

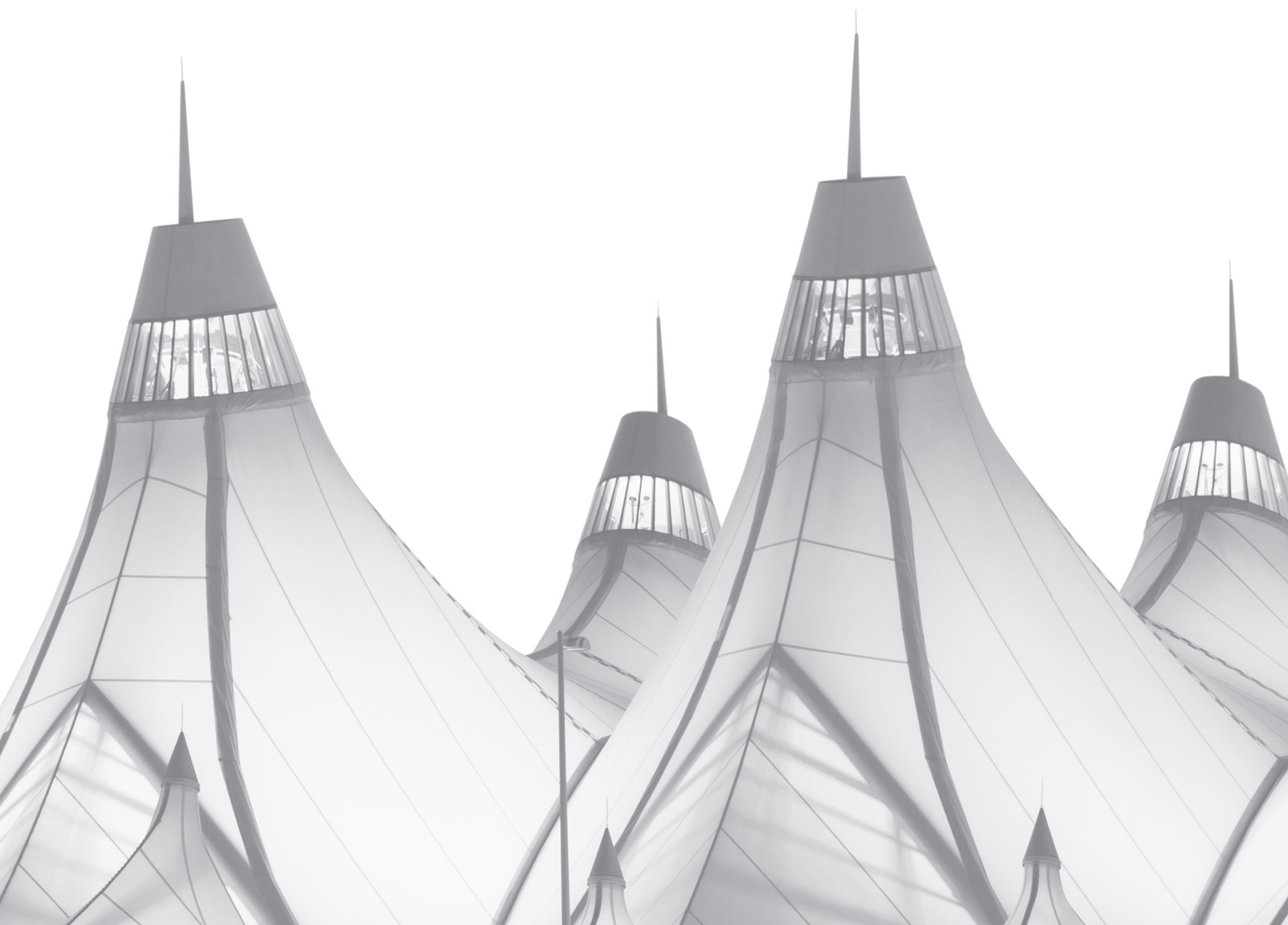
Collins

Key Stage 3

Geographical Enquiry

Teacher Book 2

**David Weatherly
Nicholas Sheehan
Rebecca Kitchen**



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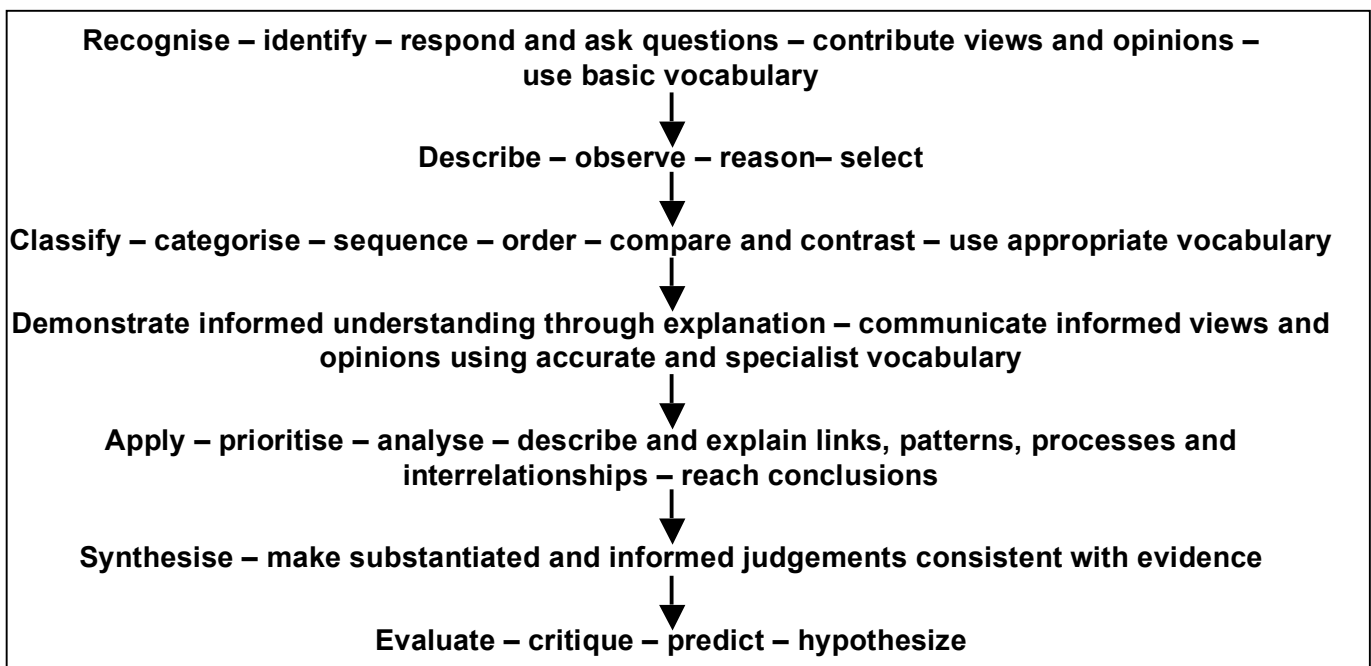
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KS3 Geographical Enquiry

This *Geographical Enquiry* programme offers you a new and exciting approach to engaging your Key Stage 3 students with twenty-first century geography. It is the antithesis of the traditional textbook based 'double-page spread' method of teaching geography, which too often offers students only a superficial and disjointed perspective of the subject. In contrast, the approach taken in this programme is to connect students with wide-ranging and stimulating geographical questions and associated data that enable them to consider the subject in greater depth. This series gives students the opportunity to see the world as geographers and enables them to achieve and perform highly through carefully planned progression and challenge.

