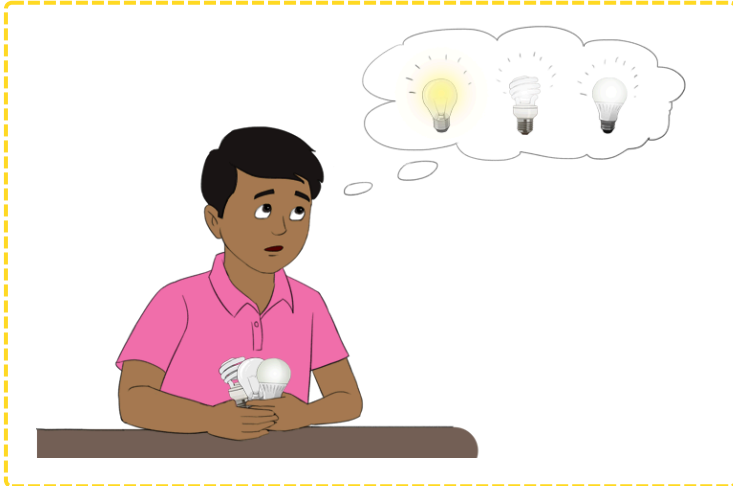
Ask 1-2 children to draw the circuit diagrams of open and closed circuits on the blackboard.

Show question number 2 from the worksheet and encourage the students for the answer.

Homework: Recreate the given images in notebooks and label them as open or closed circuits.

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4.4 How do bulbs give light?



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- Describe how incandescent, CFL, and LED bulbs produce light
- Compare bulbs on power (watts), efficiency, heat, safety, and environmental impact
- Decide which bulb is more suitable for everyday use based on efficiency and safety
- Reflect on myths such as the zero-watt bulb and think about future bulb designs

Materials:

- 3 bulb types or pictures: incandescent (filament), CFL, LED (pictures are fine if bulbs aren't available)
- Chart paper/board + markers (for comparison table or poster)
- (Optional) Old bulb packaging to show watt ratings
- Safety reminder: do not touch hot bulbs

5E Lesson plan



Engage

Ask:

- What types of bulbs are being used in your homes? LED, CFL or Incandescent
- When you go to a shop, how do you choose a bulb - just pick any, or check some things?

Show (or display pictures of) an incandescent, CFL, and LED bulb. Let children guess which is brighter/uses less electricity/ gives warmer light.

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Explore

Show the video resource in the classroom.

Ask children to note differences for each bulb while watching/reading:
How it glows, typical wattages, heat, safety, efficiency, environmental aspects.

Discuss in groups, quickly compare lists.



Explain

Let 1-2 groups explain in their own words how each bulb works (teacher steps in only to add terms like filament, phosphor/UV, semiconductor diode).

By the end of the lesson, children should be familiar with:
Incandescent Bulbs- wastes most energy as heat; CFL uses less power but has mercury; LED uses semiconductor materials, is most efficient, lasts longer, and is environmentally friendly.



Elaborate

Give the following tasks:

- Ask groups to sketch ideas for Bulbs of the future (longer life, solar, color-tuning, safer materials)
- Home connection: Survey
- Check which bulbs are used in your house - what could you replace to save electricity?

Optional:

- Make a comparison poster (Incandescent vs CFL vs LED)
- Compare features - life, electricity consumption (wattage)
- Unit cost
- Environmentally friendly

Can you find out about some other newer types of light producing devices?



