

Rocks and Landscapes Education Pack

Introduction

There are a number of RIGS (Regionally Important Geological and Geomorphological Sites) across Bedfordshire. These are sites considered worthy of protection for their earth science or landscape importance. Some are chosen particularly due to their educational value.

The Bedfordshire and Luton RIGS group have produced this resource pack consisting of worksheets aimed at Key Stages 2 and 3 science and geography studies, as well as resources sheets for teachers or older students.

The pack has been designed to aid the teaching of subjects which link to Bedfordshire's rocks and landscape. Supporting leaflets and information for the case studies are available online at www.bedsrigs.org.uk.

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Notes for teachers

This pack provides background information and supporting material for groups wishing to study Bedfordshire's rocks and landscape.

The contents are outlined below along with suggested uses:

Worksheets

Geological map

(Worksheets 1a, 1b, 1c)

Can be completed by pupils as appropriate.

- Colour the map and key to illustrate local geology
- Label significant land uses that relate to rock type
- Label habitats and link to rock type
- Label landmarks, buildings and other places of interest
- Link height of the land to rock type

Rocks and their uses

(Worksheets 5, 5a)

- Students could research a variety of rocks and their economic uses.

Rocks and their properties

(Worksheet 7)

Students could collect samples of rocks to study. A selection is available from the RIGS group; please contact Chris Andrew (see *Contacts*)

Resource sheets

An introduction to Bedfordshire

General information about Bedfordshire's geology.

Fossil identification sheets

Information about some fossils found in Bedfordshire.

How we use rocks in our lives

An introduction to Bedfordshire's rocks, quarries and their economic uses.

Case study: The Pinnacle, Sandy

Case study: The Ivel River Walk

Case study: Tiddenfoot Waterside Park and Ledburn Quarry

Tiddenfoot is open to the public with parking, Ledburn will soon have a section open to the public (currently open by special permission). Contact 01525 378101 for further details.

Case study: Stockgrove Country Park

Open to the public with parking, contact 01525 378101 for further details.



Useful Contacts and sources of information

Bedfordshire and Luton RIGS Group www.bedsrigs.org.uk
Chris Andrew c/o Bedfordshire museum, Castle Lane, Bedford. MK40 3XD
Tel: 01234 353323 Fax: 01234 273401

Bedford Museum www.bedfordmuseum.org

The Association of UK RIGS Groups www.ukrigs.com

The Sandpit Project www.sandpitproject.co.uk

The Greensand Trust www.greensand-trust.org.uk

The Ivel and Ouse Countryside Project www.ivelvalley.co.uk

The Earth Science Teachers Association www.esta-uk.org

English Nature www.english-nature.org.uk

The Forest of Marston Vale www.marstonvale.org

The National Trust www.nationaltrust.org.uk

The following PDFs are available for download at www.bedsrigs.org.uk:

The Building Stones of Bedfordshire: a 32pp introduction to the rocks used in Bedfordshire Buildings. Illustrated in full colour. Includes six *Bedrock Trails* describing good places to see rocks in buildings, including Bedford itself.

A4 information leaflets illustrated in full colour:


The Lower Greensand: the basics
The Lower Greensand: for geologists
Ice Age Sand and Gravel: the basics

A4 site leaflets illustrated in full colour:

Ice Age Gravels: Ivel Walk, Biggleswade
(Ice Age Gravels) The River Ouzel: its wild past
Ice Age Landforms: Stockgrove Country Park
Lower Greensand: Munday's Hill Quarry
Lower Greensand: Stone Lane Quarry
Lower Greensand: Tiddenfoot and Ledburn
Lower Greensand: The Lodge, Sandy Warren Quarry
Lower Greensand: The Pinnacle, Sandy



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An introduction to Bedfordshire's Rocks

Bedfordshire lies in southeast England, about 45km north of London. Our familiar landscape has been shaped by a series of geological events that have occurred over many millions of years.

The basic geology of Bedfordshire is quite simple: limestones in the northern Ouse Valley and Oxford clay elsewhere in the north of the county, then Lower Greensand and Gault clay in bands across the middle, followed by Chalk across the south.

All these rocks are classed as *sedimentary*. Sedimentary rocks form as small pieces of rock (sediments) or tiny animal shells that settle onto sea beds and, over long periods of time are packed and cemented together in layers. Bedfordshire's rocks formed many millions of years ago, the oldest rocks are over 200 million years old.

Almost all of Bedfordshire's rocks are quarried. Only the Gault clay has relatively few uses. There are many active and restored chalk, sand and clay quarries across the country and these rocks are used all around us in our everyday lives.