The following five principles have guided the design and structure of each enquiry:

- 1 Understanding the importance of geography as a discipline that enables students to recognise, describe, explain and evaluate the interactions between people and environments and acknowledging the central role geography plays in supporting these students to become 'agents of change'.
- 2 Recognising what it means to get better at geography in terms of intellectual outcomes and building progression in these skills. Excelling as a 'geographer' as opposed to just being 'good at geography' requires not only knowing and understanding the physical and human processes which shape the world in which we live, but also being challenged to apply that knowledge and understanding to new situations and to think both conceptually and critically. The following progression in geographical outcomes underlies each of the enquiries:

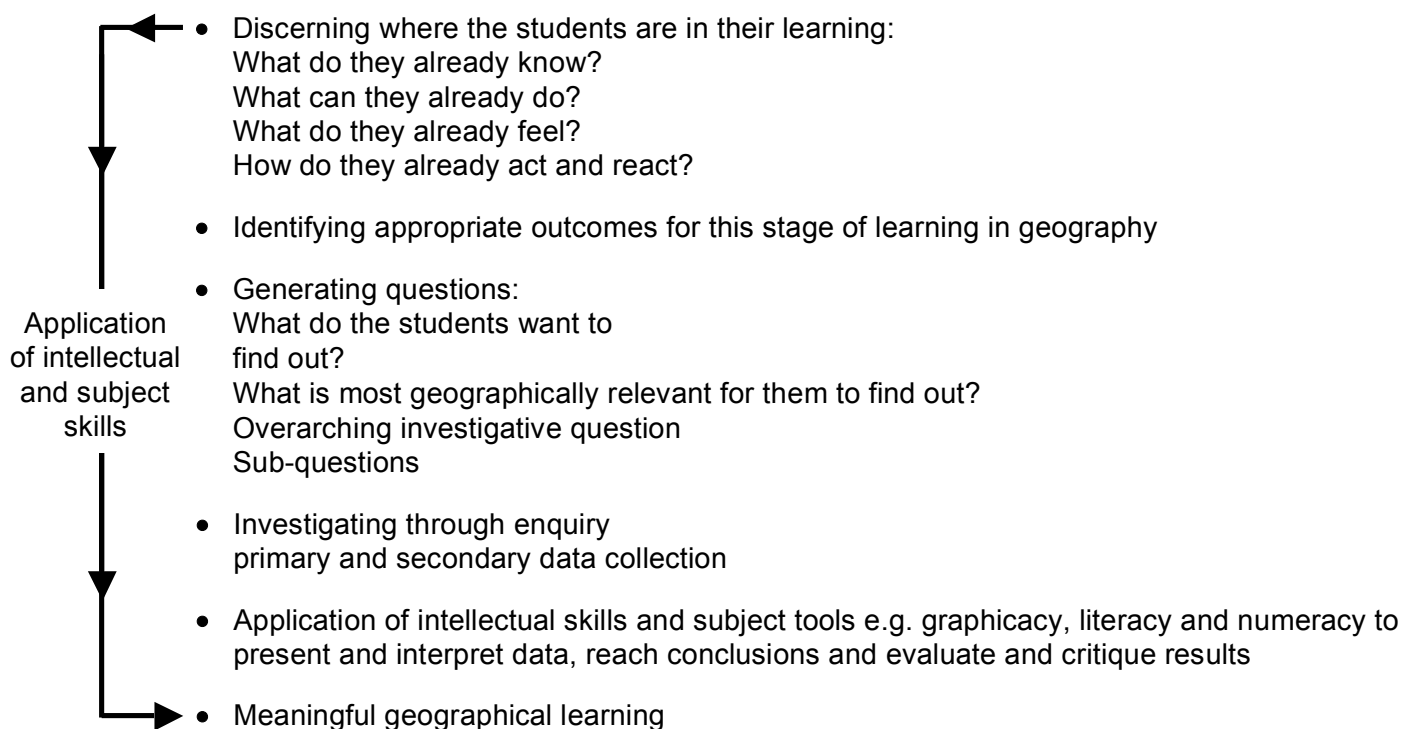


- 3 Not confusing subject 'outputs' with subject 'outcomes'. Each of the enquiries has a suggested output of learning such as a PowerPoint presentation; the design of a website home-page; a piece of persuasive writing or physical model. These outputs are not ends in themselves but vehicles for demonstrating geographical outcomes. Their value lies in what they indicate about the breadth and depth of geographical learning which has taken place e.g. to be able to evaluate the viewpoints of different stakeholders regarding a contentious issue. Such an approach makes assessment more straightforward i.e. in this example is there evidence of both appraisal of different perspectives and a judgement?
- 4 Ensuring and supporting engagement through thinking very hard about the modern geographical issues, places, themes and interactions that are of most relevance to young geographers today. Every enquiry has been informed by the subject content and recommendations of the 2014 National Curriculum in the

mastering of locational and place knowledge and the areas of study recommended for both human and physical geography. Comprehensive cross-referencing with the subject content of the Key Stage 3 programmes of study are detailed separately in the relevant section for each enquiry of this book, which also includes the supporting learning resources referred to in the Student Book. Each enquiry is made up of one overarching investigative question and a series of sub-questions serving to structure learning and provide both continuity and progression. This ensures that students gain crucial subject knowledge and understanding of the topics and relationships that lie at the heart of modern twenty-first century geography.

- 5 Making *structured enquiry* with plenty of opportunities to *consolidate your thinking* and *apply your skills* the driver for developing learning and reflection. Each of the enquiries has been designed to balance the need to provide the student with the key information required to progress through the enquiry along with the need to encourage the learner to ask as many questions themselves as possible.

Key question led enquiry based learning



In addition to the wide-ranging learning support materials in this Teacher Book further resources are also available to download from www.collins.co.uk/KS3Geogtr2.

These resources consolidate and extend student learning and have been created both to ensure that teachers possess detailed contextual information for each enquiry and also to provide ideas and spark interest in pursuing related investigations.

