Build a lighthouse

Your task

Working as a group, you have one hour to design and make a lighthouse using the materials provided. When the time is up, it will be tested and also assessed for its design and strength.

Take care: the winner is not necessarily the tallest lighthouse, but the lamp must be at least 90 cm above the base.

Planning

You should spend about 10 minutes on this stage. During the planning time you are allowed to:

- ✓ handle the materials
- ✓ make measurements
- ✓ making drawings and plans

During this stage, you are **not** allowed to fold, join or fix anything together.

Your planned lighthouse must be:

1. Free-standing (not stuck to the bench or floor, or resting on anything).
2. At least 90 cm high.
3. Fitted with a working lamp at the top.
4. Controlled by an on/off switch.
5. Made so that the battery is no more than 4 cm from the base of the lighthouse.

Think about how you can connect the battery to the lamp – the wire alone is not long enough. How will you make a switch?

Building

You should spend about 45 minutes building your lighthouse.

It often helps if you have also thought about assigning jobs to each person in the group as part of your planning.

Make sure you allow sufficient time to test your lighthouse before judging takes place.

Judging

Your lighthouse will be judged to:

- ✓ see if it meets the five criteria above
- ✓ assess the quality of its design
- ✓ determine how strong it is

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Teacher Guide

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Activity notes

There is ample paper and sticky tape, so three are only two main problems:

- making a tall enough tower that will not fall over
- making a circuit from the battery at the bottom to the bulb at the top.

The best designs seem to resemble a tripod with legs of rolled paper (these work better if connected together near the base to stop them spreading). Students usually quickly tumble to the idea of using the foil as one of the conductors in the circuit. At least three designs of switches can be made from the equipment provided, including:

- splitting then overlapping the aluminium foil
- breaking the circuit using the two drawing pins
- lining the inside of the clothes peg with foil and breaking the circuit with it.

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Technician notes

Per group of students:

12 × sheets of A4-sized paper
1 × insulated electrical wire, approximately 1 m long
1 × strip of aluminium cooking foil, just over 1 m long
1 × MES lamp with batten lamp holder
1 × battery
2 × metal drawing pins
1 × clothes peg
1 × roll of sticky tape
1 × one-metre rule
1 × 30-centimetre rule
1 × pencil
1 × pair of scissors
1 × small electrical screwdriver (suitable for the screws in the lamp holder)
assorted elastic bands

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Student checklist

Check that you have the following things.

- 12 × sheets of A4-sized paper
- 1 × insulated electrical wire, approximately 1 m long
- 1 × strip of aluminium cooking foil, just over 1 m long
- 1 × MES lamp with batten lamp holder
- 1 × battery
- 2 × metal drawing pins
- 1 × clothes peg
- 1 × roll of sticky tape
- assorted elastic bands

You will also be given tools including rulers, pencil, scissors and screwdriver.

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