Electrical Systems (torches)– Autumn 2

Ladders:

Y4-ES-D1 I can make a torch with a working electrical circuit and switch.
Y4-ES-M1 I can design a torch, giving consideration to the target audience
Y4-ES-M2 I can use appropriate equipment to cut and attach materials.
Y4-ES-M3 I can assemble a torch according to the design and success criteria.
Y4-ES-E1 I can evaluate electrical products.
Y4-ES-E2 I can test and evaluate the success of a final product.

Stick in a front page for the new year group work
Complete the science pre-assessment for 'electricity' and save this ready for this unit.
Stick in KO
Complete the pre-assessment: https://www.kapowprimary.com/subjects/design-technology/lower-key-stage-2/year-4/electrical-systems-torches/assessment-dt-y4-electrical-systems-torches/

Lesson 1:
Items needed: wires, bulbs, batteries, battery holders, rubbers, pencils, small pieces of card, split pins, buzzers and paperclips.

Before the lesson, teacher watch: https://www.kapowprimary.com/subjects/design-technology/lower-key-stage-2/year-4/electrical-systems-torches/lesson-1-electrical-products-2/
Then, children watch 'the pupil video'.

Recap and Review:

- Electrical systems are a group of parts (components) that work together to transport electricity around a circuit.
- Various electrical products, such as kettles, remote controls, etc.

Now complete the Attention Grabber. Children to attempt this the best that they can, we will revisit this at the end and add any extra detail in purple pen.

Ask the children: What is electricity? (A type of energy used to power electrical items.)

Explain that electricity occurs naturally in lightning but it took a long time for people to discover how to capture and use electricity for electrical items, such as hairdryers and computers. Until people discovered how to capture it, they lived without any electricity.

Which items in the room use electricity?
Which electrical items have you used today?
How would your day be different if you did not have electricity?

Why do we have batteries?
How do you know an item uses electricity?

Main Event:
On children's tables, place a set of electrical components (a battery, a battery holder, a bulb and three wires) on each table. Play the Pupil video: Elec

trical products.

Watch the 'electrical products' video (pause at 21 seconds) Give children some time to build the circuit with their learning partners. (make sure the 4 items are on the table).
Do the electrical items we have discussed always stay on?
Can you think of a way to create a switch in your circuit?

Children watch the rest of the video.

Recap what they just watched: (teacher then demonstrate this part)

- Pierce two holes in the piece of card and attach the two split pins.
- Attach two wires from the circuit, one to each split pin.
- Place a paper clip over the top of one split pin.
- Demonstrate how to open and close the switch by rotating the paper clip to touch both split pins (switch on) or only one split pin (switch off).

Allow the children to have a turn. They will need: a small piece of card, 2 split pins, a paper clip, a sharp pencil and a rubber.
Then, hand out a buzzer to each table so the children can swap out their bulbs and create a circuit with a switch that prevents them from making a constant noise.

Adaptive teaching
Pupils needing extra support
Could be given a completed circuit to look at while trying to create one of their own; should be encouraged to check all of the connections to ensure the circuit is complete; could be given the Activity: Circuit diagrams (showing an example circuit) at the beginning of the Main event.

Lesson 2: (Torch product analysis/ Torch evaluations)
Items needed: Whiteboard and pens.

Recap and review;
Complete presentation: 3, 2, 1 https://www.kapowprimary.com/subjects/design-technology/lower-key-stage-2/year-4/electrical-systems-torches/lesson-2-evaluating-torches/

On slide 1, children will be reminded of a picture that was on their attention grabber. They are given 2 new pieces of information. Using a purple pen, add extra notes.

Look at Sir Joseph Swan and Thomas Edison – both gentlemen are equally as important as one another. Then, look at Lewi Latimer.

Look at some examples of portable electrical torches, have they ever seen any of them? Discuss what the word potable means. On the next slide, look at the torch and the features.

Y4-ES-E1 I can evaluate electrical products.
Look at the three different types of torch. Children to work in pairs and answer these questions:
What Is your first impression of this torch?
Who might the torch be designed for?
What aspects do you like about the torch and which would you improve?

Talk through with them the three main headings: Housing, reflector and switch.

Adaptive Teaching:
Pupils needing extra support
Should spot the similarities and differences between the torches before evaluating them; could circle the features of the torch on the sheet before writing sentences; could be given page one of the Activity: Torch evaluations as it will have already been discussed as a class; could use the Resource: Features of a torch diagram (support) as an aid to writing, circling their favourite parts and discussing their ideas for their own torch design.

Lesson 3: (Torch Design)
Items needed:

Recap and review:
Arrange the children in pairs and display the Presentation: Gimme five! Allow time for paired discussion.

Ask the children of they can remember the successful features of a torch. Take some answers and the recap the picture that labels all of the features.

LI: Y4-ES-M1 I can design a torch, giving consideration to the target audience
Children will be deigning a torch based on a target audience. They need to think about these things:

1. What colours might that person like?
2. What hobbies or interests does that person have?
3. Why does that person need a torch?
4. What key features will that person need to be included in the design?

We will use Evelyn for our design.
Explain what a design criteria is....it must meet these.

Teacher may want to watch the video on how to assemble a torch in preparation.

Adaptive Teaching:
Pupils needing extra support:
Could be shown the materials that will be available to make their torch from so they can consider them while they plan their design; could be given a list of suggested materials to pick from when designing their torch; should be encouraged to keep their design simple to ensure they have the time to create a quality product.

Lesson 4:
Items needed: batteries, battery holders, wires, bulbs, split pins, paper clips, small pieces of cardboard, packaging (kitchen roll tube), foil (reflective material) and a material to prevent the circuit from moving around (tissue paper?)
Scissors and sticky tape.

LI: Y4-ES-D1 I can make a torch with a working electrical circuit and switch.
LI: Y4-ES-M2 I can use appropriate equipment to cut and attach materials.
LI: Y4-ES-M3 I can assemble a torch according to the design and success criteria.

Ensure children pay attention to their design and allow them tome to make it.
Go back to the video in lesson one and play on repeat so that children have a reference point if they get stuck. https://www.kapowprimary.com/subjects/design-technology/lower-key-stage-2/year-4/electrical-systems-torches/lesson-1-electrical-products-2/

To finish:
Create or locate a dark space for the children to test their torches. Discuss the questions below to help the children test if their torch is fit for purpose:

- Does the torch light up?
- Can the torch be switched on and off?
- Does the circuit remain securely in place when carrying the torch?

Complete the final evaluation sheet once children have tested out their torches.

Post-assessment