Downloadable resources include:

- Engaging and inspiring **Story Maps** for each enquiry which cover the basic geographical concepts that students will encounter in the Student Book
- Extensive **image galleries** related to each investigation
- **Word and PDF files** of the Teacher Book that enable teachers to either use the enquiry plans directly or adapt them according to the needs of individual students and groups

The overriding principle, which has guided the design and structure of the enquiries and learning resources in this series, has been to support and encourage students to see the world through the eyes of geographers, not geography students. We are confident that students will recognise both the relevancy of investigating the modern world they live in and the value of the enquiry method of teaching which prepares them for adult life, encourages high achievement and supports further learning.

Do corries really prefer north facing slopes?

► Purpose ◀

This investigation is designed to enable pupils to explore the formation of upland glacial landscapes, particularly corries, to investigate whether or not they prefer north facing slopes. The enquiry begins by explaining that most of the ice covering the earth's surface is currently found in areas of high latitude and altitude but this has not always been the case. By going back in time several hundreds of thousands of years we can see that the mean global temperature has fluctuated. We are currently in an interglacial period but when mean temperatures drop below about 13°C we begin to experience a glacial or Ice Age. It is worth highlighting that this process takes thousands of years – much longer than one human lifetime – so students won't wake up one morning to find an ice sheet, several hundreds of metres thick, outside their bedroom window!

The enquiry then moves on to investigate how glaciers move and the ways in which they erode the landscape. Visual aids can be quite useful here. For example, to demonstrate the process of abrasion an ice cube which has been made containing sand and small gravel can be moved over a piece of clay or wood to demonstrate the glacier's sandpaper effect. Following this explanation, pupils are encouraged to draw and add labels to a diagram showing the processes of plucking and abrasion and to also consider the process of freeze-thaw weathering. Landforms of erosion in upland areas are then introduced and specifically include corries, arêtes and pyramidal peaks. It is worth pointing out to the pupils that corries are called a variety of different things, such as cirques, cwms, coires and corries depending upon their location, as when they research these landforms they may become confused by the varying terminology.

Pupils can create a storyboard to show the formation of a corrie. They may also be able to animate this and provide a voice over – an example is provided for modelling purposes in the Teacher Book. A case study of a corrie can then be investigated; two examples are suggested from both the Lake District and Snowdonia. The pupils can devise a quiz to highlight key features of the case study; for example, 'How many metres above sea level is Red Tarn?', 'Which direction does Red Tarn face?', etc. If an OS map of the case study is available then pupils should be encouraged to interpret the map to create their questions.

Next, the main focus of the enquiry is introduced: 'Do corries really prefer north facing slopes?' and pupils are led through an assessment in which they present data and test it using Chi-squared. Whilst this is a potentially difficult technique, which is examined by most specifications at A-level, the calculations, when broken down, are in fact fairly straightforward. It may be worth pairing more mathematically able pupils with those who are likely to find it difficult and it is also worth checking that everyone has got the correct answer at the end of each question. The assessment should culminate in a written paragraph in which the pupils write a conclusion as to whether or not corries prefer north facing slopes and reasons for why this may be. There is also an extension activity where pupils can use data from the Lake District to see whether or not their answers hold for a different glaciated area.

Finally, the enquiry can be extended with pupils researching and considering glacial landforms that are typically found in lowland areas. Five examples are included: glacial troughs, ribbon lakes, hanging valleys, drumlins and moraines, although other landforms such as misfit streams, erratics or truncated spurs could also be researched. Pupils are led through the sketching of a fieldsketch from a photograph to describe and explain the formation of the landform. An example of a fieldsketch of a drumlin is in the Teacher Book and can be used for Assessment for Learning purposes. Whilst the sketch is clear, the annotations lack detail and use of geographical vocabulary and so this is not a particularly good example. The questions at the bottom of the sheet should allow pupils to critique the fieldsketch to make the annotations in particular more precise.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Develop contextual knowledge of the location of globally significant places, including their defining physical and human geographical characteristics and how these provide a geographical context for understanding the actions of geographical processes.
- Understand the processes that give rise to key physical and human features of the world, how these are interdependent and how they bring about spatial variation and change over time.
- Interpret a range of sources of geographical information to reach substantiated conclusions and judgements consistent with the evidence and communicate these in a variety of ways including through maps, numerical and quantitative skills, writing and fieldsketching.

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Human and physical geography

- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in physical geography relating to: rocks, weathering and soils, weather and climate and hydrology.
- Understand how human and physical processes interact to influence and change landscapes, environments and the climate and how human activity relies on effective functioning of natural systems.

Geographical skills and fieldwork

- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom
- Interpret topographical and thematic mapping, and aerial and satellite photographs

► Possible assessable outcomes ◀

- The activity 'Do corries really prefer north facing slopes?' on pages 8–11 is designed to take pupils through the creation of a rose diagram and calculation of the Chi-squared co-efficient. This has been done in a step-by-step fashion so that pupils can follow what is, on the surface, an advanced statistical technique. The answers for each of the questions are supplied on page 12.

Do corries really prefer north facing slopes?



1 Have a look at the OS map extract above. It shows the area around Mount Snowdon in Snowdonia, North Wales. How many corries can you spot?

HINT: Look for the word ‘Cwm’ which means ‘corrie’ in Welsh and for small circular lakes (Llyn) called ‘tarns’, which are sometimes found in the bottom of corries. If you are still stuck, have a look at the brown contour lines that show the height of the land in the colour version of the map on page 17 of the Student Book. Corries often have contour lines that look a little bit like fingerprints.

