tiny tinkering tasks

Task title

Build a push button switch

(to use in Morse Machine)

Learning outcomes

- To understand that a switch is a piece of equipment that can connect wires to allow electricity to flow through a circuit.
- To build a push button switch to incorporate into a circuit.

EHoM link

SYSTEMS THINKING

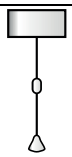
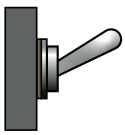
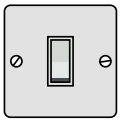
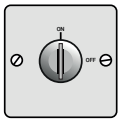
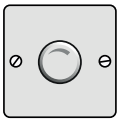
To construct an object or tool requiring the successful interaction between components and subsystems.

EDP link

Key Stage/Year Group KS2 – Year 4/6

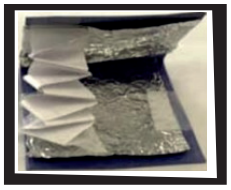
Resources required

- A collection of different switches (or pictures of switches):

							
Pull switch	Slide switch	Toggle switch	Paddle switch	Selector switch	Push button switch	Key switch	Dimmer switch

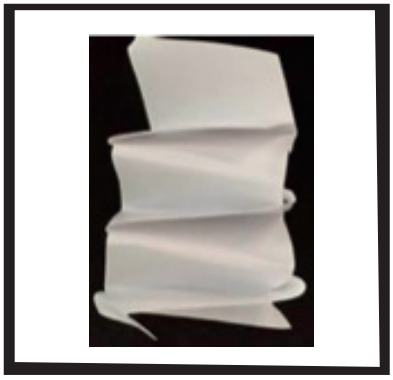
It is recommended that each child makes a switch

- A4 cardboard – 1 sheet will make 4 switches
- Paper – a sheet of A4 should be plenty for at least 5 strips – recycled paper is fine.
- Foil – see photo



How to run the task

1. Engage the children in discussing where they have encountered switches in their daily lives. Can they locate any in the classroom? Ask them to make a note of all the different examples they can see. From this elicit what they know about switches - what job do they do? What would life be without them?
2. Show the children a collection of switches (photos or actual physical examples) and explain the different ways in which they close a circuit. Do they recognise any of the examples shown? Which kind of switches are used most in the classroom? To support the explain of switches in circuits you could use: https://www.bbc.co.uk/bitesize/topics/zq99q6f/articles/zt8vg82
3. Encourage children to work in pairs to explore switches for themselves. Give each pair a piece of A5 card and ask them to measure and cut out two 5cm x 10cm rectangles, then fold these rectangles in half.



4. Next, they should attach a piece of foil to the inside top half of the rectangle and a similar sized piece to the bottom half. They should make sure that the pieces of foil are slightly smaller than the half rectangles and do not overlap each other. Ask the children why this is important.
5. They should then build a paper spring by cutting a 2cm strip from a piece of A4 paper. Fold it in half and then back and forth over itself until it forms a small stack.
6. Finally, attach the spring to each side of the inside of the switch – cover as little of the foil as possible. Foil will conduct electricity. Tape will not! Your switch is now ready to become part of a circuit.

Top Tips

- Depending on the children and time available, you could pre-cut the cardboard and paper strips.
- Extend the task by challenging the children to create different types of switches – toggle switch, slide switch, push button switch – using different components. Which is the most effective in a circuit? This is a very useful and free resource which can be downloaded from the Design & Technology association: https://www.data.org.uk/resource-shop/developing-handmade-switches/

Evaluate learning

- In pairs explain the difference switches make to our lives.
- Which of your switches worked? Why, or why not?
- What is the purpose of the paper spring?
- How could you improve your switch?
- Have you an idea for a different type of switch? What is it?

Author: Mrs Julie Wiskow, SEERIH Teacher Champion | Rode Heath Primary School

As a practising teacher, Julie has written these 12 tasks to encourage more children to engage in engineering in primary schools. They have been stimulated by real-world engineering and inspirational ideas shared by others. They are linked to the Tinkering for Learning research and development project run by SEERIH.

fascinate

Find out more about the
Science & Engineering Education Research and Innovation Hub
Faculty of Science & Engineering, The University of Manchester
www.seerih.manchester.ac.uk | @UoMSEERIH