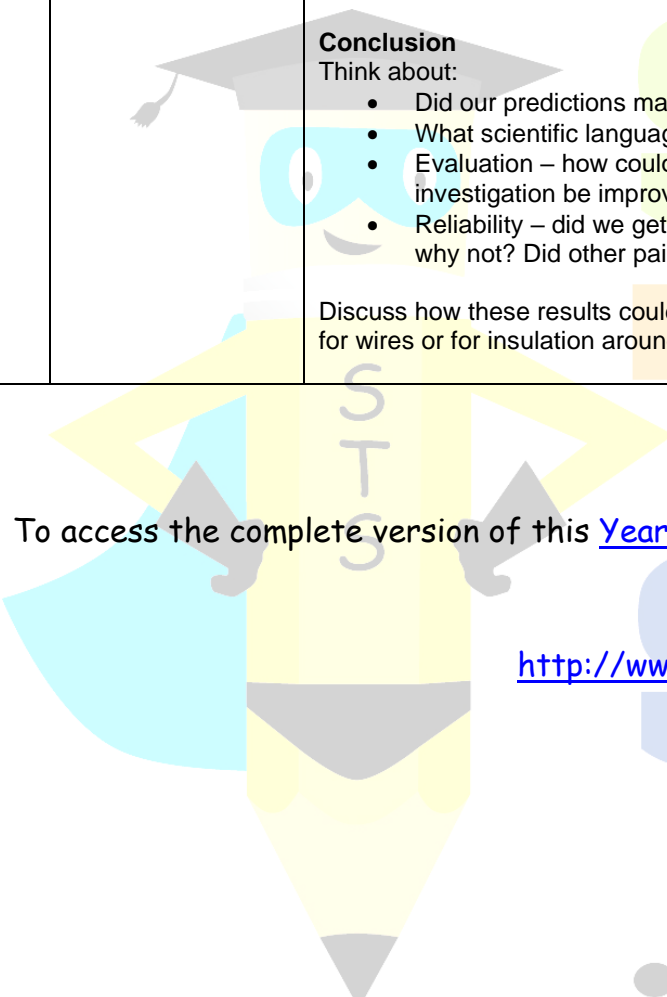


W	Learning objective	Teaching activities	Resources	Assessment: Success Criteria
1	<p>Lesson 1 (ICT-based version)</p> <p>To know the meaning of properties of materials</p> <p>(45 mins)</p>	<p>Intro: Revise how in science a material is something that is used to make something (or to make part of something) Ask children to think, pair, share the names of as many materials as they can Ask children to think, pair, share as many properties of materials as they can Revise how it is important in science that we use vocabulary and terminology accurately and precisely Explain that we are going to be learning the precise definitions of some properties of materials today: Opaque, Brittle, Thermal, Transparent, Flexible, Insulator, Soluble, Waterproof, Conductor, Translucent, Shiny, Synthetic, Absorbent, Rigid, Natural and Hard Model for children how to use a dictionary and / or glossary to find the meaning of each of these words Emphasise that children need to pick the materials-related definition for words with more than one meaning e.g. conductor Also emphasise that children should try to write the definition in their own words, rather than just copy it out Model how to use Quizlet</p> <p>Main: Children to log-in to their accounts at Quizlet.com Children to click 'Create set' (top centre-left of page) Children to name their set 'Properties of materials by (their name)' Children to find the definition for the words and use them to make flashcards (make sure they enter the term in the smaller box on the left and the definition in the larger box on the right) Children to practice learning their flashcards using the various games on Quizlet in the following order (from easy game to difficult game):</p> <ul style="list-style-type: none"> • scatter • learn • test • speller • space race <p>Children to practice learning the terms and their definitions by using each other's sets to play the games</p> <p>Plenary: Close down computers and / or return to class Memory competition – in pairs / groups to write down as many of the terms as they can remember, and their definitions Ask pairs / groups how many they got and go to the team who says they have the most terms written down Check they got them right; if they did, award them points; if not go to pair who got the next most; repeat until find winners</p>	<p>Dictionaries and / or non-fiction books on materials</p> <p>PCs / laptops</p> <p>Account set up for class / each child on Quizlet.com</p>	<p>MUST: know some of the terms and their definitions</p> <p>SHOULD: know more of the terms and their definitions</p> <p>COULD: know all of the terms and their definitions</p>

1b	<p>Lesson 1 (Paper-based version)</p> <p>To know the meaning of properties of materials</p> <p>(45 mins)</p>	<p>Intro: Revise how in science a material is something that is used to make something (or to make part of something) Ask children to think, pair, share the names of as many materials as they can Ask children to think, pair, share as many properties of materials as they can Revise how it is important in science that we use vocabulary and terminology accurately and precisely Explain that we are going to be learning the precise definitions of some properties of materials today: Opaque, Brittle, Thermal, Transparent, Flexible, Insulator, Soluble, Waterproof, Conductor, Translucent, Shiny, Synthetic, Absorbent, Rigid, Natural and Hard Model for children how to use a dictionary and / or glossary to find the meaning of each of these words Emphasise that children need to pick the materials-related definition for words with more than one meaning e.g. conductor Also emphasise that children should try to write the definition in their own words, rather than just copy it out Explain how to play the game for the independent work</p> <p>Main: Children to work together in mixed ability partners Children to look up the meaning of the words and create memory cards:</p> <ul style="list-style-type: none"> • one child writes the term on the front of a card and the meaning on the back of the same card • one child writes the term on one card and the meaning on a different card <p>The double-sided set is set out to