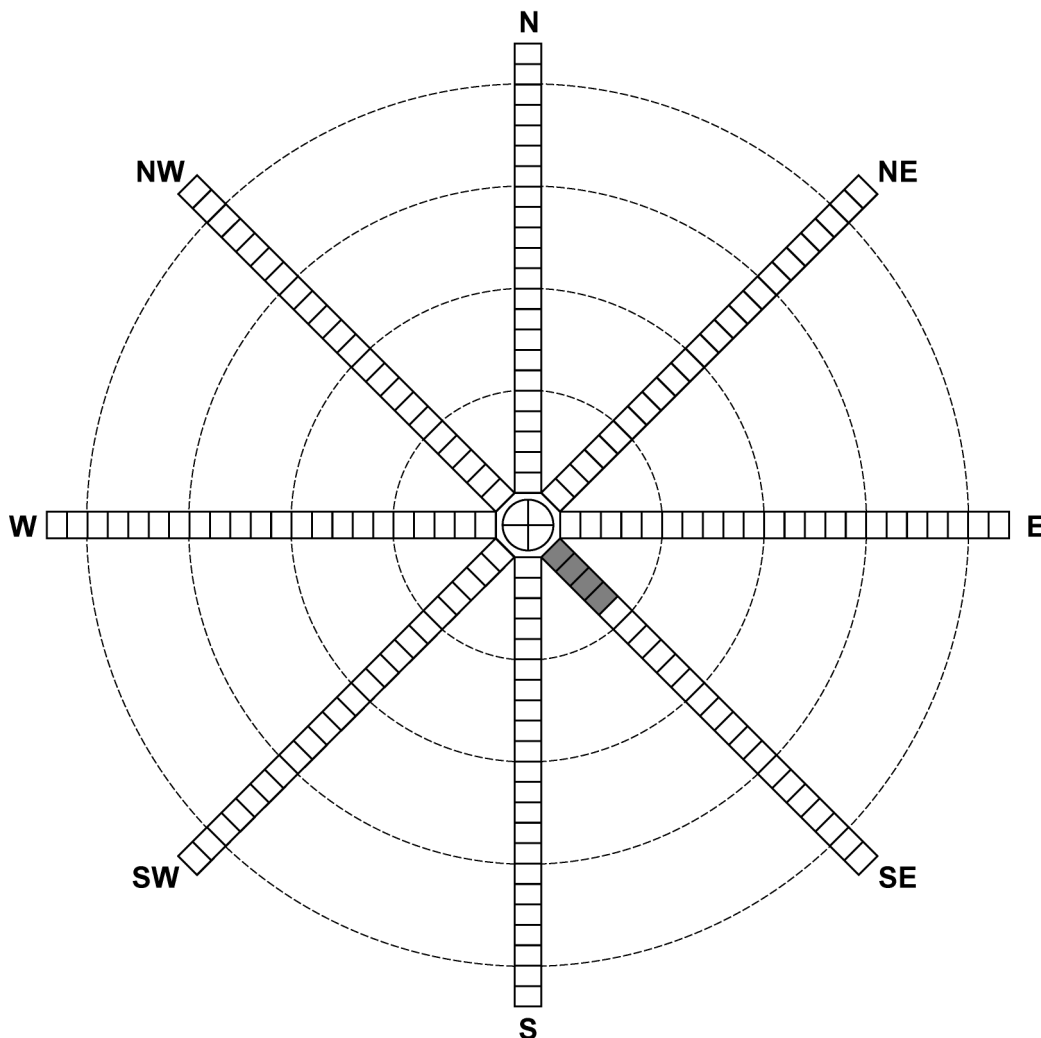
See: <http://www.bbc.co.uk/bitesize/higher/geography/physical/lithosphere/revision/6/>

2 There are about fifty-six corries in the whole of Snowdonia. We can divide them up to show which direction of the compass the slope they are on is facing. The results are shown in the table below.

Number of corries in Snowdonia							
N	NE	E	SE	S	SW	W	NW
15	15	13	4	4	1	0	4

We can draw a *rose diagram* to show these results (this is a bit like a bar graph but circular).

- a Colour in the bars on the template below to show the number of corries that face each direction. The data for SE has already been plotted for you.
- b Just by looking at your rose diagram do you think that corries really prefer north facing slopes?
- c Why do you think this?



3 Whilst a graph is quite useful to help us answer our question, sometimes we also use statistical tests to check whether our results are random or not. We are going to start with the statement ‘The way that a corrie faces (its orientation) is random’ and see whether or not we can accept or reject this statement.

a If it were the case that the way that a corrie faces is random, how many corries would you expect to find at each point of the compass?

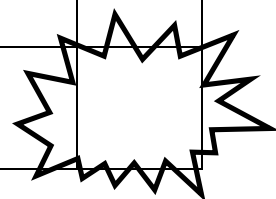
HINT: There are 56 corries in total and 8 points of the compass. We would expect to find an equal number at each compass point.

b Now that we have got our observed (O) values from the table in Question 2 and our expected (E) values – the number we have calculated in Question 3a – we can put these numbers into the table below. The calculations for SE have been done for you.

c Once you have completed the table, add up all of the numbers in the bottom row to get your grand total. Circle the correct answer out of the six numbers below.

72.6724 47.3292 36.7354 39.4283 19.3758 8.3675

	N	NE	E	SE	S	SW	W	NW	Total
O	15	15	13	4	4	1	0	4	56
E				7					56
O - E				$4 - 7 = -3$					
$(O - E)^2$				$(-3)^2 = 9$					
$(O - E)^2 / E$				$9 / 7 = 1.285$					
Total				1.2857					



It's all very well calculating a number, but what does this actually mean? We have to use the table below to find out. The row that we are interested in is row 7, where the 'Degrees of Freedom (DF)' is the number of compass points (8) minus 1.

If the number that we've calculated in Question 3c is higher than the numbers in the table then we can be sure (either 95% or 99%) that our statement is wrong and that the way that a corrie faces is not random.

Degrees of freedom (DF)	I'm 95% sure	I'm 99% sure
1	3.841	6.635
2	5.991	9.210
3	7.815	11.345
4	9.488	13.277
5	11.070	15.086
6	12.592	16.812
7	14.067	18.475

d Use all of the information that you have calculated to complete the following sentences. Fill in the blanks and circle the correct words.

- The number that I have calculated is _____ and this is higher / lower than 14.067.

This means that I am 95% sure that our statement is right / wrong and the way that corries in Snowdonia face is / is not random.

- The number that I have calculated is _____ and this is higher / lower than 18.475.

This means that I am 99% sure that our statement is right / wrong and the way that corries in Snowdonia face is / is not random.

ANSWERS

Question 1: There are six corries shown on the map extract.

Questions 2a and 2b: The completed rose diagram should suggest that corries do tend to form on some slopes with greater frequency than others. However, they are not confined to north facing slopes as north, northeast and east facing slopes have similar frequencies.

Question 2c: This can be explained by the fact that in the northern hemisphere, north facing slopes tend to be cooler than south facing slopes. As corries require the build-up of snow in order to form, this is more likely to happen on north facing slopes, which might explain the increased frequency.

Question 3a: If there are 56 corries and 8 points of the compass then we would expect to find seven (56 / 8) corries at each compass point.

Question 3b: The completed table should look like this:

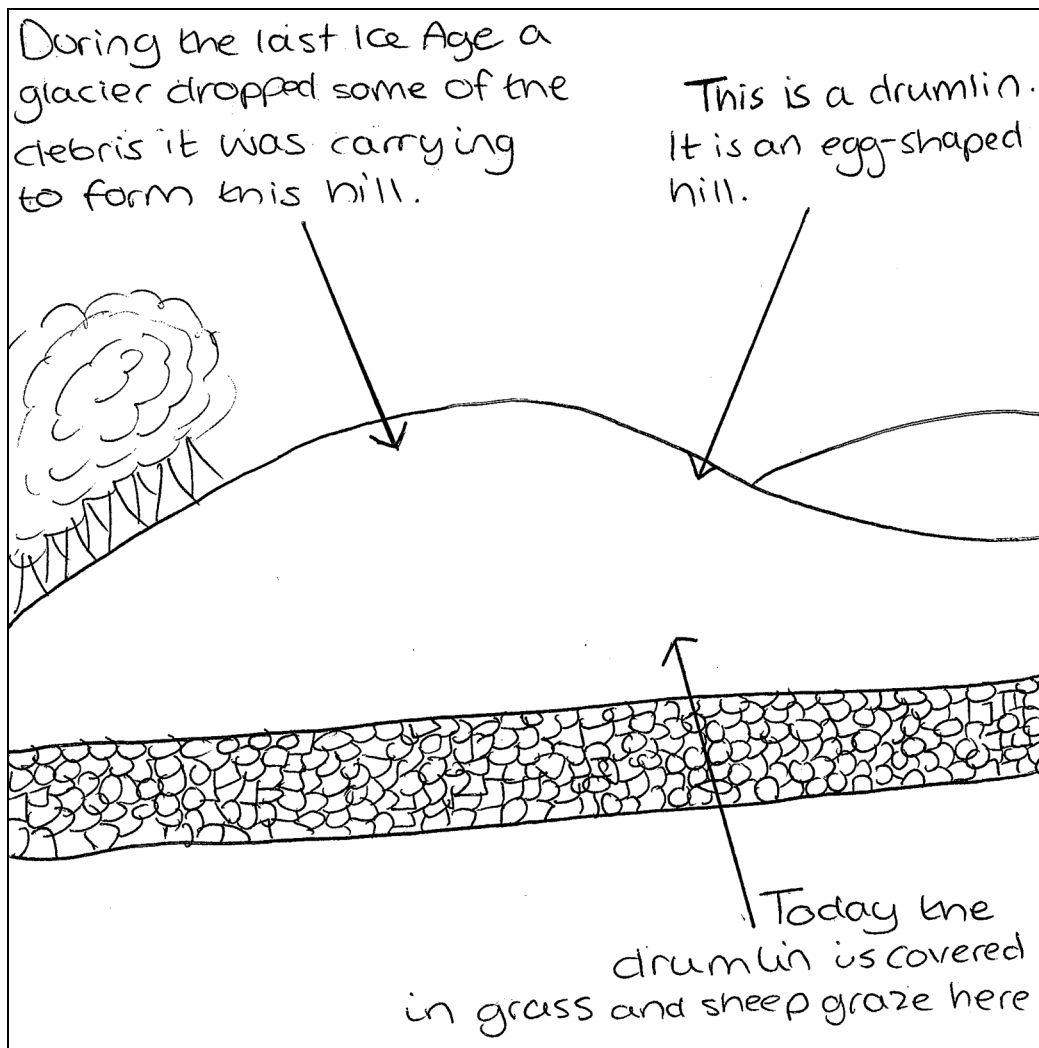
	N	NE	E	SE	S	SW	W	NW	Total
O	15	15	13	4	4	1	0	4	56
E	7	7	7	7	7	7	7	7	56
O - E	8	8	6	$4 - 7 = -3$	-3	-6	-7	-3	
$(O - E)^2$	64	64	36	$(-3)^2 = 9$	9	36	49	9	
$(O - E)^2 / E$	9.1428	9.1428	5.1428	$9 / 7 = 1.285$	1.2857	5.1428	7	1.2857	
Total	9.1428	9.1428	5.1428	1.2857	1.2857	5.1428	7	1.2857	39.4283

Question 3c: The total is: 39.4283

Question 3d:

- The number that I have calculated is 39.4283 and this is higher than 14.067. This means that I am 95% sure that our statement is wrong and the way that corries in Snowdonia face is not random.
- The number that I have calculated is 39.4283 and this is higher than 18.475. This means that I am 99% sure that our statement is wrong and the way that corries in Snowdonia face is not random.

This is a fieldsketch of a drumlin. The sketch describes what the drumlin looks like and how it was formed. Do you think it is a good fieldsketch? Use the questions below to help you to decide.



- Does the fieldsketch have a title? What would be a suitable title for this fieldsketch?
- Does the fieldsketch have the main features of the photograph in the Student Book (p.19) drawn in? Could this aspect be improved?
- Do the annotations that describe the drumlin contain a range of adjectives? Is the description detailed enough so that you could spot a drumlin yourself? How could the description be improved?
- Is there a range of geographical vocabulary in the annotations? Is the description detailed enough so that you could explain how a drumlin is formed yourself? How could the explanation be improved?
- Are there any other important features of a fieldsketch that are missing or incomplete?

Planning a trip to the Lake District

- 1 The location of the Lake District is shown in the map below. As you decide on your itinerary, mark the locations of your activities on your map and label them clearly.



- 2 Use the websites below to help to focus and structure your research:



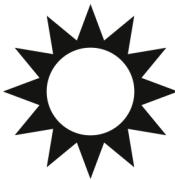
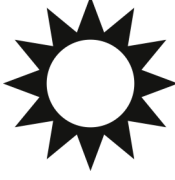

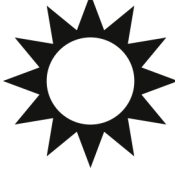

<http://www.lakedistrict.gov.uk/visiting/wheretostay/camping>

http://www.lakescottageholiday.co.uk/late_availability.asp?gclid=COeDgYPbysACFSQXwwodCDQAgg

<http://www.lakedistrict.gov.uk/visiting/thingstodo>

http://www.tripadvisor.co.uk/Attractions-g186318-Activities-Lake_District_Cumbria_England.html

Plan your itinerary in the table below. You will need to consider what you will need to pack for each day as well as where you are going to stay. Are you going to camp or stay in a cottage? Are you going to stay in one place or move around a bit?

Day	Weather	Itinerary	Where to stay?	What to pack?
Friday		Morning: Afternoon: Evening:		
Saturday		Morning: Afternoon: Evening:		
Sunday		Morning: Afternoon: Evening:		
Monday		Morning: Afternoon: Evening:		
Tuesday		Morning: Afternoon: Evening:		
Wednesday		Morning: Afternoon: Evening:		
Thursday		Morning: Afternoon: Evening:		

Can Russia exploit the Arctic sustainably?

► Purpose ◀

This investigation is designed to enable pupils to consider whether Russia can exploit the Arctic sustainably. Whilst there are a number of different countries that are looking to exploit the Arctic, Russia is arguably the largest and most prominent and this is why it has been chosen. The enquiry begins by setting the scene, defining what we mean by 'the Arctic' and describing what conditions are like there. Taking some time to explore this unique environment, which will be unfamiliar to the pupils, will help them to appreciate the challenges and opportunities presented to them as the enquiry progresses.

Having introduced the environment the enquiry then turns its attention to the claims that Russia has on the Arctic. This section has the potential to be quite complicated as it deals with conventions and treaties, however it is worth pausing to explain what a continental shelf is and to highlight the importance of the concept – and therefore the interrelationships between physical and human geography – in the drawing up of political agreements. To consolidate their thinking, pupils are asked to mark the different claims to Arctic territory onto a blank map which can be found in the Teacher Book and to consider whether or not this is a fair way of dividing up territory. Creating clear maps is an important geographical skill and pupils should be encouraged to complete their map in this way using the correct equipment (such as a sharp pencil!).

