

## KS3 Electricity Lesson 3: Measuring Voltage

### Teaching Ideas

<p><b>Learning Objective:</b> To investigate the best citrus fruit to use to make a battery.</p> <p><b>Success Criteria:</b></p> <ul style="list-style-type: none"> <li>To carry out an investigation to <b>measure</b> voltage.</li> <li>To <b>explain</b> how a battery works using scientific keywords.</li> <li>To <b>apply</b> your knowledge of batteries to <b>explain</b> how a fruit battery can power a mobile phone.</li> </ul> <p><b>Context:</b> This is lesson 3 in a series of lessons that covers the topic of KS3 electricity with a focus on measuring voltage. Students are asked to imagine that they are scientific researchers that work for a major mobile phone company. The company has asked them to investigate the possibility of moving away from lithium batteries and use an environmentally friendly alternative such as citrus fruit. In groups, students carry out an investigation to see which citrus fruits would make the best battery to power a mobile phone. 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!</p>	<p><b>Resources</b></p> <p>oranges lemons limes</p> <p>Per pair of students:</p> <p>1 piece of each fruit 1 strip of copper 1 strip of zinc 2 crocodile clips 1 voltmeter 2 wires</p>
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### Starter

#### Scrabble

Use the scrabble letters to calculate how many points each of the keywords will be worth.

### Main Activities

#### Voltage and Batteries

You can use this section to introduce voltage and explain how batteries work to the class. There is an interesting [video](#) on how batteries work which includes visual animations detailing the inside of a battery and the movement of charges.

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#### Knowledge Check Question A, B and C

You may then choose to check students' knowledge and understanding by asking them to complete the written activity on how batteries work. This is a differentiated activity with Knowledge Check Question A being most suited to high-ability learners and Knowledge Check Question C most suited to low-ability learners. Knowledge Check Question B has several sentence starters for middle-ability learners.

Allow students time to self-assess and correct any mistakes. You may choose to do this as a peer assessment activity instead. You may also choose to do the activity as a whole class discussion and create a mind map of students' knowledge and understanding of how a battery works.



## Fruit Batteries

You may like to carry this investigation out in pairs or threes, depending on the size of your class.

Please provide students with the following activity sheet **Fruity Battery Investigation**. There is a lower-ability version of the **Fruity Battery Investigation** activity sheet which provides tables for collecting data, rather than asking students to formulate their own.

Explain to students the context of the lesson – they should imagine that they are a scientific researcher working for a major mobile phone company. The company has asked the students to investigate the possibility of moving away from lithium batteries and to start using a more environmentally-friendly alternative such as citrus fruit. Students should work in groups to carry out an investigation to see which citrus fruits would make the best battery to power a mobile phone. There is an interesting video on [lemon batteries](#) which explains how a fruit battery works.

You may choose to discuss the variables of the investigation as a class or you may encourage students to complete this section of the **Fruity Battery Investigation** sheet independently. Encourage students to predict which fruit they think will produce the largest voltage. You may choose to do this as a class vote and ask students to put their hands up for the fruit they think will produce a larger voltage or you may choose to do this as an independent task.

**Teacher note – please check that the content of this video is suitable for your learning environment. Do not allow the next video to play. Twinkl accepts no responsibility for the content of third party websites. Please also check for any allergies in your class to the materials being used. Twinkl accepts no responsibility for injury or illness incurred from the teaching of this lesson.**

## Conclusion

After students have been given time to complete the investigation, there is scope for a class discussion on the findings of the investigation. Depending on the ability of the class, you may choose to do this as a mind map. Allow students time to self-assess the findings from the investigation and correct any mistakes. You may choose to do this as a peer assessment activity instead.

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## Plenary

Summarise what you have learnt today in...

three sentences.

two words.

one letter.

(Justify why you chose that letter.)

