

Year 5/6 - Science: Properties of materials

Key vocabulary: thermal/electrical insulator/conductor, material, property, flexible, permeable, transparent, hard, magnetic, stone, wood, cotton, synthetic, plastic, polyester, Kevlar.

*Most of the worksheets are differentiated. The 1-star sheets are the easiest and the 3-star sheets are the most challenging – ask your child how confident they feel before choosing a sheet for them; most children should be able to complete the 2-star sheet (the answers are provided). The **Knowledge Organiser** gives an overview of the learning for the whole unit.*

<u>Learning goal:</u>	<u>Key information & Activities:</u>	<u>Resources:</u>
I can compare materials according to their properties.	<p>Watch the PowerPoint (and video clips).</p> <ul style="list-style-type: none"> Materials have different uses depending on their properties and state (liquid, solid, gas). Materials are not just fabrics or textiles. They include any substance: different liquids (not just water), natural and man-made products. Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. <p>Complete the material properties and definitions worksheet.</p> <ul style="list-style-type: none"> Knowing the properties of a material helps you to decide the best material to use for a purpose/job. <p>Gather a selection of materials from around the house (and the equipment listed in the resource list).</p> <p>Test each material to identify their properties (<i>magnetic, hardness, transparency, flexibility, permeability</i>) and complete the testing properties worksheet. <i>[If you don't have a magnet or nail, just do the transparency, permeability and flexibility tests.]</i></p>	<ul style="list-style-type: none"> Properties PowerPoint How to identify materials – video clip https://www.bbc.co.uk/bitesize/topics/z4339j6/articles/zx8hhv4 Which materials are magnetic? – video clip https://www.bbc.co.uk/bitesize/topics/zyttyrd/articles/zw889qt Material properties and definitions sheet A selection of materials from around the house Nail (and goggles), magnet, jar, empty tray, elastic band, water Testing properties worksheet
I can group everyday materials according to their properties.	<p>Watch the video clips.</p> <p>Gather the items on the resources list.</p> <p>Complete the Materials and their Properties worksheet.</p> <p>Choose two materials and create a Venn diagram.</p> <ul style="list-style-type: none"> Any properties the materials have in <u>common</u> go in the <u>overlapping circles</u>. Any that are <u>different</u> go in the <u>correct circle for that material</u>. Any properties <u>neither</u> of the materials have go on the <u>outside</u>. 	<ul style="list-style-type: none"> How do you test the properties of materials? – video clip https://www.bbc.co.uk/bitesize/clips/z3ndtfr Testing different materials – video clip https://www.bbc.co.uk/bitesize/clips/zp2gjxs Mug, chair, towel, pencil, door, ruler, gloves, salt pot, shoe lace Materials and their Properties worksheet Venn diagram sheet
I can compare the suitability	<p>Watch the video clips.</p> <p>Complete the Useful Materials and their Properties worksheet.</p>	<ul style="list-style-type: none"> What is stone used for? – video clip https://www.bbc.co.uk/bitesize/clips/zvww87h

<p>of different materials for everyday uses.</p>	<p>Using the table provided, decide which objects would be best made using metal, wood or plastic – give a reason why (<i>think of the properties that material has and what the object needs to be able to do</i>).</p>	<ul style="list-style-type: none"> • What are bridges made from? – video clip https://www.bbc.co.uk/bitesize/clips/ztt9mp3 • Which material do we use? – video clip https://www.bbc.co.uk/bitesize/topics/z9qtvvcw/articles/zbk72sg • Choosing the right material to make shoes – animation - https://www.bbc.co.uk/bitesize/clips/zsswhyc • Preventing household fires – video clip https://www.bbc.co.uk/bitesize/clips/zsxc7ty • Useful Materials and their Properties worksheet • Object material table
<p>I can tell you about an inventor.</p>	<p>Research one of these chemists/scientists/inventors:</p> <ul style="list-style-type: none"> • Spencer Silver (glue of sticky notes) • Ruth Benerito (wrinkle free cotton) <p>Create an informative leaflet/poster/explanation text about your inventor.</p>	<ul style="list-style-type: none"> • http://www.msthalloffame.org/spencer_silver.htm • https://www.sciencehistory.org/historical-profile/ruth-benerito
<p>I can investigate thermal conductors and insulators.</p>	<p>Watch the PowerPoint (and video clips).</p> <ul style="list-style-type: none"> • Knowing the properties of a material helps you to decide the best material to use for a purpose/job. • Knowing these properties means you can give reasons for the particular uses of everyday materials, including metals, wood and plastic. <p>Investigate which material should be used for the lining of the lunchbox to keep the food cool (<u>use</u> the investigating materials sheet).</p> <p>Using the results from your investigation, design a new lunch box (<u>use</u> the lunch box report sheet) which uses an appropriate material to insulate the food inside.</p> <ul style="list-style-type: none"> • <u>Extension</u>: Make a can cooler (see link). 	<ul style="list-style-type: none"> • Keeping cool PowerPoint • Heat and insulation – video clip https://www.bbc.co.uk/bitesize/clips/zkntsbk • Dry suits, wet suits and insulation – video clip https://www.bbc.co.uk/bitesize/clips/zyyqn39 • Investigating materials sheet • Containers, thermometers, ice cubes, ruler, stopwatches, different materials from around the home • Lunch box report sheet • <u>Extension</u>: https://www.activityvillage.co.uk/make-a-can-cooler
<p>I can explain which electrical conductors would make a bulb shine brightest.</p>	<p>Watch the PowerPoint (and video clips).</p> <ul style="list-style-type: none"> • Some materials let electricity pass through them (electrical conductors), others do not (electrical insulators). <p>Test different materials in a circuit to see which ones conduct electricity best.</p> <p><i>[If you have the resources available, conduct the investigation. If unavailable: research online.]</i></p> <p>Complete the brighter bulbs worksheet.</p>	<ul style="list-style-type: none"> • Brighter bulbs PowerPoint • What are conductors and insulators? – video clip https://www.bbc.co.uk/bitesize/topics/z2882hv/articles/zxv482p • Materials which conduct electricity – video clip http://www.bbc.co.uk/education/clips/zy2qxn8 • If available: batteries, bulbs, wires, crocodile clips, range of different metals. • Brighter bulbs worksheet