Evaluate

Quick oral check:

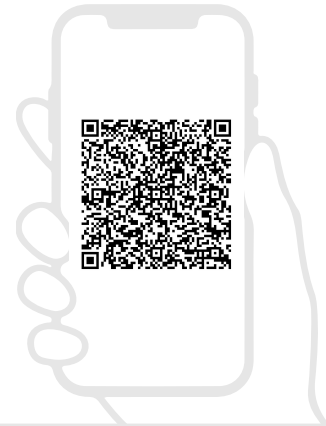
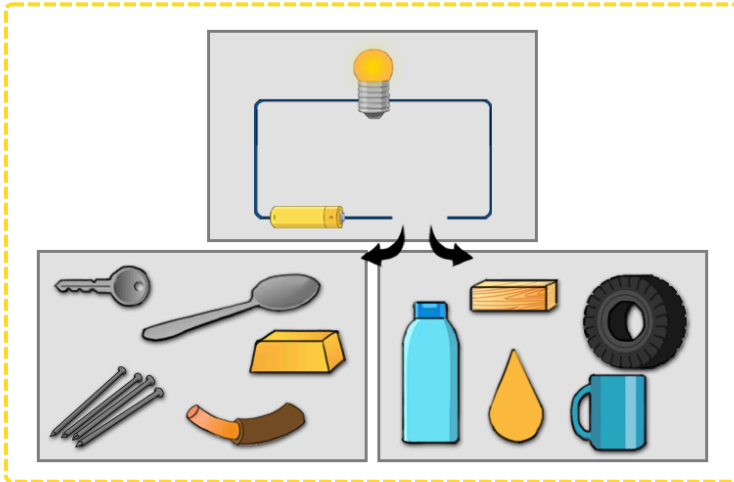
- Which bulb wastes the most energy as heat?
- Which bulb contains mercury?
- Why is LED more cost-effective?

Homework:

- Investigate the zero-watt bulb - is it really zero watts, and can a zero-watt bulb glow?
- Write a short note/table comparing the three bulbs (include example watt equivalences)

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4.5 Conductors and Insulators



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- Understand that some materials allow electricity to pass through them while others do not
- Identify conductors (like metals) and insulators (like wood, plastic, rubber)
- Relate everyday uses of conductors and insulators (wires, switches, safety tools)
- Develop observation and recording skills by experimenting and noting results

Materials:

- About 30 cm insulated wire (cut into 3 pieces – 2 small, 1 long)
- 2 allpins
- 1 LED bulb
- Two 1.5 V cells (batteries)
- Electrical tape
- Scissors
- Wire stripper
- Piece of cardboard
- A few objects to test (pencil, coin, iron nail, key, plastic scale, rubber, wood piece, eraser, etc.)

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5E Lesson plan



Engage

Ask:

- Why are switches made of plastic and not metal?
- Why are wires made of metal but covered with plastic?
- What would happen if wires were made entirely of plastic?

Let children think and share their ideas. Accept all answers without correcting immediately.

Show the video introduction (till Maya's questions).



Explore

Show the video till 2.08 minutes to children and ask them to make electrical circuits as shown.

Provide materials and guide students to set up the circuit as shown in the video (cells, wires, bulb, allpins).

Ask children to test different objects (pencil, coin, nail, wood, rubber, etc.) placed between the two allpins and observe whether the bulb glows or not.

Instruct them to record results in a simple table with two columns:

- Object tested
- Bulb glows? (Yes/No)

Encourage group discussion: Which objects made the bulb glow? Which did not?



Explain

Show the explanation part of the video from 2.09 minutes -3.08minutes.

Guide students to connect their observations to the concept:

- Introduce scientific terms: electrical conductor and electrical insulator
- Objects that allow current to flow are conductors (mostly metals)
- Objects that do not allow current to flow are insulators (plastic, rubber, wood)
- Ask a few groups to explain their results using these terms. Correct misconceptions gently.

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Elaborate

Discuss real-life applications:

- Why are wires made of copper/aluminum (good conductors)
- Why are wires coated with plastic (insulator for safety)
- Why are switches, slippers, and handles of electrical tools made of rubber/plastic?

Activity extensions:

- Test a pencil sharpened at one end vs. both ends. Does the bulb glow differently in the 2 cases?
- Discuss: Why is it advised to wear rubber slippers while handling electricity?
- Encourage children to think about more examples of conductors and insulators in daily life



Evaluate

Ask Quick oral questions:

- Give two examples of conductors
- Give two examples of insulators
- Why is plastic used in switches?
- Why did the bulb not glow with a wooden piece in the circuit?

