

<p>Science context Materials and their properties</p> <p>HSW Using scientific ideas and models to explain phenomena.</p> <p>Mathematics None</p> <p>Where? In and around the school grounds</p> <p>Time 2 x 60 min</p>	<h2 style="text-align: center;">Materials in our school</h2> <p>Lesson summary In this activity, students will gather data about the materials that are used for buildings and structures in and around their school. The process encourages them to notice the material, its condition, the properties of that material and what function(s) that material has. Back in the classroom, the students will then compare their findings with secondary data generated from a different area entirely.</p> <p>Cognitive potential To focus students on considering their everyday environment in relation to the range of materials that are used the properties and structures of these materials and how these relate to purpose and function.</p> <p>Central theme and skills Materials and properties Making observations and inferences</p> <p>Key resources Sample material (e.g. plastic guttering); one per group A template table (attached). Plan diagram of school grounds Secondary data material (example attached)</p> <p>Setting the scene (5mins) In the classroom, ask the class to get into their working groups of threes or fours. Give each group the template table or show it on the IWB and ask them to discuss the headings briefly (couple of minutes). Make sure the class have a common understanding of what each heading is asking for. Introduce their first task: 'I found this somewhere around the school. As a group, use the table to tell me what you know about this and where I might have found it'. Give each group the sample (plastic guttering?) Ask each group to record their thoughts using the sheet:</p> <table border="1" data-bbox="418 1299 1380 1455"> <thead> <tr> <th>Material</th> <th>How did you tell what it is?</th> <th>What condition do you think it is in?</th> <th>What properties does this material have?</th> <th>What could it be used for in and around the school?</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Allow no more than 10 minutes for this. Ask different groups to share their responses to the particular questions, especially getting different students to suggest where they think you might find this in and around the school and why (linking condition-property-function).</p> <p>Observations outside (15-20mins) In class, give each group a map of the school. Introduce some basic map reading skills for example "can you put your finger on the part of the map which represents the sports hall" "what symbol is used to represent out of bounds areas". Introduce basic map reading skills and introduce the incomplete materials table (beneath).</p> <p>Explain that they have 2 tasks: 1 To use clues to find a range of materials being used around the school grounds 2 To record on the basic map where these materials are located</p>	Material	How did you tell what it is?	What condition do you think it is in?	What properties does this material have?	What could it be used for in and around the school?					
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Explain that their task is to fill in the blank bits of the table, and use the map to navigate their way around the school, identifying locations/objects using the data provided and then filling in the 'missing' data. **What information do the clues give? Can you decide as a group on where/what to look for?** Give the groups about 5 minutes in class to look at the table and to begin to decide on the locations/examples in and around school that might help them with their study. You might want to suggest that for each observation, they number this and locate this number on the school map so that someone else using the completed table would know where to go. Give the groups about 20 minutes to do this. In addition to completing the survey, challenge them to go around the school and identify at least one other material that isn't on the table and fill in the relevant information about it.

Sharing ideas and provoking conflict (15-20mins)

Gather the groups back in class. Give them some time to look at their data and reflect on the process. **Did you have any disagreements or is there anything that you are unsure of? (Different interpretations of what the clue might mean (e.g. brittle) or whether something is really made of a particular material (e.g. iron).) Did you have any unexpected findings? (Recognising a material in their environment that they hadn't noticed before or expected/something being made out of a material that they hadn't predicted)** Move around the groups, listening in on their discussions and noting anything particular that is worth bringing to the class' attention. Invite different groups to share their responses to these questions, trying to link ideas across and between groups.

Introduce the other setting. Give each group the secondary data. The one attached is just an example. Please feel free to make up your own 'alternative setting' or adapt as you see fit. Read out the brief description of the setting (if you want to supplement this with photographs then do so). Ask the groups to compare and contrast their findings with this new set of data. **What do you notice? Any similarities? Any differences? How is the data different? Why?**

Linking ideas together (15-20mins)

Give students some individual thinking time. **Think privately for a few minutes. Can you remember what you thought about the materials that are used in your everyday school environment at the start? Did you have any surprises when you went out to collect the data? Has your thinking about materials changed or developed in any way? What changed your thinking?** After this quiet thinking time, you may want to get students to record their individual responses down. You could also ask students to share their thoughts in pairs and follow this with a wider, whole class discussion that pulls together some key ideas. You could end this discussion by generating further lines of enquiry: **What else would you like to know about materials?**

Extension/homework task

Ask students to look again at the two sets of data (their own and the 'other' setting). **Do you think a chemical or biological change has taken place in any of the examples? How do you know?**

Focus the students on a couple of specific chemical changes (Evidence of reaction with chemicals in the air e.g. oxygen: rusting iron/ copper going green/ Evidence of lack of pollution: lichens growing on the pavement).

Think about what information you would need to investigate the science behind the chemical/biological change? Where would you look? What evidence are you hoping to collect? How can you be sure that the information you have gathered is accurate?

Example of table a table to be completed outside

Material (These wouldn't be written - otherwise too obvious)	Number (To locate on school map)	How did you tell what it is?	What condition do you think it is in?	What properties does this material have?	What is it being used for in this setting?	What else could it be used for in and around the school?
<i>Glass</i>				Transparent		
<i>Concrete</i>						Surface of the playground
<i>Iron</i>			Rusting/colour change			
<i>Wood</i>		Dark brown/grainy texture				
<i>Rubber</i>						Stopper/end for chairs, tables
<i>An extra row for the group's own example</i>						

The 'other' setting

Beneath is an example of another setting, offering comparable secondary data. This could be presented using a site known to the pupils with photos e.g. local lido, a cricket pavilion.

The area is exposed. It receives a lot of sunlight, has long stretches of high temperature, but experiences brief stormy periods. There is some kind of power station/industrial plant nearby that releases toxic gases.

Material	How did you tell what it is?	What condition do you think it is in?	What properties does this material have?	What is it used for
<i>Glass</i>	Transparent	Newly fitted	Transparent, Collects and distributes solar energy	Solar roof panels
<i>Concrete</i>	Grey colour, patches of white (like paint)	Noticeable patches of growth (lichen?)	Strong	Roof of car park
<i>Iron</i>	Colour	Rusting/colour change	malleable	Railings
<i>Wood</i>	Dark brown/grainy texture	Evidence of rotting and bleaching	Poor conductor of heat	Bench
<i>Copper</i>	Green colour	Old, weathered-colour change	Conducts electricity	Lightning rod