The enquiry then turns its attention to exploring how the Arctic is being exploited. The focus here is on natural gas and oil extraction with fishing as a secondary theme, particularly as this is an important means of subsistence agriculture for the indigenous tribes that live there. Shipping is not mentioned, although the melting of ice as a result of climate change is likely to increase traffic within the Arctic Circle and pupils may come across this in their research. To consolidate their thinking pupils are asked to watch a Channel 4 news report and to consider the advantages and disadvantages for Hammerfest as it becomes the centre of the 'Cold Rush' – the rush to exploit Arctic resources. They are also asked to create a three-course indigenous food menu using the article referenced in the Student Book. This is an important activity as it encourages pupils to consider the traditional indigenous diet and its reliance upon the natural environment and animal species. With increased globalisation and climate change, which is threatening wildlife, it is likely that the indigenous diet will become more westernised in future years. The next section, and the key focus for the enquiry, begins to consider whether Russia can exploit the Arctic sustainably by introducing a working definition for sustainability. Pupils are then led through the assessment, which is to write a speech from one person's perspective that answers the enquiry question.

There are three roles which each have a guidance sheet in the Teacher Book; whilst these have not been obviously differentiated, the role of Russian politician Sergei Limonov is potentially the most difficult. He is likely to take a positive stance arguing that Russia can exploit the Arctic sustainably and there is limited evidence to support this position. The pupils are encouraged to think critically about what makes a good speech and the components of a good piece of geographical writing in the. Pupils can then vote for the 'best' speech, given the criteria, and the three winning speeches could then be presented to the rest of the class. The enquiry can initially be extended with pupils taking on the role of advisor and making recommendations as to how to make the exploitation of the Arctic more sustainable. Pupils are then introduced to some of the problems that are plaguing Mount Everest as increased numbers of tourists visit the area. They are encouraged to consider how tourism in the Arctic could be made more sustainable by creating a brochure for an eco-tourism company.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Develop contextual knowledge of the location of globally significant places, including their defining physical and human geographical characteristics and how these provide a geographical context for understanding the actions of geographical processes.
- Understand the processes that give rise to key physical and human geographical features of the world, how these are interdependent and how they bring about spatial variation and change over time.
- Interpret a range of sources of geographical information to reach substantiated conclusions and judgements consistent with the evidence and communicate these in a variety of ways including through maps and writing at length

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Locational knowledge

- Extend their locational knowledge and deepen their spatial awareness of the world's countries using maps of the world to focus on Russia and the Arctic.

Human and physical geography

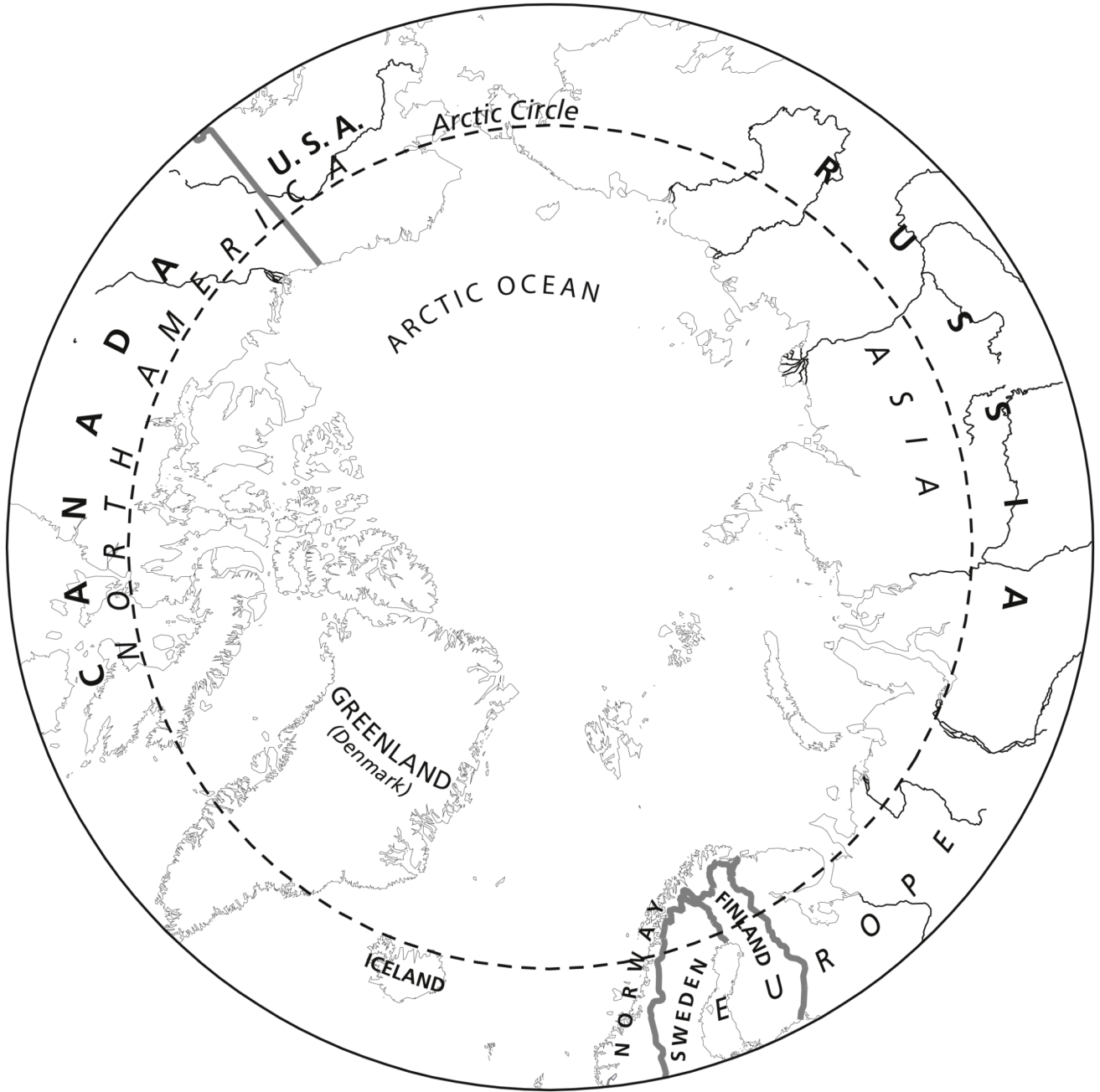
- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in:
 - Physical geography relating to: weather and climate, including the change in climate from the Ice Age to the present.
 - Human geography relating to: economic activity in the primary, secondary, tertiary and quaternary sectors and the use of natural resources.
- Understand how human and physical processes interact to influence and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems.

Geographical skills and fieldwork

- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom.

► Possible assessable outcomes ◀

- A speech in role where pupils answer the main enquiry question from one of three perspectives.
- An eco-tourism brochure created to inform potential tourists to the Arctic about how the area can be exploited sustainably.