the side (this will be used to check answers) The two single-sided sets are set out separately and used to play 'Go Fish':</p> <ul style="list-style-type: none"> • the sets are placed face down • each child takes a turn to 'Go Fish' and try to find a matching pair – if they find a matching pair, they keep it; if they do not find a matching pair, they put the cards back in the same position, face down again (the double-sided set can be used to check if the pair are in fact matching or not) • continue playing until all of the matching pairs have been found and see who has the most <p>(To begin with, the cards can be set out facing up to make it easier)</p> <p>Plenary: Collect in all of the sets of cards Memory competition – in pairs / groups to write down as many of the terms as they can remember and their definitions Ask pairs / groups how many they got and go to the team who says they have the most terms written down Check they got them right; if they did, award them points; if not go to pair who got the next most; repeat until find winners</p>	<p>Dictionaries and non-fiction books on materials</p> <p>3 sets of cards (printed on card) per pair of children</p>	<p>MUST: know some of the terms and their definitions</p> <p>SHOULD: know more of the terms and their definitions</p> <p>COULD: know all of the terms and their definitions</p>
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2	<p>Compare the properties of different objects / materials</p> <p>(40 mins)</p>	<p>Intro:</p> <p>Ask children to think, pair, share the properties of materials and their precise definitions that we learnt in the previous lesson</p> <p>Explain how scientists test the properties of materials to see which material is the best choice for a particular purpose</p> <p>Watch video on scientists testing materials at https://www.bbc.co.uk/programmes/p0119c01 (if the link does not work, Google 'BBC science clips Product testing')</p> <p>Explain that we are going to be testing the following properties of some materials / objects today: Hardness, Strength, Flexibility, Permeability, Transparency, Absorbency and Magnetism</p> <p>Explain how to use a ranking system of 1 to 5, with 1 being not ... and 5 being very ... e.g. 1 being not strong and 5 being very strong</p> <p>Revise how only iron, steel, cobalt and nickel are magnetic; nearly all other metals are not magnetic</p> <p>Main:</p> <p>Have stations setup for children to test the properties of each material:</p> <ul style="list-style-type: none"> • Water station for absorbency and permeability • Darkened area for the transparency / shoe box with hole in each end for transparency • Area with goggles for strength – children add weights and see if object breaks • Area with screw for children to try and scratch objects for hardness • Area with magnets for children to test magnetism <p>Children to rotate around each station, testing the materials and recording their results in a table</p> <p>Emphasise need to be sensible and safe e.g. not to break the glass jar</p> <p>Plenary:</p> <p>Discuss how materials can have different properties depending on how they are manufactured e.g. a table is very strong whereas an ice lolly stick is easy to break, even though they are both made of wood</p> <p>Ask children to think, pair, share more examples where the same material has different properties when manufactured in different ways e.g. copper coins and copper wire, plastic chairs and plastic rulers etc</p>	<p>See worksheet and rotations</p>	<p>MUST: understand that different objects have different properties and test the properties of materials</p> <p>SHOULD: correctly use a ranking system to assess how much an object possesses a set of given properties</p> <p>COULD: give some examples where the same material has different properties because of how it is manufactured</p>