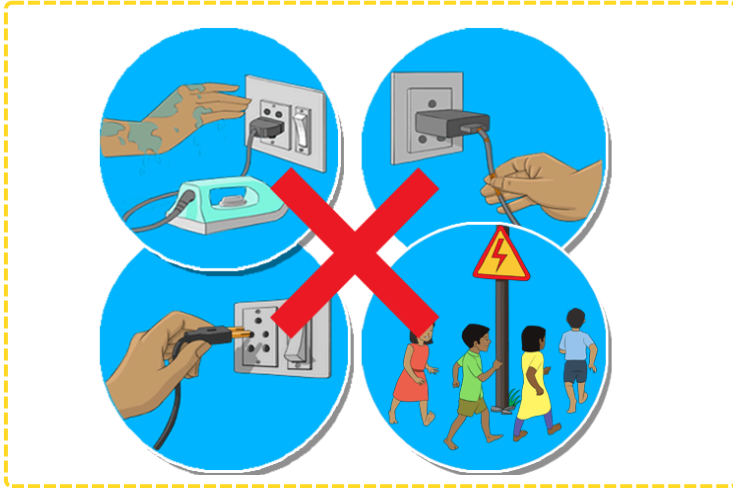
Ask children to submit their observation tables.

Show question number 4 from the worksheet and encourage the students for the answer.

Homework: Draw the circuit setup neatly in notebooks and write three uses of conductors and insulators in daily life.

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4.6 Electrical Safety Guidelines



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- Learn and understand the basic precautions while using electricity
- Recognize the dangers of careless handling of electric gadgets, wires, and sockets
- Develop safe habits when using electricity in daily life
- Apply safety rules to real-life situations and emergencies

Materials:

- Copy of the Electrical Safety Guidelines PDF
- Blackboard/Chart with common safety symbols (like electric shock warning)
- Pictures of safe/unsafe electrical practices (wet hands touching switch, damaged wires, electrician at work, etc.)
- Chalks/markers for group activity
- Notebook for writing reflections

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5E Lesson plan



Engage

Show children the electric danger symbol.

Ask:

- Have you seen this before? What does it mean?

Share a short situation: You saw sparks on an electric pole while going to school. What should you do?

Let children think, write, or share orally.

Ask:

- Have you or someone you know ever received an electric shock?
- What happened?



Explore

Give the PDF (or read aloud the main guidelines).

Divide children into small groups. Ask them to discuss and list unsafe things they have seen at home or around them (like damaged charger wire, kids playing near electric poles, loose electric wires lying around, touching switches with wet hands).

Groups share their lists with class. The teacher notes them on board.

Compare children's observations with the safety guidelines in the resource.



Explain

The teacher explains clearly the meaning of boon and bane of electricity: useful but dangerous if not handled properly.

Go through the guidelines together:

- General precautions (not touching with wet hands, not playing near poles, short-circuit precautions, etc.)
- Guidelines for experiments (why we only use low-voltage cells, why we do not use electric sockets)
- Safe use of cells and batteries and their disposal (Do not put them in the mouth, do not keep in the sun)
- Clarify misconceptions and emphasize why each rule is important

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Elaborate

Relate to real-life cases:

- Why do electricians wear rubber slippers or gloves?
- Why should we never pull wires by force from sockets?
- Why do we need to call an experienced electrician instead of fixing wires ourselves?

Pose problem-based tasks:

- What should you do if you see sparks on an electric pole?
- What should you do if your phone charger wire is damaged and the wires are visible?

Group activity: Children make posters or slogans for Electrical Safety to display in school.



Evaluate

Quick oral questions:

- List three things you should never do while handling electricity
- Why should we not touch switches with wet hands?
- Why should we not throw electric cells in household waste?

Ask children to write 5 important safety rules in their notebooks.