Aga Akycha – Representative of the indigenous Nenet community

BIO:

Aga Akycha is a 68-year-old member of the Nenet community who lives in the Yamal peninsula. Her family own a small herd of sixty reindeer which is vital to their survival. They use reindeer skins to make clothes and rugs and eat reindeer meat. Fishing is also an important aspect of their lives, particularly in summer when the reindeer meat cannot be easily stored.

Questions to help you structure your speech:

- Does Aga think that Russia can exploit the Arctic sustainably?
- What are her main concerns?
- Does she think that any aspect of Russia's exploitation is sustainable?
- What are her suggestions for how exploitation could be managed more sustainably?
- Does she have any questions for Geoff Sandford or Sergei Limonov?

Websites to help you write your speech:

<http://www.bbc.co.uk/tribe/tribes/nenets/>

<http://www.survivalinternational.org/photo-stories/3198-the-nenets-of-siberia>

<http://www.arcticphoto.co.uk/tundranenets.asp>

<http://www.theatlantic.com/infocus/2012/04/the-nenets-of-siberia/100277/>

<http://www.yamalpeninsulatravel.com/the-nenets/>

<http://www.beforethey.com/tribe/nenets>

Words that you might want to use in your speech:

Subsistence	Reindeer	Fishing
Permafrost	Migration routes	Pollution
Tundra	Climate change	Nomadic

Checklist for an effective speech:

Have you:

- Introduced yourself and the role that you have?
- Highlighted whether or not you think Russia is exploiting the Arctic sustainably?
- Made three or four clear and different points?
- Explained how each of these points link to your conclusion as to whether or not Russia is exploiting the Arctic sustainably?
- Used the words above and other geographical vocabulary?
- Used facts, figures or names of places/species to add detail to your argument?



Sergei Limonov – Russian politician

BIO:

Sergei Limonov is a 51-year-old who lives in Moscow. He is a politician who has responsibility for overseeing the exploitation of the Arctic, particularly with regards to fishing and oil and gas extraction. He has shares in the Russian company 'Gazprom' which is responsible for much of Russia's natural gas extraction.

Questions to help you structure your speech:

- Does Sergei think that Russia can exploit the Arctic sustainably?
- Can he give examples to demonstrate that Russia's exploitation is sustainable?
- Does he think that any aspect of Russia's exploitation is unsustainable?
- Does he have suggestions for how exploitation could be managed more sustainably?
- Does he have any questions for Aga Akycha or Geoff Sandford?

Websites to help you write your speech:

http://www.grida.no/files/publications/environment-times/arctic_15.pdf

<http://www.gazprom.com/about/>

<http://www.rosneft.com/about/>

<http://www.theguardian.com/environment/2013/oct/02/drilling-arctic-environmental-impact-greenpeace-piracy>

http://www.arcticparl.org/files/static/conf5_neelov.pdf

http://en.wikipedia.org/wiki/Fishing_industry_in_Russia

Words that you might want to use in your speech:

Economy	Gazprom	Technology
Rosneft	Exports	Cooperation
Regulation	Research	Globalisation

Checklist for an effective speech:

Have you:

- Introduced yourself and the role that you have?
- Highlighted whether or not you think Russia is exploiting the Arctic sustainably?
- Made three or four clear and different points?
- Explained how each of these points link to your conclusion as to whether or not Russia is exploiting the Arctic sustainably?
- Used the words above and other geographical vocabulary?
- Used facts, figures or names of places/species to add detail to your argument?



Geoff Sandford – Environmental activist

BIO:

Geoff Sandford is a 36-year-old from London. He is a member of Greenpeace and regularly attends demonstrations in support of the environment. He is also friends with some of the Greenpeace activists who were arrested in September 2013 on piracy charges when they attempted to board an oil platform owned by Gazprom which is controlled by Russia.

Questions to help you structure your speech:

- Does Geoff think that Russia can exploit the Arctic sustainably?
- What are his main concerns?
- Does he think that any aspect of Russia's exploitation is sustainable?
- What are his suggestions for how exploitation could be managed more sustainably?
- Does he have any questions for Aga Akycha or Sergei Limonov?

Websites to help you write your speech:

<http://www.bbc.co.uk/news/world-europe-24379908>

<http://www.bbc.co.uk/news/world-europe-24427153>

<http://www.bbc.co.uk/news/world-europe-24292947>

<http://www.bbc.co.uk/news/world-europe-23794232>

<http://www.worldwildlife.org/places/arctic>

http://wwf.panda.org/what_we_do/where_we_work/arctic/

Words that you might want to use in your speech:

Environment	Sustainable	Off-shore oil reserves
Oil spill	Ecosystems	Noise
Overfishing	Climate change	Shipping traffic

Checklist for an effective speech:

Have you:

- Introduced yourself and the role that you have?
- Highlighted whether or not you think Russia is exploiting the Arctic sustainably?
- Made three or four clear and different points?
- Explained how each of these points link to your conclusion as to whether or not Russia is exploiting the Arctic sustainably?
- Used the words above and other geographical vocabulary?
- Used facts, figures or names of places/species to add detail to your argument?

How to make tourism in the Arctic sustainable

Over the next four pages you will find a summary of the top ten principles for Arctic tourism. To read the full report 'Linking tourism and conservation in the Arctic' by the World Wildlife Fund (WWF) go to: http://wwf.panda.org/what_we_do/where_we_work/arctic/what_we_do/tourism/

Ten Top Tips for sustainable tourism in the Arctic

1 Make tourism and the environment work together – tourism should be compatible with conservation plans at a local, regional, national and international scale.

- Encourage tourism that supports conservation.
- Cooperate with environmental groups.
- Support the monitoring of the effects of tourism.

Tour operators: Spend time and money building up contacts that play a role in conservation. Develop a plan for how you will protect the environment and make sure that you comply with environmental laws and regulations. Ask the tourists who go on your trips to evaluate your plan for the environment; if they give negative feedback try to change what you do to make it more environmentally sound.

Tourists: Make sure that your tour company is reputable. Get the permits you need before visiting nature reserves and don't disturb any of the wildlife whilst you are there. Learn about endangered Arctic species and avoid hunting or buying products that directly affect these species. Give feedback to your tour company; did they do a good job of protecting the environment? Could they have done something better?

2 Preserve biodiversity and wilderness areas – the Arctic is unique in that there are large wilderness areas that have no roads or human development. This makes the area environmentally valuable but is also one of the main reasons why tourists want to visit the area.

- Conserve the Arctic environment by protecting wildlife and habitats both on land and sea.
- Support efforts to stop and try to reverse the fragmentation of the Arctic landscape.
- Support the Circumpolar Protected Area Network (CPAN).

Tour operators: Try to protect those large parts of the Arctic that are undeveloped. Support wildlife conservation and make sure the tourists that go on your trips don't hunt or buy products made from protected species.

