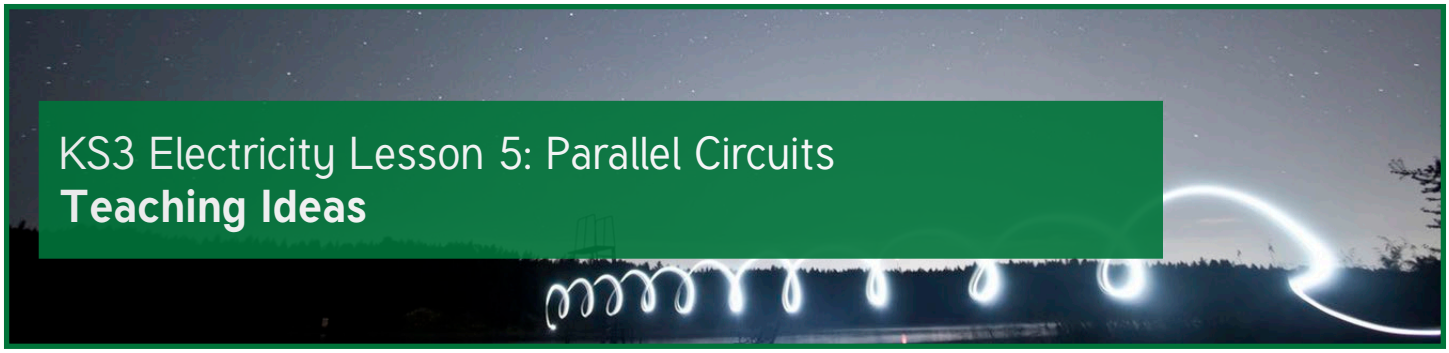

KS3 Electricity Lesson 5: Parallel Circuits
Teaching Ideas

		Resources
Learning Objective:	To investigate current in parallel circuits.	sticky tape a cardboard box or shoe box circuit wires batteries buzzer switch light bulbs scissors
Success Criteria:	• To identify the differences between series and parallel circuits. • To draw and construct a parallel circuit from a description. • To construct and electrically wire an eco-friendly house.	
Context:	This is lesson 5 in a series of lessons that covers the topic of KS3 electricity with a focus on parallel circuits. Students are asked to imagine that they are currently the site manager for a local eco-friendly housing development project. The houses are in the early planning phases and will provide luxury accommodation to executives that work in the city. Students are tasked with designing, building and electrically wiring each house using their knowledge of parallel circuits. 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!	

Starter

Lights

A light has blown in my living room. Will this stop the lights in the rest of the house from working?

Are houses wired in a series or parallel circuit? Explain your answer.

Students should draw from their own experiences of parents or carers changing light bulbs in the house. Most students should say that one light bulb blowing will not have an impact on the rest of the lightbulbs in the house and this is because the lights are wired in a parallel circuit.

Challenge: Write down ideas about the benefits of using parallel circuits over series circuits.

If one component in a parallel circuit fails, the other components will not fail as there is more than one route for the current to flow.

Another advantage is that more components can be added to a parallel circuit without the need to add more voltage.

Main Activities

Parallel vs Series Circuits

You can use this section to introduce the topic of parallel circuits to students. Discuss with students the differences between series and parallel and the advantages of parallel over series in houses.

Building Parallel Circuits

Next, you can introduce the rules of building parallel circuits and the activity. Before students draw the parallel circuits, you may choose to encourage students to build the circuits first as this may help with drawing them. There is a step-by-step method for those students who may need more support when constructing the parallel circuits.

Go through the rules of drawing circuits with students and then provide the **Dream House Activity Sheet**.

There is a lower-ability version of the **Dream House Activity Sheet** which provides some of the parallel circuits partially drawn. You may find that different groups need different lengths of time to complete the tasks. Allow students time to self-assess and correct any mistakes. You may choose to do this as a peer-assessment activity instead.

Dream House Construction

Introduce to students the construction of the dream house. Students are asked to imagine that they are the site manager for a local eco-friendly housing development project. The houses are in the early planning phases and will provide luxury accommodation for executives that work in the city.

Students are asked to design, build and provide electrical wiring in each house.

For every house that is constructed, there are certain rules that the students must adhere to.

Inside the house:

- There must be at least two separate rooms.
- There must be a series circuit with 2 bulbs, 1 battery and 3 wires wired correctly.
- There must be a parallel circuit with 2 bulbs, 1 battery, 1 switch and 5 wires wired correctly.

Outside the house:

- There must be a parallel circuit with 2 bulbs, 1 battery, 1 switch, 1 buzzer and 6 wires wired correctly.

The 'house' must be made of a cardboard box no smaller than the size of a shoe box.

For each phase of the construction process, you will be awarded points. There are 50 points up for grabs.

Open up a class discussion about what students would like to see in their own dream house. You may choose to create a mind map with a list of ideas and desirable features that students may wish to include.

Dream House Design

Next, you can introduce to students the idea that a blueprint design of their dream house should be drawn. The design should be a bird's eye view drawing of how their house will look when students add the electrical wiring. For higher-ability students, you may wish to challenge them further by asking them to draw an accurately-scaled design of their house.

Students should add labels to their design to indicate where the series and parallel circuits will be placed. Students should also think carefully about where the wires go. It might be an idea to suggest taping the wires down. Ensure that students test their circuits before fitting them into the house.

Once students have drawn their designs, then they should proceed with constructing the circuits and attaching them to the cardboard box. With the **Dream House Activity Sheet** comes a checklist for students to be able to tick off as they construct their house. The checklist can also be used to grade students - for each of the five checkpoints, students can score a maximum of 10 points. You may choose to use the checkpoint activity as an opportunity for self-/peer-assessment.

For a second lesson, you may wish to extend the house-building activity and discuss how the house could be thermally insulated. You may also choose to investigate which materials are better at insulating than others.

Plenary

Light Bulbs

Students have made lots of different circuits today.

If a student removes one of the bulbs from a series circuit and one from a parallel circuit, what will happen?