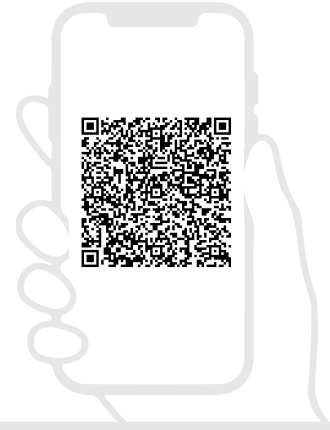
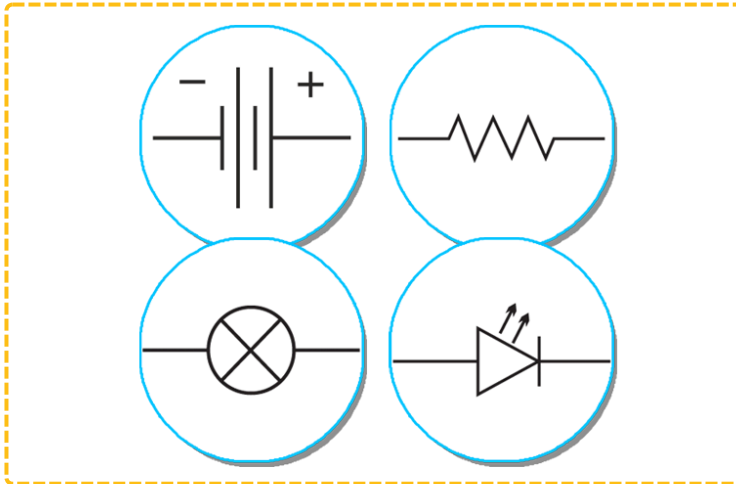
Show question number 8 from the worksheet and encourage the students for the answer.

Homework:

Interview parents or elders- ask them about any incident of electric shock they know, and find out which safety rule was ignored. Write in 5-6 sentences.

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4.7 Symbols of Electric Circuit Components



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- To learn the standard symbols of components of an electric circuit
- To understand the importance of symbols for drawing and reading circuit diagrams
- To practice drawing circuit diagrams using symbols
- To relate the use of symbols with real-life applications like electrical layouts in homes

Materials:

- Chart/poster of common electrical symbols
- Blackboard and chalk or marker
- Student notebooks and pencils
- Simple circuit kit (cell, bulb, switch, wires) for demonstration
- Worksheet with circuit diagrams to complete/draw

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5E Lesson plan



Engage

Ask:

- If you have a cell, bulb, switch, and wires, how will you show the connection on paper?

Allow them to draw in their notebooks. Encourage them to label the parts.

Ask:

- Is it possible to draw a real picture of a bulb or switch every time?

Lead the discussion:

- Will everyone draw it the same way? How will we know if the switch is ON or OFF?

Tell them: Scientists faced the same problem and solved it by using symbols for each component. Let's learn from them.



Explore

Show students actual materials: a cell, bulb, switch, wires.

Then show them the matching symbols on a chart.

Let students try to match each real object with its correct symbol.

Small activity: Give groups a few jumbled symbols and names, and ask them to match pairs (cell, battery, bulb, LED, switch ON/OFF, etc.).



Explain

Go through each symbol in the resource:

- Cell, Battery, Bulb, LED, Wire, Wire joint, Wire crossing, Switch ON/OFF, Fuse, Resistor, Voltmeter, Ammeter
- Explain its meaning and function

Highlight why these symbols are universal and used worldwide.

Example: A resistor is like a speed breaker, it slows down the flow of current.

Show how symbols make circuit diagrams easy to read and understand.

Teacher's Manual: Electricity Part 1



Elaborate

Draw a simple circuit (cell + bulb + switch + wires) using symbols on the board.

Ask students to copy it into their notebooks.

Pose a problem: Maya wants to protect her house from short circuits.

- Which symbol should we include in the circuit diagram?
(Answer: Fuse)

Show a diagram with a bulb replaced by LED. Ask: Will the diagram be the same? What will be the change?

Extension activity: Give students a real circuit setup (cell, bulb, wires) and ask them to represent it with symbols.



