4. Sensors

2 hours activity

The children follow guidelines and using the knowledge, understanding of circuits and switches that they have revised, design and build a water sensor to indicate an effective water level in the village well.

OBJECTIVES

- To know that science is about thinking creatively to try to explain how living and non-living things work, and to establish links between causes and effects
- To design a sensor to solve a problem
- To make a sensor by creating a switch operated by the water level in a well, to complete a circuit and light an indicator bulb

RESOURCES

(per group of 4 children, unless otherwise stated)

- Activity sheets 12-13
- Plastic tube - wide diameter just greater than size of cork possibly made by rolling plastic sheeting or the tube from a toothpaste pump
- Cork
- 2lt clear plastic drinks bottle cut to about 20 cm height
- Circuit equipment – as before
- Foil, coin or crown bottle top (with paint sanded off to expose metal)
- Paper fasteners
- A5 stiff card
- Adhesive tape
- PVA glue

INTRODUCING THE ACTIVITY

Discuss the homework from Activity 3 about different switches and sensors and how they work.

If possible, look at a circuit board from inside an electronic device (this could be obtained from a local electronics company). Establish that although it is far more complex and has more components than the ones we have made, it works on the same principle, with electricity running round the circuit and switches change the components used each time. Discuss ways electricity travels round the circuit (which materials are conductors and which insulators).

MAIN ACTIVITY

Children discuss in groups, using Activity sheet 12, and report back their ideas. They are looking for different ways to make a switch to connect/disconnect a circuit which will operate as a sensor to detect when the water in the well has reached a certain level.

There will need to be some discussion at this point about the use of electricity for appliances that use water. Draw the children's attention to things like electric kettles, electric shavers (which run on low voltage), food processors and similar items where water is close to electricity. What do they think needs to be considered to make these items safe.

Discuss children's ideas and establish which ones are practical and safe to make in the classroom and why. The instructions on Activity sheet 13 can help or support children where required.

Children make a water sensor and come up with their own ideas of how to modify and improve the sensor, explain how it works and explain a suitable way of running it using wind power.

Safety note

Explain why water and electricity are safe in some cases.

PLENARY

Go back to the letter (Activity sheet 5). Have we answered the questions? Brainstorm what the children have learnt from carrying out these activities.

EXTENSION

Use photos and written work to create a report, booklet, power- point presentation or poster to show what the children have established in response to the industrial request.

If it is possible to visit a power station, electronics industry etc. then the information could be shown to the staff.

If not then invite a representative in to see how you have solved these problems and to talk about how these problems are tackled in industry.