Project Sheet 1

Design and Technology - How things work

Up hill and down dale

This activity sheet sets you a challenge.

Imagine you are at the foot of a steep cliff. How many different ways can you think of to get to the top?

Write them down

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Which would be the best way if you wanted to take a lot of different people every day?

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One solution which is used in places such as ski resorts and at the Heights of Abraham in Matlock Bath (Derbyshire) is a cable car.

The cable car at the Heights of Abraham was the first alpine style cable car in Britain. When you go there on your visit you could find out what fellow passengers think about this way of travelling.

Can you design and build your own model cable car?

First, sketch out what it might look like. You'll need to decide how high it needs to climb and over what distance. Add these measurements to your sketch.

Label your design with suggestions for the materials you might use and why.

Things to think about:

- How many people will each car carry?
- Can passengers get a good view of the valley as they travel?
- How easy is it for people to climb in and out?
- How can you make sure it is safe?

When you have built your model, make a list of its good points and bad points.

Good points	Bad points
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. . . . .	. . . . .
. . . . .	. . . . .

What would you do differently if you built it again?

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Compare your model with the cable car and list the ways in which it is similar/different.

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The Heights of Abraham
Cable Cars, Caverns & Hilltop Park

Project Sheet 2

Geography- How did it get like this?

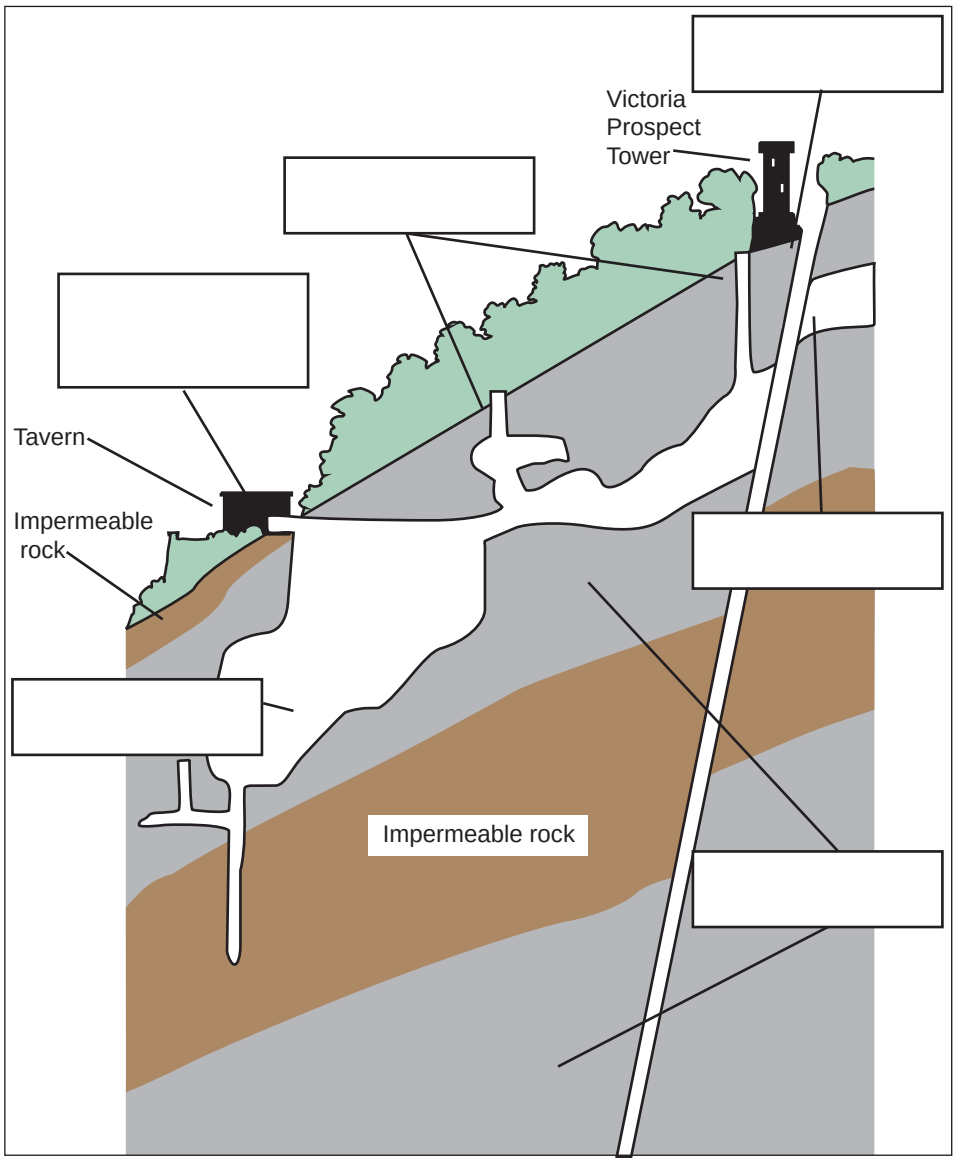
Making caves

This activity sheet will help you understand the effect that water can have on some types of rock when they are underground.

