

# KS3 Resistance Investigation

**Aim:** The aim of the practical is to find the length of wire that has the least resistance.

**Equipment:** List all the equipment that you will be using in the practical today.

**Prediction:** I predict that the longer/shorter the wire, the more/less resistance there will be.

**Method:** Write a step-by-step method for the practical investigation. Use the words in the box below to help you fill in the blanks.

ammeter

hot

3V

power pack

crocodile clips

Step 1 – Collect the equipment.

Step 2 - Attach two of the circuit wires to the \_\_\_\_\_. Place the opposite end of one of the wires that are attached to the power pack into the \_\_\_\_\_.

Step 3 – Attach the remaining circuit wire to the ammeter.

Step 4 – Place the crocodile clips onto each end of the circuit wires that are not connected to anything.

Step 5 – Place the \_\_\_\_\_ onto each end of the copper wire.

Step 6 – Set the power pack to \_\_\_\_\_. Warning: when the power pack is switched on, the wires can become \_\_\_\_\_. Take the reading from the ammeter swiftly and then turn the power pack off. Do not leave it on as it may melt the wire.

**Results:**

Length of Wire (cm)	Voltage (V)	Current (A)	Resistance ( $\Omega$ ) = Voltage (V) $\div$ Current (A)
20	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =
40	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =
60	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =



80	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =
100	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =

**Conclusion:** Write about what you found out from the practical. Remember to use your results to support your answer.

From the practical investigation, I found out that the longer/shorter the wire, the more/less resistance there is. \_\_\_\_\_

Which length of wire do you recommend the farming company should use? Explain your answer.

I recommend that the farming company use the \_\_\_\_\_ cm wire. I have suggested this length because... \_\_\_\_\_

### Evaluation:

What were the variables in this experiment?

independent variable	
dependent variable	
control variable	

What was the biggest difficulty you had with this experiment and how could you overcome it?

What would be the advantage of comparing your results with other peoples?



# KS3 Resistance Investigation Answers

**Aim:** The aim of the practical is to find the length of wire that has the least resistance.

**Equipment:** List all the equipment that you will be using in the practical today.

**1 power pack, ammeter, three circuit wires, varying lengths of copper wire (20, 40, 60, 80, 100cm), crocodile clips.**

**Prediction:** Students will have their own answers.

**Method:** Write a step-by-step method for the practical investigation. Use the words in the box below to help you fill in the blanks.

ammeter

hot

3V

power pack

crocodile clips

Step 1 – Collect the equipment.

Step 2 - Attach two of the circuit wires to the **power pack**. Place the opposite end of one of the wires that are attached to the power pack into the **ammeter**.

Step 3 – Attach the remaining circuit wire to the ammeter.

Step 4 – Place the crocodile clips onto each end of the circuit wires that are not connected to anything.

Step 5 – Place the **crocodile clips** onto each end of the copper wire.

Step 6 – Set the power pack to **3V**. Warning: when the power pack is switched on, the wires can become **hot**. Take the reading from the ammeter swiftly and then turn the power pack off. Do not leave it on as it may melt the wire.

**Results:** Students will have their own answers.

Length of Wire (cm)	Voltage (V)	Current (A)	Resistance ( $\Omega$ ) = Voltage (V) $\div$ Current (A)
20	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =
40	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =
60	3		resistance ( $\Omega$ ) = voltage (V) $\div$ current (A) = 3 $\div$ _____ =



80	3		$\text{resistance } (\Omega) = \text{voltage (V)} \div \text{current (A)}$ $= 3 \div \underline{\hspace{2cm}} =$
100	3		$\text{resistance } (\Omega) = \text{voltage (V)} \div \text{current (A)}$ $= 3 \div \underline{\hspace{2cm}} =$

**Conclusion:** Write about what you found out from the practical. Remember to use your results to support your answer.

From the practical investigation, I found out that the **longer**/shorter the wire, the **more**/less resistance there is. **Pupils are encouraged to use some examples from their results to support their answer.**

Which length of wire do you recommend the farming company should use? Explain your answer.

I recommend that the farming company use the \_\_\_\_\_ cm wire. I have suggested this length because... **Student's answers will vary. They should suggest that the shortest wire will have the least resistance.**

#### Evaluation:

What were the variables in this experiment?

<b>independent variable</b>	<b>The length of wire.</b>
<b>dependent variable</b>	<b>The resistance in each wire.</b>
<b>control variable</b>	<b>The method and equipment.</b>

What was the biggest difficulty you had with this experiment and how could you overcome it?

**Students will have their own answers.**

What would be the advantage of comparing your results with other peoples?

**To ensure that the results are repeatable.**

