



BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT: -SCIENCE

CHAPTER: - Electric Current and its Effects

Week -5th October to 9th October, 2020.

Number of Blocks: 2/3

GUIDELINES FOR STUDENTS

Dear Students

- There is only **1 Assignment**.
 - Assignment: Based on Sub topics given below.
- Attempt the assignment in Science notebook.
- **Video links** have been provided for better understanding of the concept through visuals. Watch the videos carefully as these will help you in doing the assignment.
- Read the lesson from **NCERT textbook** also.

SUB TOPICS:

- Heating effect of electric current

INSTRUCTIONAL AIDS:

- Torch bulb, electric cell, switch, connecting wires.
- You-tube links: <https://www.youtube.com/watch?v=F8WucWRAgZw>
<https://www.youtube.com/watch?v=Wu4iwvKN3tg>
- NCERT Link: http://ncertbooks.prashanthellina.com/7_Science.html

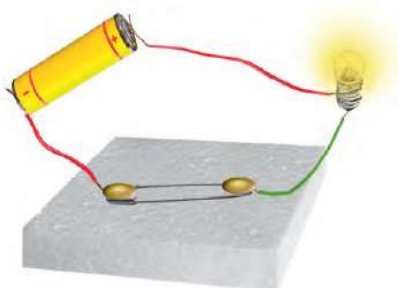
LEARNING OUTCOMES:

By the end of this lesson, **each learner will be able to:**

- Observe heating effect of current in order to enlist its uses and compare it for conductors of different material, length and thickness.
- Summarize the benefits of using CFLs over ordinary electric bulbs.
- Evaluate the role of a fuse wire for electrical safety in a circuit.

ACTIVITY

Students will connect the following simple electric circuit using a torch bulb, an electric cell, switch and connecting wires.



Keep the switch in off position. Touch the bulb. Now move the electric switch to the 'ON' position and let the bulb glow for a minute or so. Again, touch the bulb. It becomes hot.

LESSON DEVELOPMENT:

The Heating Effect of Electric Current

When an electric current passes through a wire, the wire gets heated up. This is known as the **heating effect of electric current**.

Many appliances work on the heating effect of electric current such as:

- electric heater
- electric iron
- electric stove
- geysers
- electric coffee maker
- toaster
- hair dryer

Electric heater



Electric room heater



Electric iron



Electric kettle



Appliances that work on the heating effect of electric current

Element-

All electrical heating devices consist of a coil of wire called an element. When these appliances are switched ON after connecting to the electric supply, then their elements become red hot and release the heat.

The heat that is produced in the wire depends upon the following factors:

- the material of the wire
- the length of the wire
- the thickness of the wire

Depending upon the amount of heat required by heating appliances different types, sizes and length of wire are used in them. Some wires can break down or melt as they get heated.

Production of Light in a Bulb due to the Heating Effect of Electric Current:



Glowing filament of Electric Bulb

The filament of a bulb is a coiled wire that gets hot when electricity is passed through it. This makes the filament glow and as a result, light is produced from the bulb.

CFL (Compact Fluorescent Lamp)



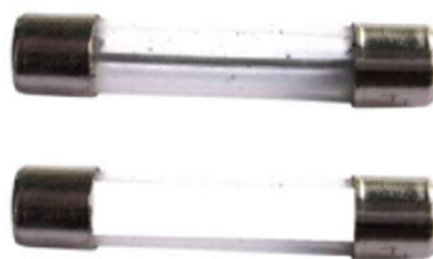
CFL

- CFLs save energy as they do not produce heat along with the light.
- Ordinary bulbs on the other hand waste energy as they get heated while lighting up.

What is an electric fuse?



Fuse used in buildings



Fuses used in electrical appliances

Different types of Fuses

- An electric fuse is a device that is used to prevent the damage that can be caused by an excess of electric current. According to the heating effect of the electric current, a wire becomes hot as current is passed through it. However, if an excess of current is passed through a wire it can melt or break.
- The electric fuse consists of a wire which is made up of a metal or an alloy which has a low melting point. As a result, the wire breaks down easily as the current exceeds the safe limit. Fuse is thus a safety device which prevents damages to electrical circuits and possible fires.
- Different types of fuses are used for different devices and some are also available for houses as well.