The shape of Bedfordshire's landscape is strongly influenced by the underlying rock. Hard rocks are more resistant to *erosion* (being worn away by the action of weather, ice and water), so stand higher in the landscape.

The north of Bedfordshire tends to be flat where the soft clay has been washed away or scraped away by glaciers during the Ice Age. In the south the Chalk of the Chilterns is not only a harder rock, it is *permeable*. This means water can flow down through the rock instead of flowing across the top of the rock and wearing away the surface.

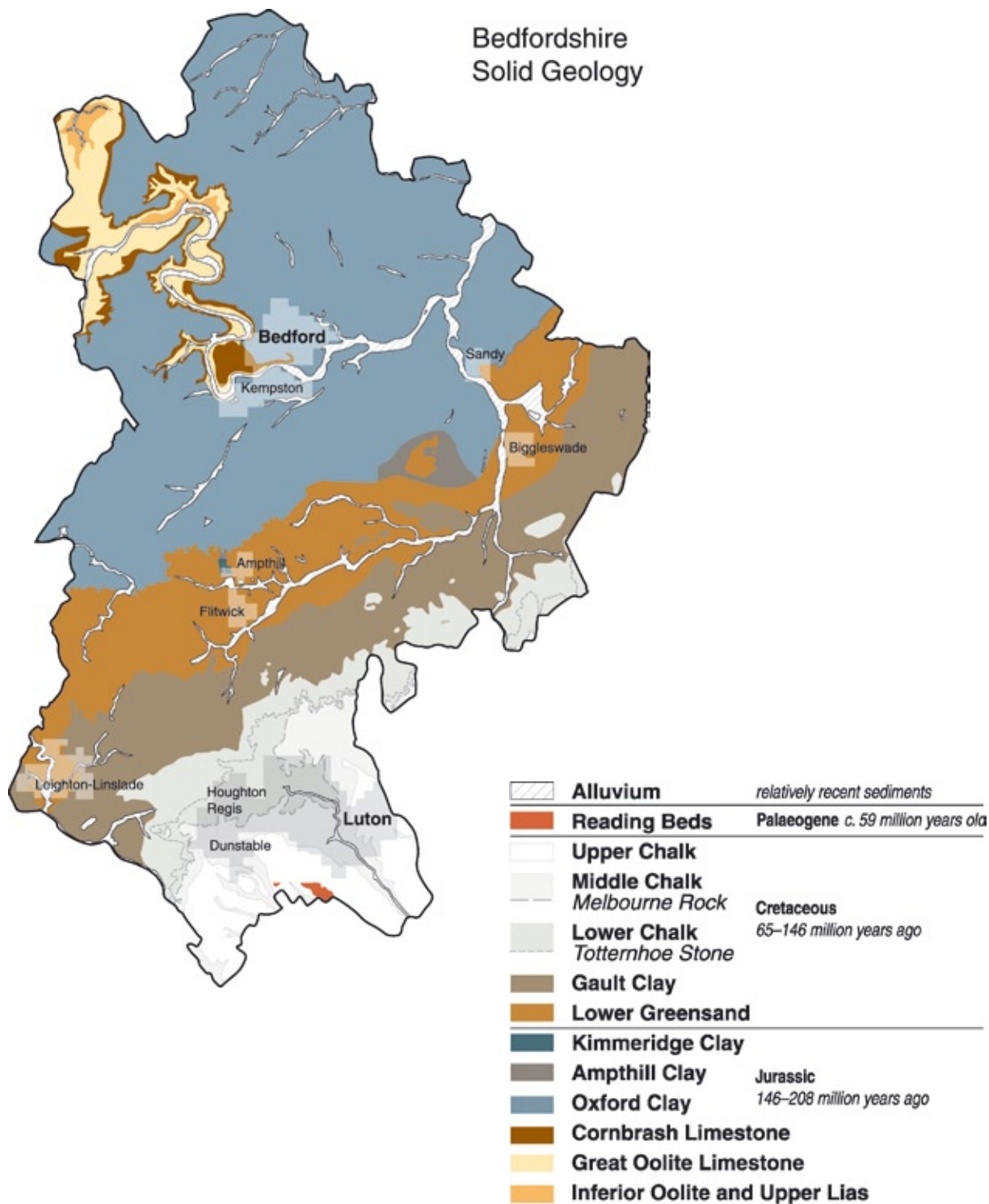
The underlying rocks not only shape of the land, but also influence the wildlife and habitats found on it. Gorse and heather favour the free draining soils of the Greensand Ridge, while Rock Rose and the Chiltern Gentian prefer acidic chalky soils. The Black Hairstreak butterfly tends to be found along the low-lying band of clay from Oxford to Cambridge feeding on Blackthorn.



