



Material World - Lesson 1: Introduction session

A session introducing the concept that everyday 'things' are made from natural resources, some of which may be 'finite'. Pupils trace the journey of several objects from the extraction of raw materials, through manufacture and finally to disposal, considering the environmental impacts of each stage.

Lesson takes 1.5 hours.

During this lesson, please encourage pupils to use reusable white boards where possible, to reduce the use of paper. At the end of the lesson you could challenge pupils to explain your reason for doing this, thereby making explicit the link with the theme of the lesson i.e. reducing resource use.

National Curriculum references

Geography:

Geographical skills and fieldwork

- Use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied

Human and physical geography

- Human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water

Locational knowledge

- Locate the world's countries, using maps to focus on Europe (including the location of Russia) and North and South America, concentrating on their environmental regions, key physical and human characteristics, countries, and major cities

Children's previous experiences:




Learning objectives:

- 1) I can locate countries on a world map.
- 2) I can identify the natural resources used to make a range of everyday items.
- 3) I can describe some of the impacts on the environment of making everyday objects.
- 4) I can give examples of how people can reduce, reuse and recycle.
- 5) I can identify the difference between a need and a want.




Lesson 1: Introduction session, continued

<p>Differentiation:</p> <p>For the 'process cards' activity, the processes with fewer stages may be given to groups with lower ability pupils</p>	<p>Other means of support:</p>
<p>Resources:</p> <ul style="list-style-type: none"> • 6 world maps • Ball of string <p>Source sets of clean objects:</p> <ul style="list-style-type: none"> - 6 glass jars/bottles - 6 plastic bottles - 6 sheets of newspaper - 6 aluminium cans - 6 pieces of cotton fabric <ul style="list-style-type: none"> • Supporting resource: images of natural resources* • Material World PowerPoint* • Supporting resource: Set of 'process cards' each for: cotton, aluminium, plastic, paper, glass* <p>*Download from zone.recycledevon.org</p>	<p>Health and safety:</p> <p>Ensure that the objects provided to pupils are clean and dry, with no sharp edges.</p> <p>Emphasise the importance of handling glass objects safely.</p> 

Organisation	Teacher Activity	Pupil Activity
<p>Introduction:</p> <p>20 mins</p> <p>Class seated in groups of 5/6 with jotters/mini whiteboards</p>	<p>Ask the pupils to make a list of all the things they would 'WANT' if it was their birthday next week and their family had just won the lottery.</p> <p>A 'want' is something we would like to have.</p> <p>When they have made their list, ask pupils to make a second list of things they 'NEED' to live.</p> <p>A need is something we must have for survival – food, air, water, shelter and clothing.</p> <p>Class discussion: Compare the two lists, drawing out a distinction between a 'want' and a 'need'. Why do we 'want' so many things? E.g. advertising, peer pressure.</p> <p>Point out that we use a huge range of objects in our everyday lives. Ask pupils "What are some of those objects made from?" and hand out the objects and cards for the matching activity.</p>	<p>In pairs, pupils make a list of all the things they would 'want', if they had limitless money. Feedback and add ideas to the board.</p> <p>This is followed by a list of all the things they 'need' to survive.</p> <p>Matching activity: In groups of 5/6, pupils match everyday objects with images* of the natural resources from which they were made (plastic/oil, cotton/plant, glass/sand, aluminium/bauxite, paper/trees). *Download from zone.recycledevon.org</p>




Lesson 1: Introduction session, continued

<p>Main: 1 hour</p>	<p>Explain to pupils that each material has a story behind it.</p> <p>Using steel as an example, trace the journey from iron ore to can using the Material World PowerPoint (slides 2 and 3).</p> <p>Highlight the fact that each part of the process uses time, energy, water and has environmental impacts such as habitat destruction.</p>	
	<p>Introduce the next activity: organised into 5 groups, pupils are given an object and a set of cards showing its manufacture process.</p>	<p>Each group is given a set of process cards for a particular material (glass, cotton, aluminium, paper and plastic).</p> <p>Their task is to:</p> <ol style="list-style-type: none"> 1) Match the images with the descriptions. 2) Arrange the cards on a table in the correct order to show the process of manufacture. 3) Discuss the images/descriptions and identify any impacts on the environment resulting from each stage in the process. 4) Record their ideas on a whiteboard and leave it next to the process cards.
		<p>Groups rotate around the displayed processes. They are given a short period to read/discuss the descriptions and the list of environmental impacts. Each group is challenged to add one more environmental impact to the list.</p>
	<p>Once each group has visited every object/process, lead a class discussion about what they have learnt, drawing out the common themes/impacts:</p> <ul style="list-style-type: none"> • energy use and the associated carbon dioxide emissions • water use • transport and its associated pollution • the generation of waste • habitat destruction and the associated impacts on wildlife. 	<p>Pupils share the environmental impacts they have identified.</p>