Evaluate

Oral/written questions:

- Draw the symbol of a bulb and a switch in OFF position
- Why are symbols better than pictures in circuit diagrams?
- Which instrument measures current? Which measures voltage?
- What does a fuse do in a circuit?

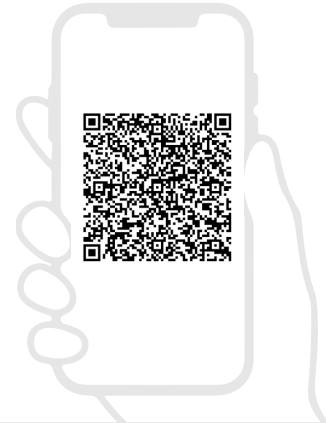
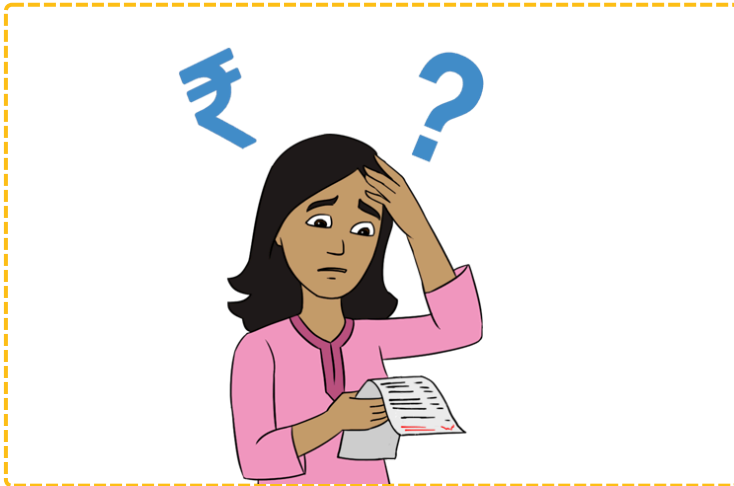
Classwork: Students draw a given circuit diagram using correct symbols.

Show question number 3 from the worksheet and encourage the students for the answer.

Homework: Collect and paste pictures of 5 electrical appliances at home and identify which symbols would represent them in a circuit diagram.

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4.8 Understanding Your Electricity Bill



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- To learn how to read and understand the electricity bill
- To understand terms like kilowatt-hour (kWh), tariff, fixed charges, and taxes
- To relate electricity consumption to the use of electrical appliances
- To develop awareness about saving electricity and reducing bills

Materials:

- Sample electricity bill (real or printed copy)
- Blackboard/Chart with units, tariff, fixed charges explained
- Notebook for calculations

Teacher's Manual: Electricity Part 1

5E Lesson plan



Engage

Ask:

- Have you ever seen your electricity bill at home? Did you understand it?
- Show a sample electricity bill. Point to the numbers and ask: What do you think these numbers mean?

Quick brainstorm: Which appliance at home do you think consumes the most electricity?



Explore

Show the part of the bill with Current reading - Previous reading = Units consumed.

Ask students to do a small calculation using example numbers (e.g., 12658 - 12420 = 238 units).

Compare appliances: If a 5W bulb runs for 2 hours, how much electricity does it use? What about a 45W fan?

Group activity: Each group picks an appliance they use daily (fan, TV, mobile charger, fridge) and guesses which consumes more and why.



Explain

Show the explanation part of the video till 3.35 minutes. And if needed Teacher explains key concepts:

- Watt (W) = unit of power
- 1000 W = 1 kW
- kWh (kilowatt-hour) = 1 kW used for 1 hour

Explain sections of the bill:

- Consumer info (name, account no., billing period)
- Meter reading and units consumed
- Tariff slabs: different rates for different usage levels
- Fixed charges: paid even if consumption is low or nil
- Electricity tax: government charges
- Other charges: like late fees, installation charges
- Introduce star ratings on appliances (more stars = less consumption = lower bills)

Teacher's Manual: Electricity Part 1



Elaborate

Show the 'Pose a Problem' section from 3.36 minutes till end:

- If your house used 322 units in a month, and the tariff is ₹5 per unit, how much would you pay?