This is why fuses are used to prevent any kind of short circuit and overloading.

- **Cause of Large Current Flow in household electric wiring-**

An extremely large current can flow in the household electric wiring circuits under two circumstances - overloading and short circuit. We might have read reports in the newspaper about fires caused by short circuits and overloading. Now, let's study these two terms.

- **Overloading-**

It is a situation when too many electrical appliances are connected to a single socket; they draw an extremely large amount of current from the household circuit. The flow of large current due to overloading may heat the copper wires of household wiring to a very high temperature and fire may be started.

- **Short Circuit-**

Electric current is supplied by household through two insulated wires which run together and reach each and every electrical appliance. One insulated wire is called live wire and the other insulated wire is called neutral wire and both these wires are necessary for the working of an electrical appliance (say an electric iron).

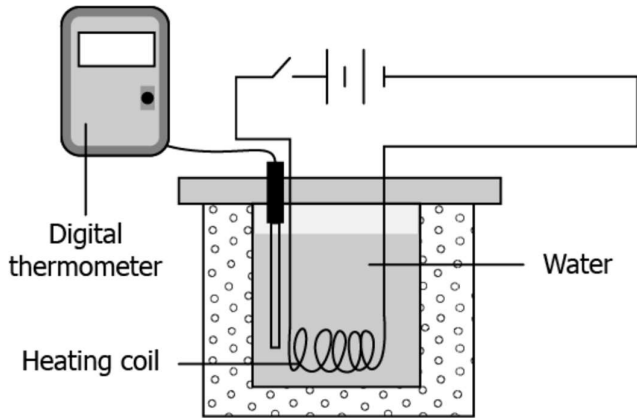
- So, if in case the plastic insulation of the live wire and the neutral wire gets worn due to wear and tear, then the two naked wires touch each other. So, this touching of live wire and neutral wire directly is known as a short circuit. Due to which a large current flows through the household wiring and this large current may heat the wires to a dangerously high temperature and a fire may be started.

Note: Always use proper fuses which have been specified for particular applications carrying ISI mark. Never use just any wire or strip of metal in place of a fuse.

ASSIGNMENT-1

Q1 Choose the correct option:

- i) A student performs an experiment where he uses a heating coil to heat the water as shown in the image. The initial temperature of the water is measured as 10°C . After switching it on for 5 minutes, the student records the temperature of the water as 18°C . The water is allowed to return back to its initial temperature. The activity is then repeated with another heating coil having half the length of the original heating coil. He notices that after 5 minutes, the temperature of the water reads 14°C . Which statement can be concluded based on the activity?



- (a) Reading on thermometer reduces with time
- (b) Temperature of water drops with every repetition
- (c) Length of the material affects the amount of heating
- (d) Temperature of the water increases after a certain period of time

ii) Which of these statements explains the benefit of CFL over incandescent bulbs?

- (a) It produces electricity from heat
- (b) It gives heat along with the light
- (c) It consumes a lesser amount of electricity
- (d) It does not require electricity to produce light

iii) A student studies that a fuse wire helps in protecting electrical appliances. What role does the fuse wire play in an electrical appliance?

- (a) It reduces the consumption of electricity
- (b) It helps to avoid the passing of large current
- (c) It helps in storage of electricity for further use
- (d) It avoids overheating of an electrical appliance

Q2. State the property of a conducting wire that is utilised in making electric fuse.

Q3. Paheli does not have a night lamp in her room. She covered the bulb of her room with a towel in the night to get dim light. Has she taken the right step? Give one reason to justify your answer.

Q4. State one measure to avoid overloading in an electrical circuit. Also mention the name given to a situation in which the live and the neutral wires accidentally come in contact. Describe the role of a safety device in this situation.
