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Teacher Instruction KIT

# Electricity and Circuits

Syllabus: NCERT
Subject: Science
Grade: 6
Textbook Name: NCERT- Science Textbook for class VI
Chapter Number & Name: 12. Electricity and Circuits

## 1. OVERVIEW

1.1 OBJECTIVES AND PREREQUISITES

### Objective

- To understand electric cells and how to make an electric circuit.
- To understand different materials such as insulators and conductors.

### Prerequisite Concept

- Electric conductors and insulators ( some familiarity with electricity in everyday life)
- Electrical Energy, Grade -5, Chapter- 13: Amazing Energy

### Content Index

*Kindly Note: Activities marked with * are mandatory*

4.1 EXERCISES & REINFORCEMENT

Making an electric circuit

Activity 4: Making an electric circuit

4.2 IMPORTANT GUIDELINES*

Exercise Reading

Perform Textbook Activity

Provide Homework

## 2. LEARN

2.1 KEY POINTS

- Conductors: are materials or substances which allow electricity to flow through them. They are able to conduct electricity because they allow electrons to flow inside them very easily. Example: copper, aluminium, gold and silver.
- Insulators: are materials or substances which resist or don't allow the current to flow through them. They are mostly solid in nature and are finding use in a variety of systems. They do not allow the flow of heat as well. Example: glass, wood, rubber and plastic.

2.2 LEARN MORE

None

## 3. ENGAGE

3.1 INTEREST GENERATION ACTIVITY

### Purpose of electricity

**Activity 1: Purpose of electricity**

*Materials Required*: None

*Prerequisites:* None

*Activity Flow*

- For a minute, switch off the fan or any electrical appliance which is currently being used in the class.
- Then ask why did it turn off? Turn it on back again. Why did it turn back on?
- Discuss and then explain to them what electricity is.
- Tell students that they cannot see electricity because electrons, the charged particles whose movement through a substance creates electricity, are too small to

be seen even with a microscope. When electrons flow through certain substances (like copper wire), they form an electrical current. Electrical current provides energy to power all kinds of things, from fans to video games to refrigerators.

## 3.2 CONCEPT INTRODUCTION ACTIVITIES

### Electric circuit

**Activity 2: Electric circuit**

*Materials Required:* wires, battery, switch, buzzer and bulb, tactile diagram showing electric circuit.

*Prerequisites: None*

*Activity Flow*

**Act out an electric circuit, as follows:**

- Ask students to join you in forming a circle.
- Tell students that you represent a battery and they represent a wire conductor.
- The circle represents a circuit. Distribute an object -- like a ball, their stylus, a book, or an eraser -- to each member of the circle, including you. Ideally, everyone should have the same object. Tell students that these objects represent electrons inside a wire conductor. Explain that a wire conductor is full of electrons.
- Remind students that you are playing the part of the battery in this circuit, and explain that all batteries have a positive end, represented by your left hand, and a negative end, represented by your right hand. Pass your "electron" to the student on your right. The student receiving your electron should in turn pass the one he or she is holding to the right. Have students continue passing on electrons to the person to their right.
- Tell students that because electrons share the same negative charge, they repel one another, which keeps them moving along in the same direction. State again that the flow of electrons through a conductor is called electrical current.
- Tell students that as long as the circle remains intact and the electrons continue to flow, their circuit is closed. To illustrate what happens when a circuit breaks, or opens, create a gap in the circle of students that is too wide across to pass electrons. The current will stop as a result.

**Real materials (wires, batteries, bulbs) and tactile diagram showing electric circuit**

- After the activity show them the real materials like wires, batteries, and bulbs.
- After that show them the tactile diagram of a circuit and explain that two terminals of the electric cell were connected to two terminals of the bulb with the help of a wire.
- The electric circuit provides a complete path for electricity to pass (current to flow) between the two terminals of the electric cell. The bulb glows only when current flows through the circuit.

- Show them the electric circuit consisting of wires, bulb, buzzer and battery. Let them explore each part by touching it and how it is connected to the other. Add the buzzer also in the same circuit so that when the circuit is closed, the bulb will glow and the buzzer would make a sound which would signify the same that the circuit is closed whenever the sounds come.

Electric Switch:

- A switch is a component which controls the open-ness or closed-ness of an electric circuit. . They allow control over current flow in a current (without having to actually get in there and manually cut or splice the wires). Switches are critical components in any circuit which requires user interaction or control.
- Show them the real switches and ask them to switch on and off. Now they will understand why in the first activity the fan/electrical appliance turned off.

## Conductors and Insulators

**Activity 3: Conductors and Insulators**

*Materials Required:* copper wire, aluminium wire, plastic, paper, wood.

*Prerequisites: None*

*Activity Flow*

- Ask the students, how many of them have experienced a feeling of electric shock while opening the window of your car or coming in contact with wires in wet conditions?
- But, why is that? Why don't you get similar experiences with wooden materials?
- Introduce them to conductors and insulators along with the examples.
- Examples of conductors: copper, aluminium, gold and silver.
- Metals, human, and animal bodies are all conductors. This is the reason we get electric shocks! The main reason is that being a good conductor, our human body allows a resistance-free path for the current to flow from wire to our body.
- Examples of insulators: glass, wood, rubber and plastic.
- For example, plastic s used for electrical insulation and wiring shields. It is also employed for heat insulation requirements. It is used in toasters, fat roasters, coffee kettles, switches, vending machines, refrigerators, etc.
- In the same electric circuit used in the previous activity, children can use different objects like paper, plastic, copper wire, etc to check which one of them conducts electricity. For this they have to use these objects in between two wires of that electric circuit.

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE*

- Take the students to the school physics laboratory and let them explore some open circuits and the components of the circuits for the material.
  *NOTE: Make sure that there is no current being passed through the circuit while the student is feeling it.*
- Handles of the tools like screwdrivers used by electricians have plastic or rubber covers.

## 4. EXERCISES & REINFORCEMENT

4.1 EXERCISES & REINFORCEMENT

### Making an electric circuit

**Activity 4: Making an electric circuit**

*Materials Required:* rubber mat, parchment paper, stylus.
*Prerequisites: Electric circuit*

*Activity Flow*

- Now that the students know how and what an electric circuit is. Ask them to make an electric circuit on a parchment sheet.
- Let them make two circuits, one closed circuit and one open circuit. They can take the reference of the tactile electric circuit which is shown to them in the previous activity.

4.2 IMPORTANT GUIDELINES*

**Exercise Reading**

It is very important that the children practice their learnings as well as their reading. Hence have the children read out the newly learned concepts from their textbooks or other available resources.

**Perform Textbook Activity**

It is good practice to have the children perform the textbook activities. Your textbook activities might not be accessible hence go through this resource to learn how to make textbook content accessible

**Provide Homework**

To evaluate their understanding and to help the student revise and implement the new learnt concept ensure to provide them with homework. Students should perform one or two of the questions mentioned above or from the textbook exercises with the teacher in

Class and the remaining may be given for homework. Also, ensure that the student knows their special skills linked to independently using their accessible books as it will be critical to doing homework independently

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