

Teaching of 'Magnetic Effect of Electric Current'

Content points:

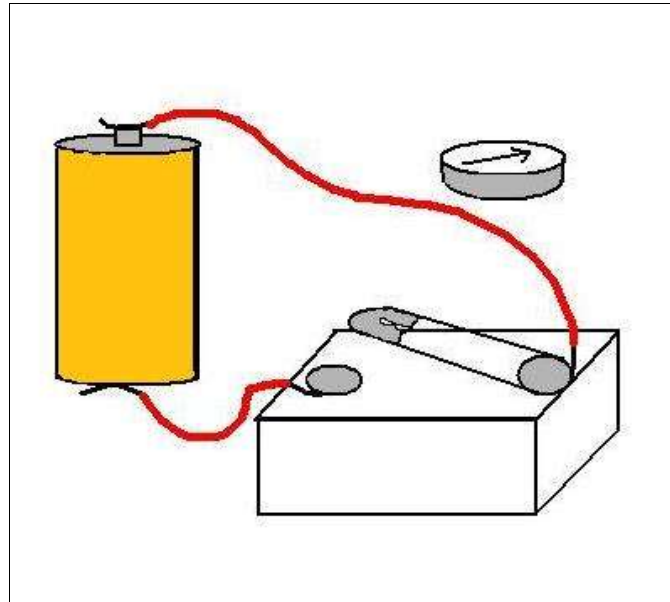
- Activity 1
- Key and electric current
- Compass needle
- Magnetic effect of current
- Hans Christian Oersted
- Activity 2
- Electromagnet

The magnetic effect of current can be introduced to class VII learners with an activity described below. All through the activity, lot of questions should be posed by the teacher to make the teaching learning interactive. Ample opportunities should be given to the learners to voice their ideas. For a demo lesson, the video given alongside may be watched.

Activity 1:

Items needed: Electric cell, compass needle, key, connecting wires.

Figure 1:

**Procedure:**

- 1) Make the circuit by connecting the two terminals of the electric cell to the 'key' as shown in Fig.1. However, take care to keep the 'key' open.
- 2) Place the 'compass needle' close to the circuit.
- 3) Note the direction in which compass needle is pointing.
- 4) Now, while watching the compass needle carefully, close the key. Take care to close the key for only a few seconds, otherwise the electric cell will get weakened very quickly.
- 5) Open the key, while watching the compass needle carefully.
- 6) Repeat steps 4) and 5) again.

Observation:

The compass needle rests in the north-south direction. When the key is closed, the compass needle gets deflected. When the key is opened, the compass needle comes back to the north-south direction again.

Analysis:

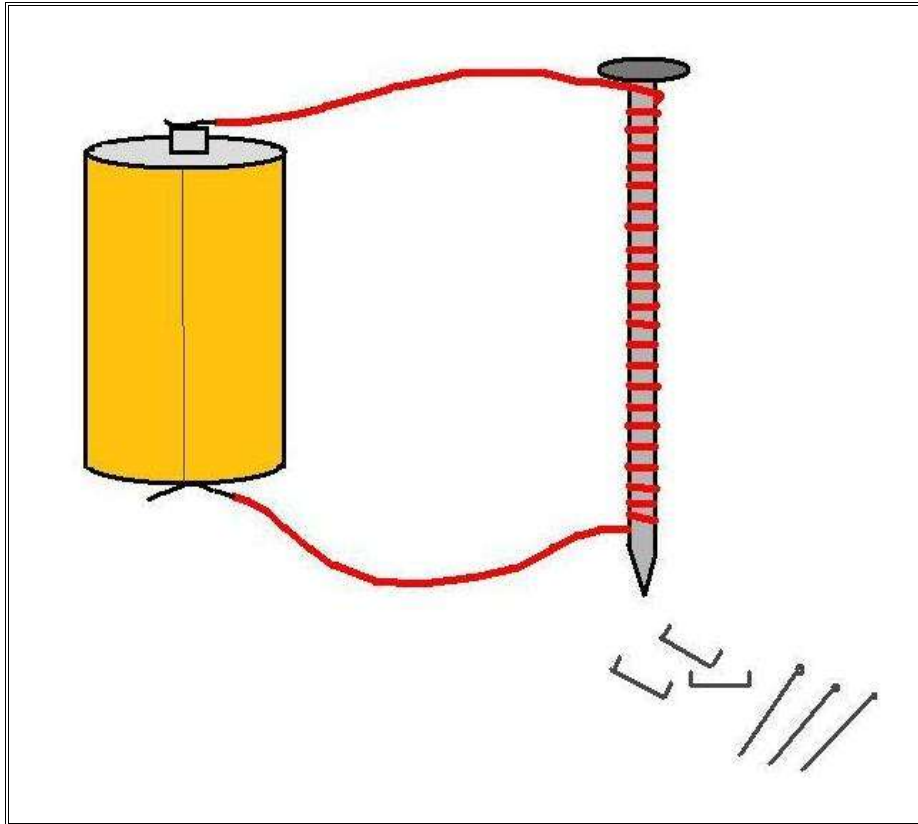
After the learners arrive at this conclusion, they may be informed that the magnetic effect of electric current was first noticed by a scientist called Hans Christian Oersted (1777-1851). The anecdote regarding this discovery may also be narrated to the learners. Oersted used to set up experiments to give demonstrations to his friends. Once he was demonstrating the heating effect of current. A compass needle was lying close by because on the same day he had planned to do another demonstration using it. Oersted suddenly noticed that when he switched on electric current, the compass needle got deflected. This was an astonishing discovery in those times when electricity and magnetism were considered to be two separate phenomenon. Thanks to Oersted we now know that an electric current can be used to make magnets.

Now the learners can make their own magnets using electric current as described in Activity 2.

Activity 2:

Items needed: Electric cell, long iron nail, long piece of wire, iron pins.

Figure 2:



Procedure:

- 1) Wind the wire tightly around the nail in the form of a coil as shown in Fig. 2.
- 2) Connect the free ends of the wires to the two terminals of the cell, as shown in Fig.2.
- 3) Bring the tip of nail close to small iron pins and observe what happens. (Take care to connect the wires with electric cell for only a few seconds, other wise the electric cell will get weakened very quickly).
- 4) Disconnect the wire ends from cell terminals and observe what happens.
- 5) Repeat steps 2), 3) and 4) again.

Observation:

When wire ends are connected to the terminals of cell, the small iron pins are attracted to

After making electromagnets, the learners may be questioned about the uses of electromagnets. If the school has a computer room, they may be taken there to do a search on uses of electromagnets. If the school does not have a computer room, they may be provided the names of few reference books available in the school library to search for this. In the next class the teacher may give some time to learners to present their search results. Then some uses, such as the working of an electric bell, can be explained by the teacher, maybe with the help of a model.