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<p>3</p>	<p>To understand electrical conduction and insulation</p> <p>Investigation: Which materials are the best for conducting electricity?</p> <p>Decide how to test an idea, explaining how to make a simple test fair</p> <p>Identify patterns in results and use these to draw conclusions</p> <p>Explain results in terms of their scientific knowledge and understanding</p> <p>(1 hour 30 mins)</p>	<p>Test the below experiment a week or so in advance of the lesson to see how well different objects act as conductors and insulators. Ideally want some of the materials to allow some electricity to be conducted so that the bulb is not at full brightness and not completely dim either</p> <p><i>Experiment: In pairs / groups, have children create a circuit with a bulb. Children to test how well different objects / materials conduct electricity by making one of them part of the circuit and seeing the affect that this has on the brightness of the bulb. Repeat for each object / material. Have them repeat this a number of times for each material with a different bulb</i></p> <p>Ask children to think, pair, share what electricity is (covered in Year 4) and what the terms 'conductor' and 'insulator' mean Explain that materials can conduct or insulate electricity Watch video on revision of points covered in Year 4 on electricity and conduction and insulation of electricity at https://www.bbc.co.uk/bitesize/clips/zxksb9q (if the link does not work, Google 'BBC Bitesize video An introduction to electricity')</p> <p>Aim and prediction Discuss what investigation we could carry out using the equipment Think, pair, share (explaining what we will be doing if children don't suggest it in a timely way) Think, pair, share what might affect the brightness of the bulb Why are we going to repeat each trial more than once? (more reliable results)</p> <p>Method Think, pair, share what we would need to do to make a 'fair test'. Plan a fair test, with these conditions being the same:</p> <ul style="list-style-type: none"> • The wires in the circuit • The length of wire in the circuit • The age of the batteries • The type / voltage of the batteries • The number of batteries • The number of bulbs • The style of bulbs • The age of the bulbs <p>Discuss how changing these things would be unfair and why this is the case. Explain controlled, independent and dependent variables for G+T</p> <p>Emphasise need to be careful not to touch live wires (with the low voltages, this would not be very dangerous, but good to reinforce the idea)</p> <p>Investigation and Results Explain that we will use a rank of 1 to 5 for the brightness of the bulb Model how to draw a results table. What will it need to include?</p>	<p>Check video opens and plays OK</p> <p>Batteries</p> <p>Bulbs</p> <p>Wires</p> <p>Crocodile clips</p> <p>Objects / materials to test</p> <p>Investigation frames</p> <p>Graph frames</p>	<p>MUST: plan and carry out an experiment by using an investigation frame, <i>with</i> adult support</p> <p>SHOULD: plan and carry out an experiment by using an investigation frame, <i>without</i> adult support</p> <p>COULD: link predictions and conclusions to scientific knowledge and use scientific language</p>
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		<p>Carry out the investigations</p> <p>Discuss whether we should use a bar graph or a line graph? Why? (we need to use a bar graph because brightness of bulb is a discontinuous type of data) Model for children how to draw a bar graph (if necessary) Revise how to use tick list on investigation frame for drawing a graph correctly</p> <p>Conclusion Think about:</p> <ul style="list-style-type: none"> • Did our predictions match our results? Why / why not? • What scientific language could we use? • Evaluation – how could we have made a better 'fair test' / how could the investigation be improved? • Reliability – did we get the same result each time we repeated the test? If not, why not? Did other pairs / groups get similar results to us? If not, why not? <p>Discuss how these results could be useful in real life e.g. knowing which material to use for wires or for insulation around wires</p>		
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To access the complete version of this [Year 5 Properties and Changes of Materials planning](http://www.saveteacherssundays.com/science/year-5/510/), and all of the resources to go with it, visit:

<http://www.saveteacherssundays.com/science/year-5/510/>

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