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An introduction to Bedfordshire's Rocks *continued*

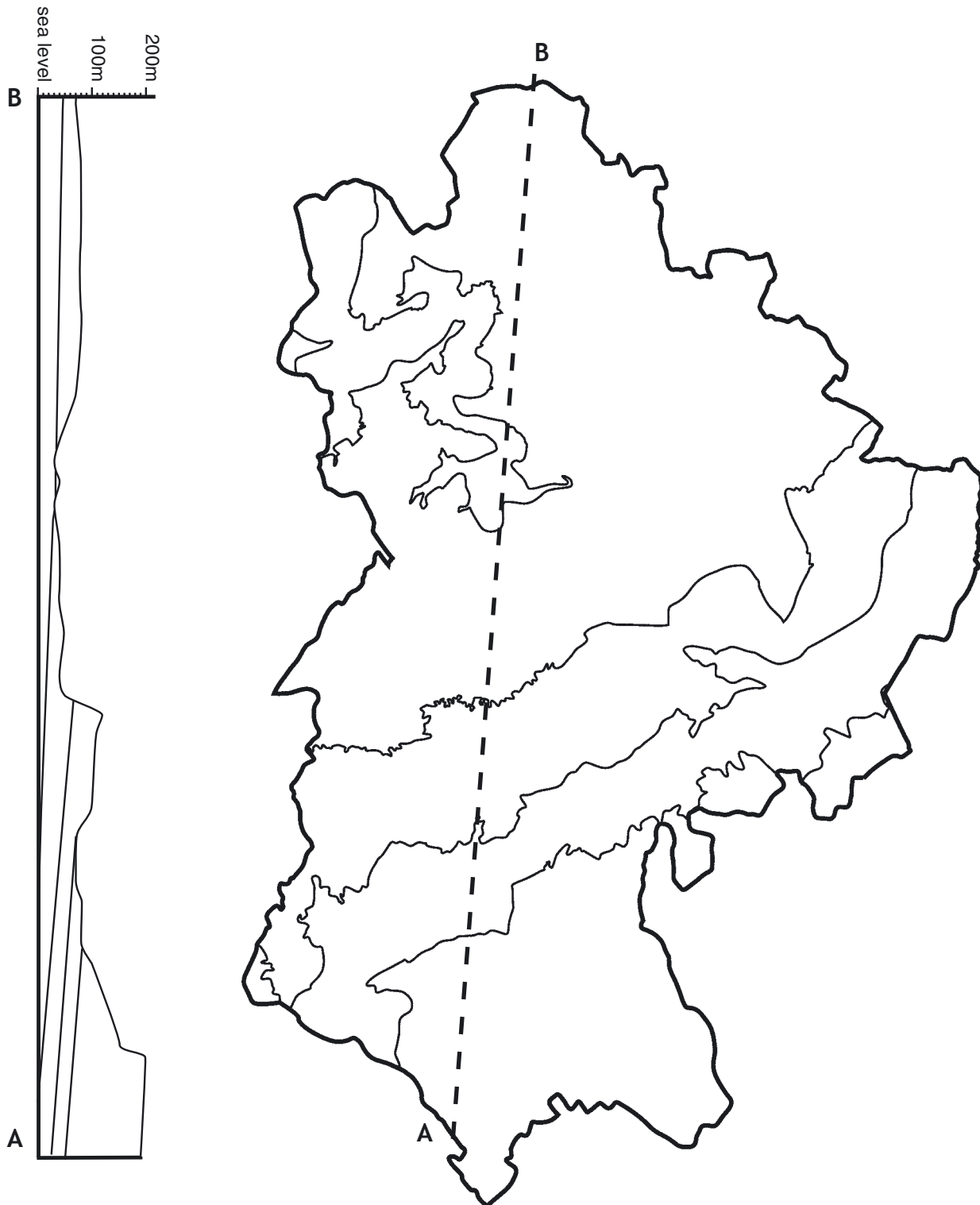


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An introduction to Bedfordshire's Rocks *continued*