This diagram is a cross-section. It shows the different layers of rock that lie beneath the Heights of Abraham.

When it rains, water soaks down (percolates) into limestone because it is a porous or permeable rock.

The water also wears away (erodes) the rock to make caves. The caves at the Heights of Abraham were found by lead miners who went in along a geological fault called the Great Rake. Later they cut mine shafts down into the caves. There are no caves in the limestone below the impermeable or non-porous rock because this does not let water soak through.



Label the diagram by putting these words in the right boxes.

caves limestone mine shaft

Masson Cavern Great Rake

Rutland Cavern -Nestus Mine (Entrance)

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Project Sheet 3

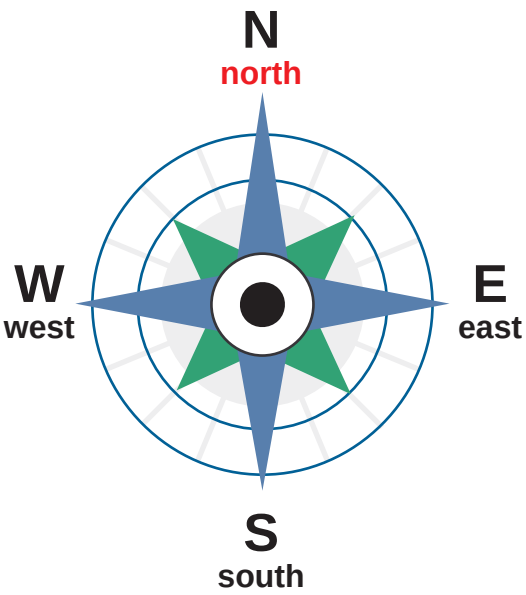
Geography- Maps and Photographs

Getting there

This activity sheet will help you learn how to use maps to get from one place to another. You will need three different types of map for this exercise: a map of England, a road atlas and an OS map of the Matlock area. (OS Landranger map No. 119 or Touring map No. 4)

The challenge is to find out which route you will take to get from your school to the Heights of Abraham in Matlock Bath, Derbyshire.

First, look at the map of England to find out where Matlock Bath is in relation to your school. In what direction will you be travelling - north, south, east or west?



Next, using the road atlas and a separate sheet of paper, write out route directions for your bus driver, giving details of road numbers and any major landmarks you may pass.

Will you go the more direct route along B roads and country lanes or a longer way round but using quicker main roads or motorways?

How many rivers will you cross?

Name them:

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. . . . . .

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How many railway lines?

. . . . . .

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Estimate how far your journey will be?

. . . . . miles

How long do you think it would take to get there. . . . . hours . . . . . minutes

Will you need to allow for toilet or refreshment stops? If so, can you find suitable places?

Finally, look at the OS map to decide on the best place for your bus to park. Give the grid reference for it on the OS map.

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On the day of your visit, ask your bus driver to log his mileage so that you can check how accurate you were. If you time the journey you can then work out the average speed at which you travelled.

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Project Sheet 4

History- The Victorians

Holidays then and now

This activity sheet makes you think about the differences between holidays in the past and today. Read this sheet, answer what questions you can and then talk about all the differences with your class.

The Heights of Abraham is Derbyshire's oldest tourist attraction.

It first became fashionable for wealthy people to visit Matlock Bath in the late 18th century when the Napoleonic Wars made it dangerous for them to travel to the continent. They used the spa waters, climbed the hills, visited the caves and enjoyed the gardens. The visitors stayed in the new hotels.

In early Victorian times the tourists were wealthy. How long would they stay away on holiday?

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Why were working class people not tourists? (Think about how people travelled, how long it would take them, and how much it would cost them).

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Working class people came to Matlock Bath when the railway was built. They had occasional day trips. They did not stay overnight.

Can you find out how much these people might have earned?

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How many days off did they have in a year?

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How many days off in a year do working people tend to have today?

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If your family went to Derbyshire, how long might you stay? A few hours, a day, a week?

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If you went to Matlock Bath how would you get there?

. . . . . .

How long would it take you?

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Project Sheet 5

History- The Victorians

On the right track

This sheet will help you to understand the impact that the railway had on Matlock Bath.

Early tourists travelled to Matlock Bath by horse and carriage. Then in the 1800s the railways were built.

Look at a map of the region to see where the railways are and where there are stations. List the stations between Derby and Matlock Bath.

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In 1842 the railway from Derby opened as far as Ambergate, making day trips from Midlands industrial towns possible.

Where were the nearest mill towns?

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From Ambergate, visitors were taken in boats along the canal as far as Cromford. They then had to walk the last mile to Matlock Bath. This limited the size of parties to about 500 and they often walked in crocodile with a band leading the way!

