

SCIENCE

ACTIVITY-14(A)

ELECTRIC CURRENT AND ITS EFFECTS

Class: VII

Duration-30 minutes

Nature of activity: Group

Learning Outcome: Students will be able to examine that the when current flows through a wire it generates heat, which is known as heating effect of electric current. More the amount of heat flow, more will be the heating effect.

What we have to do?

To observe the heating effects of electric current.

What do we require?

1.5 V cell. Cell holder, Switch, Nichrome wire, a candle.

What do I need to know?

A closed circuit allows the current to flow through it.

Teacher's Activity: The teacher will arrange ten kits. Each kit will have the following things – one 1.5 V cell, Cell holder, switch, Nichrome wire and a candle for each of the ten groups. Teacher will give instructions regarding the activity.

How will you proceed?

Student's Activity:

1. Take about 20 cm long Nichrome wire. Wrap it over a candle uniformly so that each turn is separate from the other. Now you have made a coil with the candle as its core.
2. Connect one end of this wire with the positive terminal of the battery and complete the electric circuit.
3. Insert the switch in a plug. The electric circuit is closed now.
4. Observe the candle for 5 minutes. Does it start melt around the wire?

What have you observed?

Melting of the wax	After 1 min	After 5 min

What have you learned?

- Electric current produces _____ effect in the wire which causes the wax to melt. More the current flows through the wire _____ will be the _____ effect.

What more can we do?

- The activity can be repeated with wires of different lengths and materials.
- The activity can be repeated with batteries of 1.5 V, 3V, 4.5V and report their observations.
- Discussions may be initiated with students on the following points:
 - Does the heat produced in the wire depend on its length?
 - Does the heat produced on the material of the wire?
 - Does the heat produced depend the number of cells used?

ELECTRIC CURRENT AND ITS EFFECTS

ACTIVITY-14 (B)

Class: VII

Duration-30 minutes

Nature of activity: Group

Learning Outcome: Students will be able to verify that the when current flows through a wire it behaves like a magnet and this effect is known as magnetic effect of electric current. The magnet generated by this process is known as an electromagnet and its strength can be increased by increasing the number of turns of the wire.

What we have to do?

To observe how the strength of an electromagnet depends upon the number of turns of the wire.

What do we require?

10 cm long three iron bolts, enamelled copper wire, a battery of two cells, a switch, shoe nails about 100 g, plastic pipe (10cm), and paper.

What do I need to know?

When electric current is passed through a coil it produces magnetism and it is known as an electromagnet.

Teacher's Activity: The teacher will arrange ten kits. Each kit will have the following things – 10 cm long three iron bolts, enamelled copper wire, a battery of two cells, a switch, shoe nails about 100 g, plastic pipe (10cm), and paper for each of the ten groups. Teacher will give instructions regarding the activity.

How will you proceed?

Student's Activity:

1. Make three electromagnets with 20, 40, and 60 turns. For this wind the enamelled copper wire tightly around the iron bolt in the form of a coil.
2. Rub the free ends of the wire of each electromagnet with the sand paper to remove the enamel coating.
3. Connect the electromagnet with 20 turns to a battery of 2 e end of the bolt and switch.
4. Place some shoe nails near the end of the bolt and switch on the current. What happens? Do the nails cling to the bolt? Count the number of nails attracted by this electromagnet.
5. Switch off the current. Now the coil loses most of its magnetism. A few nails may still cling to the electromagnet.
6. Repeat this activity with the other electromagnets of 40 and 60 turns with the same set –up.
7. Wind 60 turns of the enamelled copper wire around a plastic pipe instead of an iron bolt and observe if it acts as an electromagnet. Note the number of iron nail it attracts.

What have you observed?

- The electromagnet _____ its magnetism when the electric current is switched off.
- Number of nails attracted by the electromagnet having 40 turns is _____ than the number of nails attracted by the electromagnet having 20 turns. Also the number of nails attracted by the electromagnet having 60 turns is _____ than the number of nails attracted by the electromagnet having 40 turns.

What have you learned?

- A current carrying coil of wire wrapped around a piece of iron works as an _____ and its strength depends upon _____ wire and the core used to make the electromagnet.

What more can we do?

- Repeat this activity by replacing the battery of two cells by a battery of three cells and find out if there is any change in the strength of the electromagnet.

Extended learning worksheet

Answer the following questions:

1. Name three electrical appliances in which heating effect of current is desirable.

_____.

2. Name three electrical appliances in which heating effect of current is undesirable.

_____.

3. Why do we use iron for making electromagnet and not steel?

_____.

4. What is the common name of the magnet made by using current?

_____.

5. Name any two device where electromagnets are used.

_____.

6. Which of the two is used to load heavy iron girders on to a ship- an electromagnet or a permanent magnet?

_____.