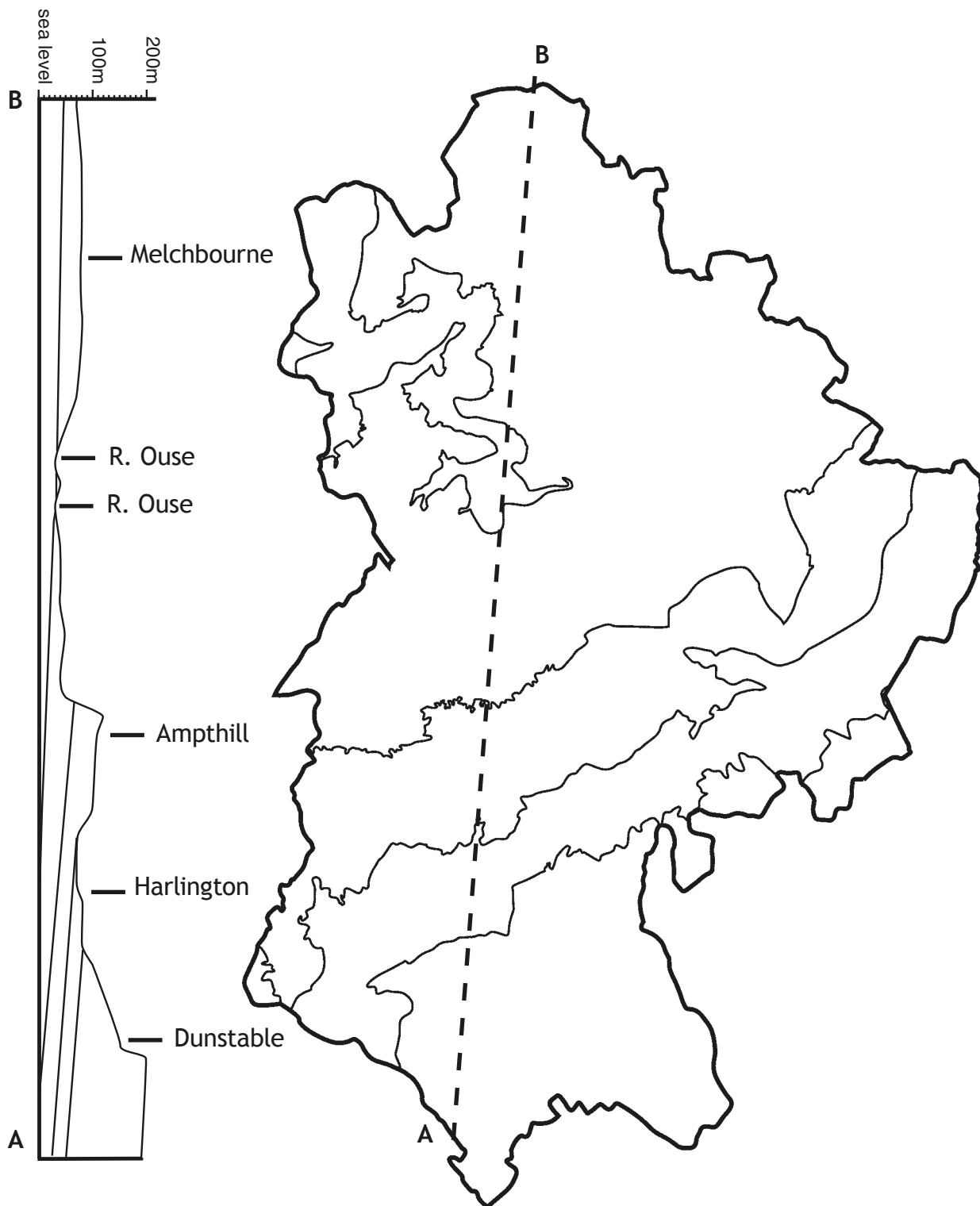


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An introduction to Bedfordshire's Rocks *continued*



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Bedfordshire's Rocks and Us

For hundreds of years humans have been using the earth's natural resources including rocks, which may be quarried (extracted from surface diggings) or mined.

The main rocks that are quarried in Bedfordshire are clay, limestone (including chalk) and sand. They are together classed as aggregates; the term given to a rock which has been broken down into smaller pieces either naturally or by humans.

Rocks are used all around us in building and roads as well as being found in more unusual places such as medicines and cosmetics.

Clay can be:

- Fired to make bricks and pipes
- Used to coat paper

Sand can be:

- Heated and mixed with limestone to make glass for windows, bottles, television screens, microscopes, and much more.
- Blasted onto bricks to face them.
- Used for dog tracks and horse ménages.
- Mixed with cement to make ready-mix concrete
- Used for sandpaper, play sand and golf bunkers
- Used to make moulds for casting engine parts
- Used to filter drinking water.