Tourists: Learn about how to effectively conserve the Arctic and support this by donating money or volunteering. Visit nature reserves; the money that you spend here will be reinvested to support and protect the area and might lead to other areas being protected.

3 Use natural resources sustainably – conservation of natural resources is vital for the long-term health of the Arctic environment. Once an area is developed it cannot return to its original state and so can be considered as a non-renewable resource.

- Use natural resources, including undeveloped areas, in a sustainable way.
- For those areas that are already developed, encourage use in a sustainable way.

Tour operators: If the tourists on your trip want to hunt or fish make sure that they have good hunting equipment and that they don't deplete local stocks of wildlife. Think about how many visitors you are going to take to each site and talk to other operators about your plans so that there aren't too many people in one spot at any time. Try to limit total numbers to 100. Try to use campsites and trails that already exist. Try not to disturb wildlife, particularly polar bears.

Tourists: Walk or use non-motorised transport such as kayaks, boats or dog sleds. In particular, try to avoid snow scooters as they cause pollution and damage the ground. Watch and take photos of wildlife from a distance; the animal should ideally never know that you are there. Don't get too close and watch out for signs of distress such as laid-back ears and raised hair. If you do hunt or fish get the correct permits and only take as much as you need. Try to leave undeveloped areas as they are and use existing campsites and trails. Make sure your tour operator gives you enough information so that you minimise damage to places you visit.

4 *Keep waste, consumption and pollution to a minimum* – reducing waste and pollution improves the tourism experience and keeps clean-up costs low.

- Try to use or develop waste recycling schemes.
- Get rid of waste in a safe way.
- Use biodegradable or recyclable packaging.
- Minimise the use of fossil fuels and try to avoid motorised transport.
- Develop lodgings that save energy, recycle and dispose of waste effectively.
- Clean up and restore the environment where it has been damaged.

Tour operators: Choose biodegradable or recyclable products and minimise packaging. Limit energy use and choose a mode of transport that is environmentally sustainable; in particular avoid using snow scooters. Choose places to stay that respect local traditions and which have recycling systems in place and which dispose of rubbish effectively. Make sure there is no evidence of your visit and support groups that clean up waste and polluted areas.

Tourists: Choose biodegradable or recyclable products and minimise packaging. Limit energy use including heat and warm water. Leave as little trace as possible that you have visited an area. Avoid using transport that uses fossil fuels such as snow scooters.

5 *Respect local cultures* – people live in the Arctic and tourism should not change their lives (unless they want it to do so)

- Respect the rights of the local people.
- Ask for permission before visiting sites that local people use.

Tour operators: Talk to local communities so that they know to expect you and so that you are made welcome. Arrange visits well in advance and confirm your visit the day before you go. Talk to the local community about activities your visitors will do whilst they are there and find out how many people they are comfortable accommodating. Don't interfere with their daily activities and in particular don't disturb people who are working. Make sure you have all the permits you need and talk to your visitors beforehand so that they understand and respect local cultures and customs. Ask the locals whether visitors can photograph or video their experience.

Tourists: Learn about the cultures and customs of the places you will visit and the people that you will meet. You are more likely to be welcomed if you respect the locals and travel with an open mind. Ask permission before you take any photos or videos.

6 Respect historic and scientific sites – these sites are important for local heritage and for science. If they are disturbed this can reduce their value and is often illegal.

- Respect these sites and ensure they are protected.

Tour operators: Get permission before visiting historic or archaeological sites and make sure your visitors treat these sites with respect. Don't go to scientific sites unless you have arranged this with them beforehand and don't disturb people whilst they are working.

Tourists: Don't take souvenirs from historic sites; they may look abandoned but may still be very important to the local people. Keep out of any abandoned military installations. Respect scientists and don't disturb them whilst they are working.

7 Tourism should benefit local communities – Getting the local people involved in the planning of tourism helps to address concerns. This improves the tourist experience, as well as minimising damage and maximising benefits for the local community.

- Find local people who would like to be involved in planning for tourism.
- Promote the employment of local people in tourist activities.

Tour operators: Try to use local people where possible and if local people need training then arrange this for them. Try to develop long-term relationships with local businesses as this usually means that the tourist experience will be better. Respect the local communities that you visit and encourage your visitors to buy handicrafts. Choose places to stay that are built, owned and run by local people.

Tourists: The money that you spend is really important for sustaining the local community. Choose businesses that employ local people and buy local products and handicrafts. Choose places to stay that are built, owned and run by local people.

8 Make sure staff are fully trained – Educating and training staff makes the quality of tourism better. Training should cover topics including environmental, legal, cultural and social issues. Staff can act as positive role models for the tourists.

- Staff should be encouraged to behave responsibly and this will encourage the tourists to behave responsibly too.
- Staff should know and understand laws which may affect the tourists.

Tour operators: Hire a good team that understand and respect local cultures and the environment. Hire staff that know the Arctic; at least one person should have a remote first aid and survival qualification and most of the team should know the Arctic environment well. Make sure everyone follows a code of conduct for Arctic tourists and don't let unsupervised crew go ashore. Make sure you have a good staff to visitor ratio; for most trips 8–15 tourists for every staff member is recommended. If you are travelling by ship, 15–20 passengers for every staff member is recommended.

Tourists: Choose a reputable tour operator who has significant Arctic experience. Choose a tour operator with a good staff to visitor ratio; 8–15 tourists for every staff member for land-based tours and 15–20 passengers for every staff member for cruises.

9 Take the opportunity to learn about the Arctic – When tourists learn about and understand the Arctic environment they are more likely to act as ambassadors for environmental protection that provides the most benefits and does the least damage.

- Provide information on cultural and environmental issues to the tourists.
- Promote responsible tourism.

Tour operators: Provide information and lectures for your visitors to inform them about the Arctic environment and its global significance. Inform your visitors how they can support conservation in the Arctic. Provide your visitors with information about the Arctic climate, species and habitat as well as local people and customs and what is considered appropriate behaviour. Make sure your visitors follow a code of conduct.

Tourists: Learn about the Arctic, particularly the places that you will visit. Find out how best to conserve these areas. Choose a tour operator that provides this information for you. Choose tours and visits that provide specific and detailed information about the climate, species and habitat as well as local people and customs and what is considered appropriate behaviour.

10 Be safe – the Arctic can be a very dangerous environment so tourists need to be prepared and careful. Failure to do this could lead to serious injury or could put pressure on local rescue services.

- Follow the rules and regulations to keep tourists safe.
- Make sure everyone has information and training about safety procedures.

Tour operators: Provide the local authorities with your plans and itineraries to make sure that you are complying with local safety regulations and so that someone knows where you are. Make sure you warn all your visitors about the dangers of encountering wildlife, particularly bears. Have at least one member of staff who is in charge of safety and for avoiding dangerous situations.

Tourists: There are some species of wildlife, particularly bears, walrus and muskox, which are dangerous. