Fruity Battery Investigation

You are currently a scientific researcher working for a major mobile phone company. The company has asked you to investigate the possibility of moving away from lithium batteries and using an environmentally friendly alternative such as citrus fruit.

Your boss has told you that the average mobile phone needs **4V** to charge it.

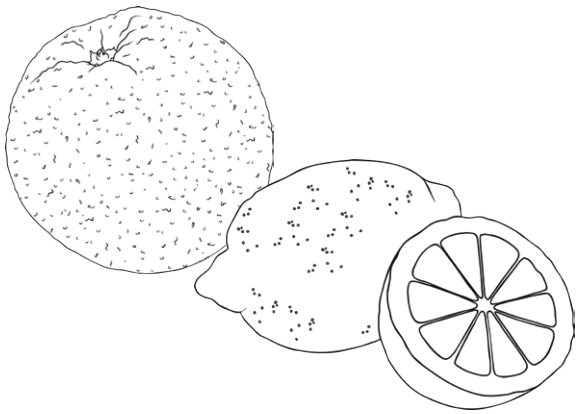
In groups, you are going to carry out an investigation to see which citrus fruits would make the best battery to power a mobile phone.

What are the variables in this investigation?

Independent Variable (what we change)	
Dependent Variable (what we measure)	
Control Variable (what we keep the same)	

Construct a table to record your results.

Fruit Being Tested	Voltage Measured (V)
orange	
lime	
lemon	



Prediction

Which fruit do you think will produce the most electricity and why?

I predict that the fruit that will produce the highest voltage will be the _____. I think this because _____

_____

_____

Conclusion

Which citrus fruit created the biggest voltage? What evidence do you have to support your answer?

The citrus fruit that created the biggest voltage was _____. The evidence I have to support this comes from _____

_____

_____

_____

Why don't we use fruit instead of batteries?

We do not use fruit batteries instead of chemical batteries because _____

_____

_____

_____

Did you find any anomalous results?

_____

How do you know the result(s) were anomalous?

_____

_____

Evaluation

How could we improve the investigation for next time? We could improve the investigation next time by

_____

_____

_____

_____

_____

_____

Questions

1. Batteries store chemical energy but what is it transformed into?

   _____

2. Describe what voltage is. **Keywords:** bigger, energy, electrons, hard.

   The voltage of a battery tells us how much _____ it provides to the components in the circuit. It also tells us how _____ a battery pushes the _____ in a circuit - the bigger the voltage, the _____ the push.

3. Describe what current is. **Keywords:** amps, circuit, charge, faster.

   Current is the flow of _____ around a _____. The _____ the charge flows, the higher the current. Current is measured in _____ using an ammeter.

4. Use the data that you have gathered from your investigation. Will fruit be able to charge a 4V mobile phone? In your explanation, you should include the following **keywords:** voltage, current and electrodes.

   From our investigation, I found out that citrus fruit will/will not be able to charge a 4V mobile phone. I know this because _____

Fruity Battery Investigation Answers

You are currently a scientific researcher working for a major mobile phone company. The company has asked you to investigate the possibility of moving away from lithium batteries and using an environmentally friendly alternative such as citrus fruit.

Your boss has told you that the average mobile phone needs **4V** to charge it.

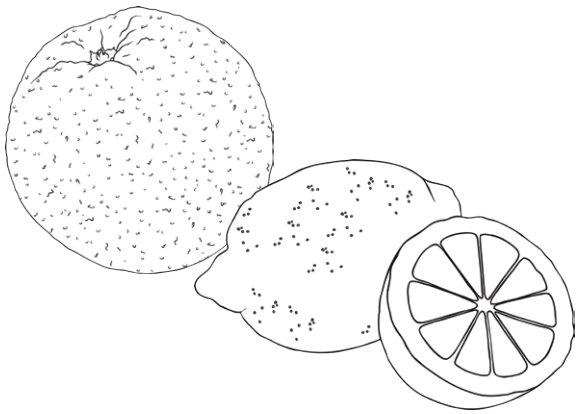
In groups, you are going to carry out an investigation to see which citrus fruits would make the best battery to power a mobile phone.

What are the variables in this investigation?

Independent Variable (what we change)	**fruit**
Dependent Variable (what we measure)	**voltage**
Control Variable (what we keep the same)	**equipment, method**

Construct a table to record your results.

Fruit Being Tested	Voltage Measured (V)
orange	
lime	
lemon	



Prediction

Which fruit do you think will produce the most electricity and why?

Students will have their own answers.

Conclusion

Which citrus fruit created the biggest voltage? What evidence do you have to support your answer?

Students will have their own answers.

Why don't we use fruit instead of batteries?

We do not use fruit batteries instead of chemical batteries because
Students' answers may vary. Fruit batteries are unreliable and cannot maintain powering a device over a long period of time. This would not be useful to the customer who may need their mobile phone for long journeys.

Did you find any anomalous results?

Students will have their own answers.

How do you know the result(s) were anomalous?

Students will have their own answers.

Evaluation

How could we improve the investigation for next time? We could improve the investigation next time by

Students' answers may vary. If students carried out the experiment only once, then next time they should carry it out three times in total. This will allow students to calculate an average. Students should compare their results with other groups in the class to see if they have a similar pattern.

Questions

1. Batteries store chemical energy but what is it transformed into?

   electrical energy

2. Describe what voltage is. **Keywords:** bigger, energy, electrons, hard.

   The voltage of a battery tells us how much **energy** it provides to the components in the circuit. It also tells us how **hard** a battery pushes the **electrons** in a circuit - the bigger the voltage, the **bigger** the push.

3. Describe what current is. **Keywords:** amps, circuit, charge, faster.

   Current is the flow of **charge** around a **circuit**. The **faster** the charge flows, the higher the current. Current is measured in **amps** using an ammeter.

4. Use the data that you have gathered from your investigation. Will fruit be able to charge a 4V mobile phone? In your explanation, you should include the following **keywords:** voltage, current and electrodes.
   Students will have their own answers as to whether their fruit was able to charge up to 4V. All of the keywords should have been included.