Limestone can be:

- Mixed with sand to make glass for windows, bottles, television screens, microscopes....
- Crushed (aggregate) and used in the building industry.
- Blended with clay to make cement.
- Ground to use for agriculture to neutralise acidic soils.
- Powdered limestone for use as a gentle abrasive used in toothpaste
- Burnt to make steel.

Quarries provide a glimpse into our local geology while they are being worked. They also reveal fossils and archaeological artefacts.

Restored quarries provide many opportunities for the future. For example Stewartby Lake and Brogborough Lake are restored clay quarries now used for water sports. Tiddenfoot Waterside Park in Leighton Buzzard, a restored sand quarry, is now a public park and Totternhoe quarry, a former chalk quarry, is now managed as a nature reserve.



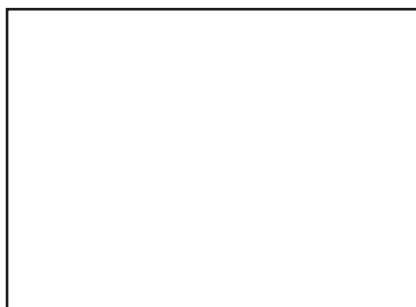
Local rocks and their properties

A number of different types of rock are found in Bedfordshire including sand, clay and limestone. These rocks differ in their properties and appearance.

Select six rock samples and complete the following table to describe the properties of each rock.

	1	2	3	4	5	6
Rock name:						
What colour is it?						
Texture: rough						
smooth						
How hard is it? hard						
soft						
very soft						
Does it absorb water?						
Yes, quickly						
Yes, slowly						
No						
Does it contain fossils?						

Sketch each rock, including any distinctive features.



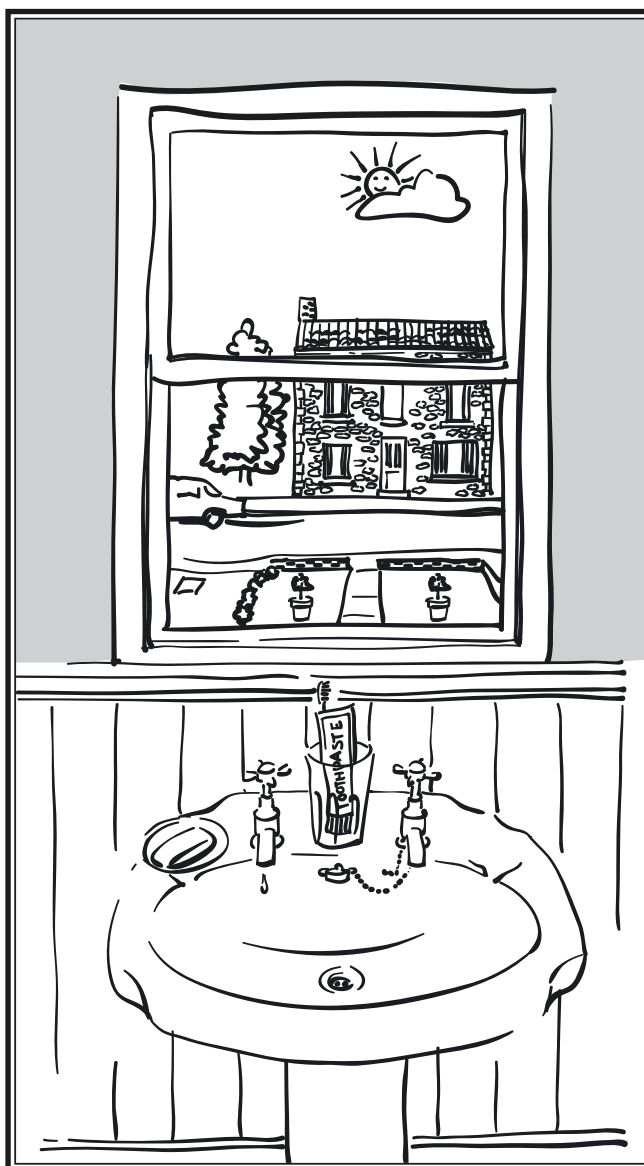
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Local rocks and their uses

Several types of rocks can be found in Bedfordshire including sand, clay and limestone. These rocks differ in their properties and appearance. For thousands of years people have been collecting and using natural resources, including rocks. Parts of your house and many of the things in it have been made using rocks that might have come from Bedfordshire.