In 1849 the Manchester, Buxton and Midland Junction Railway opened with stations at Matlock Bridge and Matlock Bath. It joined Matlock with the rapidly growing railway network.

The railway meant that more people could visit. By 1900, 10,000 people were visiting Matlock Bath by rail on a typical Bank Holiday.

People who did not have very much money could also afford to travel. A train can carry a lot of people. The more people who travelled the cheaper it cost.

Where could visitors now come from? (Look at a map showing railways for clues).

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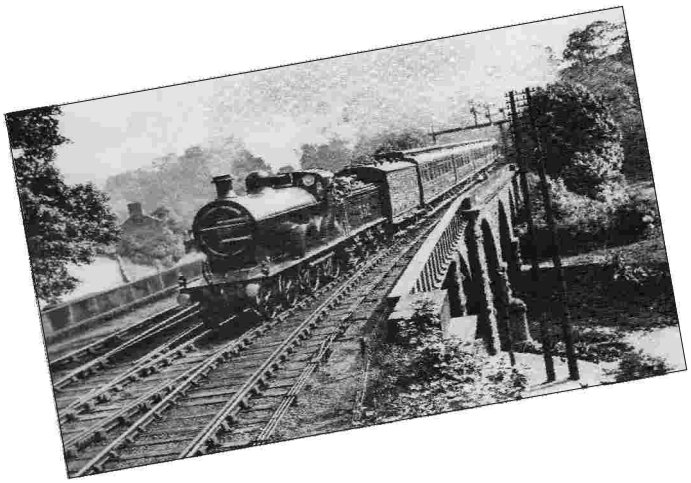

Once the railway line connected Matlock Bath with major towns and cities the number of people in a single excursion grew to about 5,000 in some cases. They came on several trains with up to 50 coaches from as far away as London.

Did any of your grandparents or elderly relatives ever visit Matlock Bath?

If they did, ask them to tell you about it and then write up their story for the whole class.

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Project Sheet 6

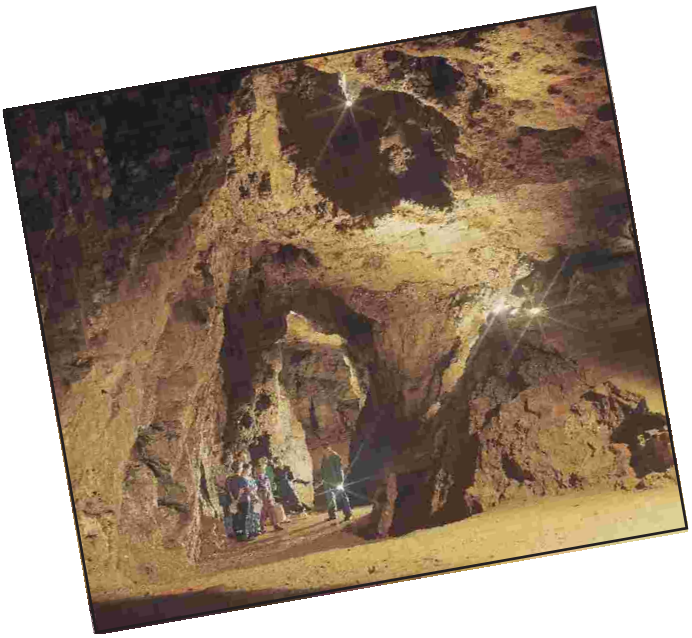
Science- Habitats

In the dark

This sheet asks you to carry out experiments which will help you to discover why plants don't grow in caves.

There are several caves at the Heights of Abraham. There are very few plants in them.

The conditions inside the caves are dark, damp and cool. (The temperature inside remains a constant 5°C all year round.)



Can you design an experiment to find out why plants do not grow there?

To recreate the conditions that are found in the caves, you will need a dark box.

To keep it cool you need to insulate it from the heat. Line a cardboard box with polystyrene tiles and cover it with aluminium foil.

Fill two identical seed trays with gravel, plant them with seeds such as mustard and cress and water them.

Place one on a windowsill (as a control), place the other inside your box and put the lid on.

Which seeds grow first?

What can you conclude from your results?

Challenge:

Take this experiment one step further.

Can you create an environment that is kept at a constant temperature?

You will need two tin boxes and two maximum/minimum thermometers. Make sure both thermometers are set at the same level. It may be a good idea to cool them down to about 10°C to start with.

Place one tin outside above the ground and in the shade.

Bury the other as deep as you can under the ground. Record the depth. After a week record the temperatures reached in each box. Don't let the thermometers change their temperature too much while you are reading them. Re-set and repeat the experiment.

Try burying the tin deeper until you record the least difference between the maximum and minimum temperatures.

Try to reduce the difference between the maximum and minimum temperature by insulating the box with: aluminium foil, polystyrene, cloth/a towel.

Which material is the best insulator?

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