

Unit 3 - Living near a cement works



Based on Unit 8: Improving the environment (Geography Year 4)

This QCA unit suggests that children look at school grounds and see what environmental issues there are and how these could be resolved. This set of lessons suggests a different way of teaching this QCA unit. The QCA unit can easily be adapted to looking at environmental impact management and ultimate restoration options for cement manufacturing operations. This opens this unit into the children's wider environment and looks at extremely topical issues in their local community:

- Think about what an environment would be like around a cement works. What potential environmental impacts might be experienced by children in villages around a works/quarry?
- Fieldwork to record actual environmental conditions around a cement works
- This data is analysed and deductions made about cement works environment
- Children are asked what they think about environmental conditions in cement works. Issues and points of view are explored
- Restoration plan to show what children would turn a quarry and cement works into when they have finished making cement.

Lesson 1 - What is a cement works?

Learning objectives	<ul style="list-style-type: none"> • Find out what cement is and how we use it every day. • Look at cement making process. • Make statements about what it might be like to live next to a cement works.
Relevance	Begin to appreciate that industry can effect the environment.
Vocabulary	<p>Cement Concrete Quarry Dumpers Crusher Grind Mill Blast Pre-heater Kiln Clinker Dispatch</p>
Preparation/resources	<ul style="list-style-type: none"> • Cement product e.g. piece of pipe, roof tile, paving slab. • Look at British Cement Association Website (www.cementindustry.co.uk) for items made from cement. • A4 size map showing your local cement works – copy from road atlas/OS map. • Aerial photographs of works and other images of works/quarry (contact cement works) to see if any available or use Internet to search for images. • Whiteboard to run British Cement Association website (www.cementindustry.co.uk), or download and laminate pictures, to show stages in cement making process. • Cards describing each stage of cement manufacture process • Percussion instruments, or simple materials to make own instruments (e.g. cans and dried beans).

Lesson 1 - What is a cement works?

Lesson plan

Introduction

Show children a cement product (e.g. piece of pipe, paving slab etc). Explain what it is, and that it is made from cement. What other things do they think are made from cement? Perhaps they can see some of the items on school buildings and grounds. Go through list from BCA website. Cement is vital to our lives. Each family uses approximately one tonne of cement each year. This is roughly the same weight as an average family car! It is the most used material after water.

It is made by heating up rock to roughly the same temperatures you would find in a volcano. The molten rock is then cooled, gypsum added and then all ground into a powder. Show children stages of production using BCA website on class whiteboard or using laminated pictures downloaded from website (or actual photographs from a cement works visit).

Development

Carry out performances of each stage of cement making process as described in Unit 4, lesson 1.

The children can then show rest of the class their performance. Then ask them to do all stages together, just like it would happen in a real cement works. You might want to record this and play it back to children so they can hear just how much noise they made!

What might it be like to live next to a cement works? What did they notice when the whole process was happening?

Hopefully children noticed it would be very noisy. Lots of very noisy processes like crushing, blasting, grinding ... what was the noisiest?

Do children have any ideas of how to control noise? Could put really noisy stage in another room, so walls stop noise. This happens in cement works, where crushers and grinders are kept inside buildings to control dust and noise (point out in photograph). How to control noise of blast? Quarries have big banks around them to stop noise (point out on photograph). Demonstrate this by putting something noisy in a box, cupboard or another room. You could use the recording of the quarry process and place it in a cupboard.

Plenary

It could be a very noisy environment around a cement works. But people do live very close to cement works. Look at map and aerial photograph. Does anyone live close to cement works? How close? What might it be like to live there? Would the children like to live next to a cement works?

Lesson 2 - What is it like at a Cement Works

Fieldtrip to local Cement Works

Learning objectives	<ul style="list-style-type: none">• To identify possible impacts of quarry/cement works.• To learn how impacts can be managed.• To use scales to estimate levels of impacts.
Relevance	To look at real industry example of how people effect the environment and how these effects can be managed.
Vocabulary	Impacts Decibels Environment
Preparation/resources	<ul style="list-style-type: none">• Copies of Worksheet 1: 'What is the Environment Like?', clipboards and pencils.• Portable tape recorder• Video camera• Digital camera• Decibel meter• See advice for fieldtrips for further equipment/preparation.• Worksheet 1

Cement Works visit - half day

Introduction

Children must be told safety rules of site and equipped with safety gear. Hand out sheets etc.