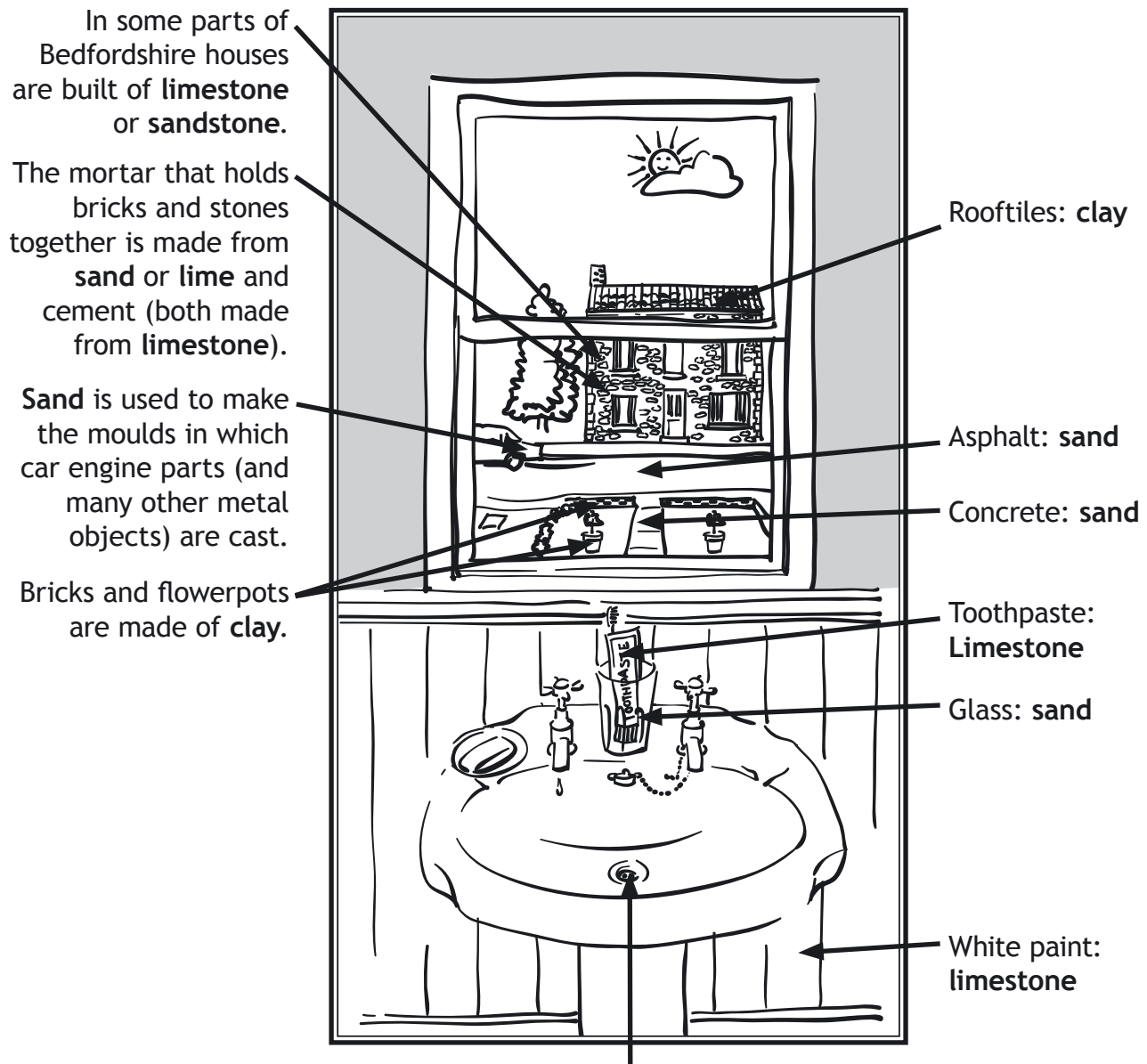
Research and then label things in the picture below that might be made from Bedfordshire's rocks.



Local rocks and their uses

Several types of rocks can be found in Bedfordshire including sand, clay and limestone. These rocks differ in their properties and appearance. For thousands of years people have been collecting and using natural resources, including rocks. Parts of your house and many of the things in it have been made using rocks that might have come from Bedfordshire.

Research and then label things in the picture below that might be made from Bedfordshire's rocks.



Waste water flows to the treatment plant through **clay** drainage pipes.

Sewage treatment plants use **sand** in their filtration beds.