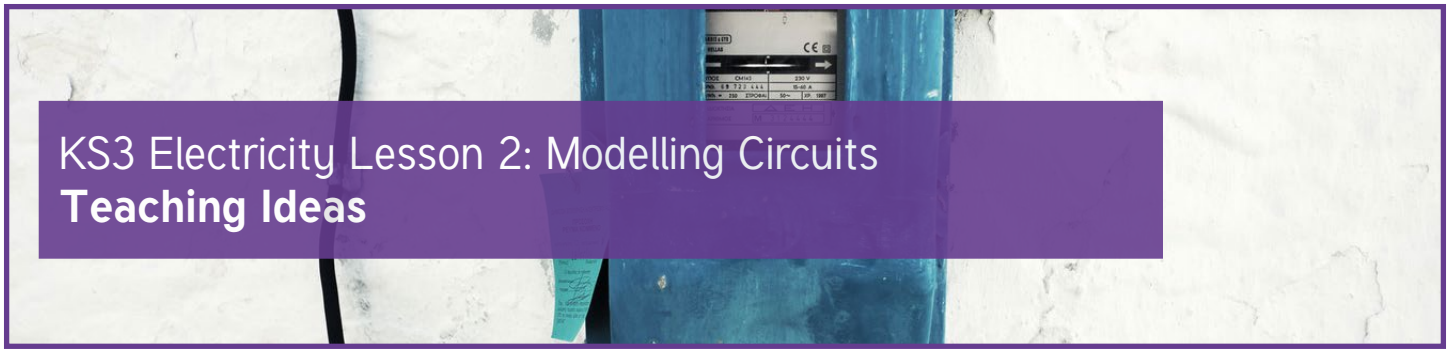

KS3 Electricity Lesson 2: Modelling Circuits
Teaching Ideas

Learning Objective:	To use an analogy to explain how electrical circuits work.	Resources rope jelly beans (or other small sweet) masking tape
Success Criteria:	• To use simple models to describe scientific ideas. • To use a model to explain how electricity flows around a circuit. • To compare and contrast different models.	
Context:	This is lesson 2 in a series of lessons that covers the topic of KS3 electricity with a focus on modelling circuits. Students are asked to use several different models to aid their understanding and ability to explain electrical circuits using keywords. You can teach this lesson as a stand-alone lesson or use it to form the wider unit of work on the introduction of electricity. The choice is yours! **Teacher note – Please be aware of any allergies or dietary/religious requirements in your class in relation to the sweets you decide to use for the jelly bean activity. Twinkl does not accept any responsibility for injury incurred during the teaching of this lesson.**	

Starter

What's the Link?

The starter shows three pictures. You can use this activity to initiate a class discussion about the use of the word model and how it can mean different things. You may choose to ask students to independently think of the keyword for the lesson and think about what the pictures represent.

Main Activities

What Is a Model?

You can use this section to introduce modelling to students and explain what it is and how scientists use them to explain difficult concepts.

The Rope Model

A fun activity! You may find it useful to role-play an electric circuit using the whole class. The model is useful for explaining why components become hot in the circuit. Ask the students to form a circle around the classroom. The students should hold the rope with a loose grip. One student acts as the 'battery' and pulls the rope so that it slides through the hands of the 'circuit components' (the other students). The students should feel that their hands become warmer as the energy is transferred from the rope. There is room for plenty of discussion about how the model represents an electrical circuit. There is also room to discuss students' ideas about the potential advantages and disadvantages of the model. This could be done as an initial mind map to gather students' ideas before completing the **Jelly Bean and Rope Model Activity Sheet**. There is a lower-ability version of the **Jelly Bean and Rope Model Activity Sheet** which includes sentence starters for the long-answer questions and 'fill in the gap' activities.

The Jelly Bean Model

Another really fun activity! You may find it useful to role-play a second electric circuit using the whole class. This model has many differences to the rope model and is useful for students when comparing models. The students collect two jelly beans from the table 'battery'. A piece of masking tape should be placed on the floor on the opposite side of the battery. The students should walk around the room holding their jelly beans. As they approach the piece of tape in turn, each student should recite a tongue twister (Peter Piper is suggested on the **PowerPoint**). The tongue twister represents resistance in a circuit and how resistance results in a smaller current. As each student leaves the tape and continues their journey back towards the battery, they should eat the jelly beans. Once they are back at the battery, the process is repeated. The table represents the battery providing the energy to the charges. The children represent the flow of charges around the circuit. The current is represented by the speed at which the children are walking. The voltage is represented by the number of jelly-bean charges each student holds. As each child holds two charges, this shows that the voltage around the circuit is 2V.

You may, after modelling both circuit models, ask students to complete the **Jelly Bean and Rope Model Activity Sheet**.

Allow students time to self-assess and correct any mistakes. You may choose to do this as a peer assessment activity instead.

Model Strengths and Weaknesses

Next, you can introduce the analogy of the central heating system. You may choose to do this as a whole class discussion. You can ask students to identify on the model which parts represent the current, battery, wires and bulb. Ask students to consider the strengths of the central heating system model, but also its weaknesses. There is room for a class discussion and you can gather students' ideas; you may choose to create a mind map of students' ideas.

Plenary

Provide students with the **Model Evaluation Activity Sheet**. There is a lower-ability version of the **Model Evaluation Activity Sheet** which includes sentence starters for longer-answer questions and 'fill in the gap' activities.