Lesson 1: Introduction session, continued

<p>Main:</p>	<p>Point out that transport is a major impact since it is involved in every manufacturing process, usually at several stages.</p> <p>Explain the next activity: each group is given a length of string and a world map to plot the journey of their object from extraction to manufacture to use.</p> <p>Which group has the longest piece of string?</p> <p>Pupils trace the journey of their object through its manufacture to its eventual use in Devon.</p> <p>They measure their piece of string and then compare it's length with those of the other groups.</p>	
	<p>Class discussion:</p> <p>Discuss the disposal of our 'waste' in Energy from Waste (EfW) plants or landfill sites. Apart from the actual object we are throwing away, what else are we wasting? I.e. the raw materials, time, energy, water etc which goes into creating the objects (images on Material World PowerPoint slide 4).</p> <p>Revisit the manufacturing processes displayed on the tables. Point out that each system is a line – in order to create more 'things' we have to return to the beginning of the process to extract, transport and process more resources. Challenge pupils to think of disadvantages to this approach. Explain that many of the resources we use are 'finite' – they will not last forever.</p> <p>Explain that if everybody on Earth lived the way we do in the UK we would need three planets to provide the resources, habitats, water, energy etc that we use. (This would be seven planets if we all lived like the average American!) But we only have one Earth! See extension below for a web link which explains the concept well.</p>	
<p>Plenary: 10 mins</p>	<p>How can we use fewer resources and make a circular system where materials flow round and round? Using the 3Rs (Reduce, Reuse, Recycle) is a very good place to start.</p> <p>(Show Material World PowerPoint slides to demonstrate how each of the 3Rs changes the linear manufacturing process.)</p> <p>Remind pupils again of their original lists of 'wants' and 'needs'. It is important that we distinguish the two to spend our money wisely, become responsible 'consumers' and look after our world.</p>	<p>Pupils use each of the 3Rs to make a pledge (this may be written down or discussed in small groups/pairs).</p> <p><i>E.g. An example for reduce could be, "I will have fewer items on my 'wants' list."</i></p> 
<p>Extension activity 1: Many things are made to be 'disposable' or 'Designed for the Dump'. As a homework task, challenge pupils to find things at home which have been designed to be used once then thrown away. E.g. batteries, sandwich bags, carrier bags, disposable camera, biro pens, various packaging examples, paper cups, plastic cutlery, razors, nappies. How many of these have alternatives that can be used again and again?</p> <p>Extension activity 2: Take the lengths of string used to trace the journey of each object and use the key of the map to calculate how many miles/km the object travelled.</p>		



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Extension activity 3: Look at the following webpage for a good explanation of how we have used up the Earth's resources www.theguardian.com/environment/2015/aug/12/humans-have-already-used-up-2015s-supply-of-earths-resources-analysis

Extension activity 4: Show Ellen MacArthur's inspiring film clip (approx. 17 minutes) giving insights she gained after sailing solo around the world, specifically, taking and using exactly the amount of resources she needed and no more www.ted.com/talks/dame_ellen_macarthur_the_surprising_thing_i_learned_sailing_solo_around_the_world

Key vocabulary/glossary:

Waste - any unwanted item

Natural resources - the planet's reserves of minerals, land and other natural assets

Raw material - a basic material used in the production of goods

Disposable - intended to be thrown away after use

Consumer - a person who purchases goods and services. A person who uses or consumes something

Renewable - a resource that can replenish to overcome use or consumption

Finite/Non-renewable - a resource that does not replenish itself at a sufficient rate for extraction in human time frames, when it has been used up; that's it

Reduce - make less of; in this context to make less waste

Reuse - use an item again and again

Recycle - reprocess waste, converting it into something new

Energy from Waste - the process of burning non-recycled waste at very high temperatures (850°C) to create electricity, and potentially heat

Landfill site - an area of land where waste is buried for disposal



Assessment

Who?	Criteria:	Strategies:	Evidence/recording:
Notes:			

Facts sourced from: www.hydro.com/en/About-aluminium/Aluminium-life-cycle/Bauxite-mining/
www.ecology.com/2011/09/10/paper-chase/
www.iea.org/
www.glassallianceeurope.eu/en/industries
wwf.panda.org/about_our_earth/about_freshwater/freshwater_problems/thirsty_crops/cotton/