Ask students to find tariff slabs in their own city. (homework)

Show star-rated appliances (picture/chart). Discuss: How does buying a 5-star fridge save money in the long run?

- Can you find an appliance in your home that consumes a lot of electricity?
- Can you find one with a better rating and lower consumption of electricity?

Extension link:

- Name the company that provides electricity to your home
- Compare rates and electricity charges for 3 different companies
- Would you wish to change your electricity provider?
- Where does the electricity in your home actually come from? Name the source (Introduce generation briefly, connect to future lessons).



Evaluate

Oral Quick questions:

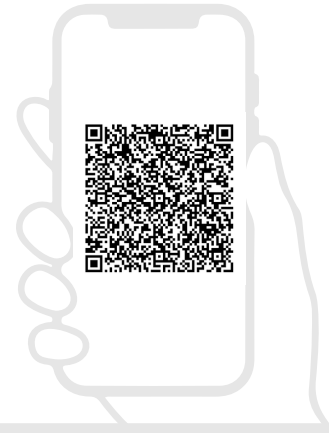
- What is the unit of electricity consumption?
- If a 100 W bulb runs for 10 hours, how many units are consumed?
- What are fixed charges in an electricity bill?
- Why is a 5-star appliance better than a 1-star appliance?

Classwork: Students label the parts of a sample electricity bill.

Homework: Bring a copy/photo of your family's electricity bill and identify: total units consumed, tariff slab, and fixed charge.

Teacher's Manual: Electricity Part 1

4.9 Worksheet



Scan or click the QR code to open the resource.

Learning objectives:

By the end of this lesson, students can:

- To assess and reinforce understanding of electrical circuits
- To identify open and closed circuits
- To connect real-world objects to their ability to conduct electricity
- To practice drawing circuit diagrams using standard symbols
- To reflect on safety aspects related to electricity

Materials:

- Printed worksheet copies for each student
- Blackboard/chalk or chart for discussions
- A few sample materials (nail, pencil, comb, paper, wood, bicycle spoke) for demonstration
- Simple circuit set (cells, wires, bulb, switch) for verification

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5E Lesson plan



Begin with a quick question:

- When does a bulb glow in a circuit? Can you make it glow with just a cell and wire?

Show a simple circuit (cell + wire + bulb).

Ask:

- What do you think will happen if the wire is disconnected?

Tell students: Today, we will test your knowledge with a worksheet and see how much you understand about circuits.



Distribute the worksheet.

Ask students to carefully observe the given circuit pictures (Q1, Q2) and predict: Will the bulb glow or not?

Allow them to mark ✓ or ✗ individually, then compare answers with a partner.

For Q4, bring real objects (nail, pencil, paper, comb, bicycle spoke, wood). Let students guess which will allow the bulb to glow, before actually testing one or two in class.



Discuss answers together:

- Why the bulb glows in a closed circuit but not in an open circuit
- Difference between conductors (nail, bicycle spoke) and insulators (wood, paper, comb)
- Importance of correct connection of cells (Q5)

Teach/revise the symbols of circuit components before Q3 and Q6.

Reinforce safety rules (Q8) by showing the unsafe activities from the worksheet and asking why they are dangerous.

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Elaborate

Ask students to think:

- If the wires are connected but the bulb does not glow (Q7), what might be the reasons?" (Possible answers: fused bulb, weak cells, loose connection, wrongly connected)

Challenge:

- Draw a neat circuit diagram using symbols in your notebook that will definitely make the bulb glow

Extend to daily life: Where do you see circuits at home or school? What happens when a switch is ON or OFF?



Evaluate

Collect and check worksheets (individual evaluation).

Oral questions for quick check:

- What is the difference between a closed and open circuit?
- Name two conductors and two insulators from the worksheet
- Why should we use symbols instead of pictures in a circuit diagram?
- What precautions should be taken while working with electricity?

Homework: Redraw one of the circuits from the worksheet in your notebook and label with correct symbols.