Brief children on why they are visiting quarry and cement works– to look at what environment is like around a quarry/works. What did they remember from previous lesson when they acted out their cement making process? That it was very noisy – so this trip is to see whether it really makes as much noise as you made in the classroom! Also to see how people manage to live near a noisy cement works. Go through what to do on worksheet 1.

Development

Tour of quarry and works, including a careful look at possible impacts on environment and how they are controlled. At each point around the tour, ask children to record what they think about environmental conditions their worksheets (it must be their own ideas of how much impact there is at each point – no copying or asking an adult). Record noise levels on tape recorder and decibel meter. Might want to video environment at each point or take some photographs to give an idea of environmental conditions around works. You may not be able to visit every point in cement making process if it is too dangerous to do so.





Worksheet 1 - What is the environment like in the Cement Works?

Use this sheet to write down what you think each part of the cement works is like.

- Is there lots of noise?
- Is there lots of dust?
- Does it smell?
- Is it hot?

	QUARRY			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				





	GRINDER			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				





	PRE-HEATER			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				

	KILN			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				

	COOLER			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				

	MILL			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				

	DESPATCH			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				

	OUTSIDE CEMENT WORKS			
				
	NONE	LITTLE	SOME	LOTS
Noise				
Dust				
Smell				
Heat				

Lesson 3 - An investigation - what is the limit?

Learning objectives	<ul style="list-style-type: none">• Display data gathered on fieldtrip.• Analyse data to make statements about what environmental conditions exist around the cement works.• Begin to explore different points of view.
Relevance	To do their own investigation to see whether industry affects their own local area.
Vocabulary	Data Decibels Tolerable Points of view Limits
Preparation/resources	<ul style="list-style-type: none">• Graphing/software or graph paper.• Children's worksheets recording environmental conditions around the cement works.• Tape recordings of noises at cement works.• Know legal limit for noise produced by cement works – ask at works.• Video and photographs taken around cement works.

Lesson 3 - An investigation - what is the limit?

Lesson plan

Introduction

Hand back worksheets to children. Revisit cement works trip and remind children what it was like. What were their favourite bits? Any surprises? Show the video footage and any photographs. Make sure they remember what was happening at each stage of the process.

Development

The aim of this lesson is to look at your results on worksheets to see which parts of cement works was the worst environment. Put children into four groups. Assign one type of environmental impact to each group. Plot scale as four points on y-axis. Plot each different area on x-axis. Each child uses own data.

Back as a whole class, ask each group which area was: noisiest, dustiest, smelliest and hottest. Which area was: quietest, cleanest, not smelly and coolest?

Plenary

If results within each group showed that different areas were worst/best conditions, discuss why different people might have different ideas about what is nice. Different people tolerate different noise/dust/smell/heat levels. Are there examples in school? Some people cannot bear screaming in the playground, some people think it is OK.... This is the same in the cement works. Some people living around the cement works think that noise/dust/smell is OK, some do not. This is because people have different opinions/tolerances.

This is why cement works have to measure environmental conditions – to see if they are within legal limits set by environmental agencies. Show records from decibel meter. Show how they compare to legal limits for the works (ask for current limit on visit to works). Play noise recorded in quarry – perhaps from noisiest place and from outside. What do the children think? Is it tolerable? Would they complain if they lived outside the cement works? How was it controlled? Could it have been better? How? Tell the cement works if you have any good ideas!

Lesson 4 - What do you think?

Learning objectives	<ul style="list-style-type: none">• Writing for a purpose• Listen to different points of view on an issue.
Relevance	Understanding issues facing modern industry and how industry has to be responsible for its impacts on the environment.
Vocabulary	Problems Control Opinions Public relations Improve Local Parish council Campaign
Preparation/resources	<ul style="list-style-type: none">• Download task cards 1 and 2.• Look at newsletters produced by cement industry for examples of possible problems and how the industry communicated with local communities on these issues.• Access to IT to help children put together campaigns if necessary.• Art equipment for posters/leaflets.

Lesson 4 - What do you think?

Lesson plan

Introduction

You saw a cement works and how it does its best to look after the environment.

What were the main problems? (put list on board)

How were they controlled? (put list on board)

Ask children to vote (privately with eyes closed!) whether they thought the cement works had done enough and it was alright to live next to the cement works OR whether they think the cement works needs to do more and they would not be happy to live next to a cement works.

Development

Working in mixed attainment groups of 4 or 5:

- Children who thought cement works was alright - give them task card 1.
- Children who thought cement works was not alright - give them task card 2.

Plenary

Get the groups back together and ask them to present their work. Summarise their different points of view and explain how people do have different points of view about industry and how it effects the environment. Today, industry needs to go to long lengths to look after their environment. Industry is also very careful to listen to what people around their sites think about the way they look after the environment. It is also very important for people to say if they are not happy and see if anything can be done to improve things (citizenship).

Lesson 4 - Task cards

Task card 1

You are a public relations team working for the cement works. A public relations team looks after cement works and tells people that your company is good. Your task is to help cement company to show local people what is being done to take care of the environment. You need to show local people that your cement works will not make any pollution (e.g. dust, noise, fumes, look horrible). You can use posters, leaflets, or make up a TV item with interviews.

Task card 2

You are a parish council working for a village very close to a cement works. A Parish Council is made up from people in the village. Their job is to look after the village. Some people in your village are not happy about the environment around the cement works. They think it is too noisy, dusty, smelly, and does not look very nice. You need to make a campaign to say what you think is wrong and what you want done about it. You can use posters, leaflets, or make up a TV item with interviews.

Lesson 5 (or alternative lesson to lesson 4) - Restoration – what is left?

Learning objectives	<ul style="list-style-type: none"> • To design a restoration scheme for a cement works and quarry. • Show how the industrial environment can be improved to benefit people and/or animals.
Relevance	To see how industry is working towards sustainable goals.
Vocabulary	<p>Aerial view Restoration Plan Design Key</p>
Preparation/resources	<ul style="list-style-type: none"> • Copies of Worksheet 1. • Copies of Worksheet 2. • Could make an outline plan of local cement works that children visited. • Ask for a copy of actual restoration plan of local works that you visited. • Could use IT to do a restoration design on computer. • Interactive whiteboard and slides of restored works from BCA website, or use laminated pictures downloaded from website.

Lesson 5 - Restoration – what is left?

Introduction

When a cement works has finished, machines are taken away and used on other cement works sites. Buildings can be dismantled and used elsewhere, or recycled. This leaves an empty quarry and a flat piece of cleared land. A cement company cannot just leave the land like this. They need to change it into something useful for people or wildlife. This is called restoration, improving the environment after the cement works has finished. What could you do with this land? Cement works sites have been turned into all sorts of things: wildlife reserves (with classrooms and nature trails), shopping centres, fishing lakes, golf courses, farming, cycle tracks....

Development

Imagine that you are left with this empty cement works site – worksheet 1, or your own site plan. This is a plan of the site, looking as if you are floating above the land (aerial view). What can the children see around the site? Does this help them think of ideas of what might be good to put in their restoration plan? Perhaps start to get some ideas on the board (the wackier the better). Who would benefit from these ideas? It has to be useful for people or good for wildlife (or both are best!).

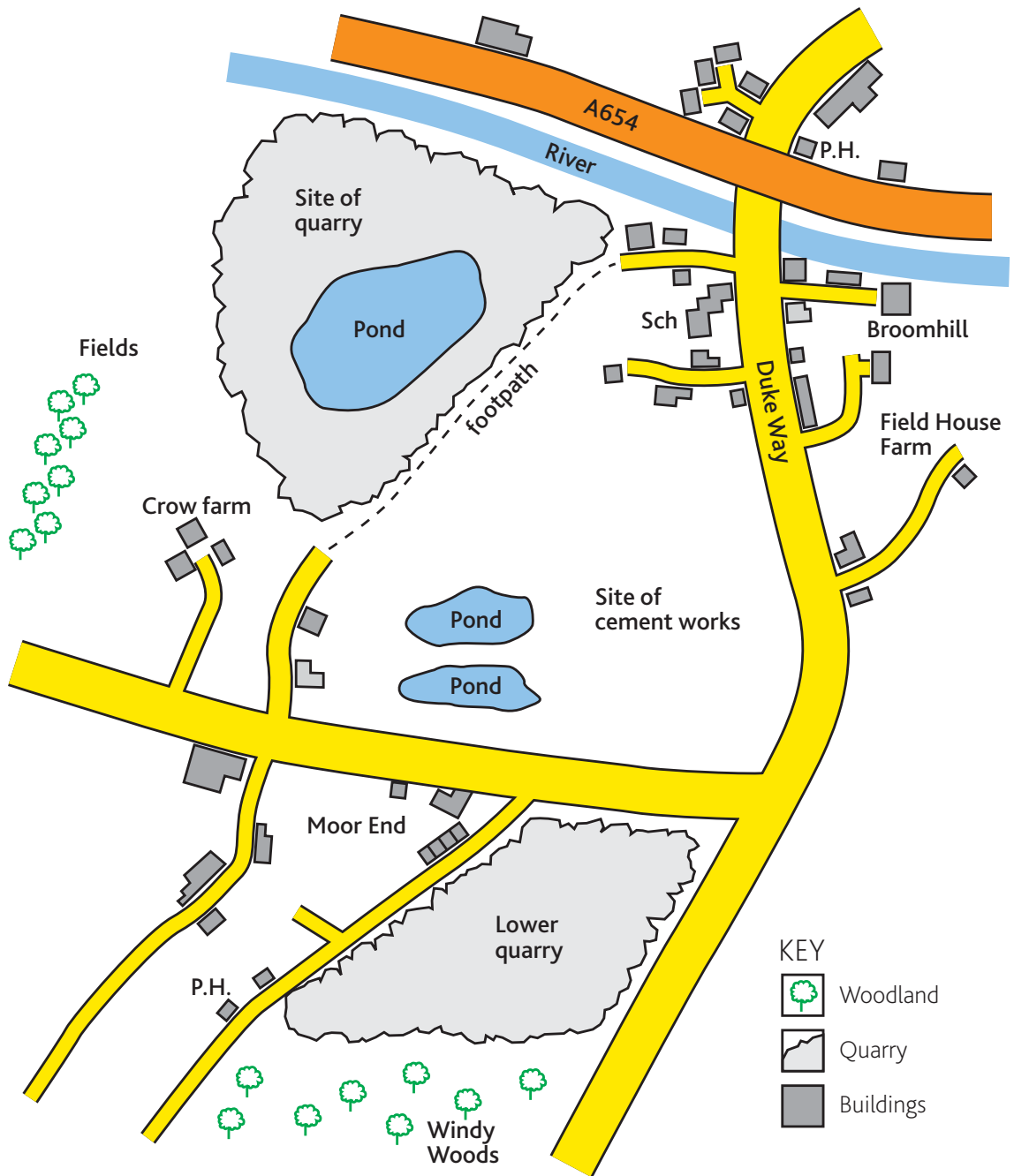
Habitat creation is very important because modern society is destroying the countryside at an alarming rate. We need to make sure that all UK wildlife has enough habitat to survive. All industry is being pressurised to promote biodiversity wherever it can. Restoration schemes are an excellent opportunity to do this.

Hand out worksheet 2, this is an outline plan of the area after cement works has gone. The area for restoration is inside dotted lines. Ask the children to do their own plans with labels, giving details of what they have drawn. They could even add a key to their plan....

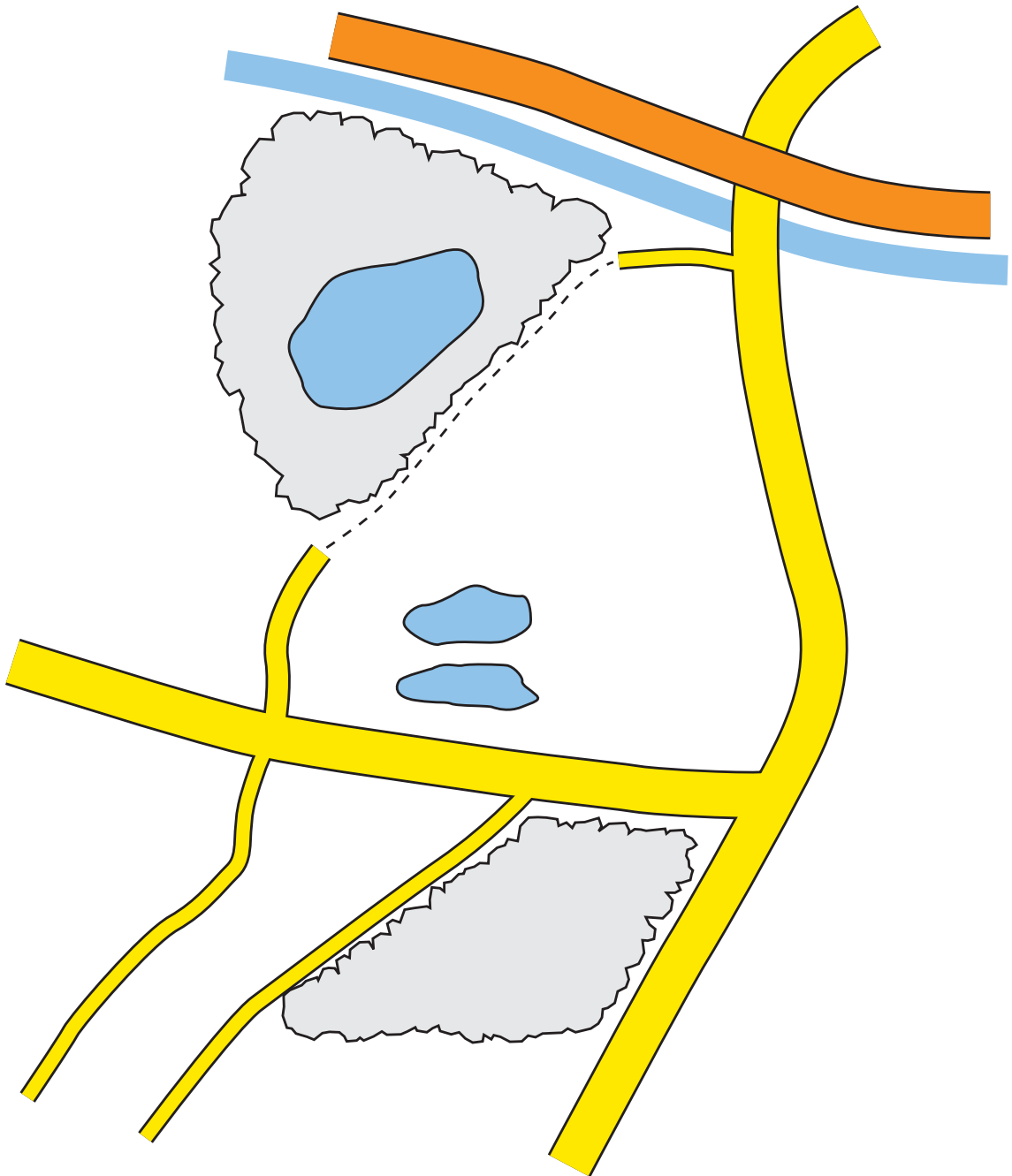
Plenary

Children could their designs with the rest of the class. Could vote for the class's favourite plan. Why do they like it so much? Who benefits – people/wildlife? If you have used the actual site of your local cement works – send them the plans. They would definitely like to see them and the children's ideas might be used. Discuss the actual restoration plan for your local cement works. When will it happen? Who will benefit? Do the children think it could be better? How? Could send this feedback to the cement works!

Lesson 5 - Worksheet 1



Lesson 5 - Worksheet 2



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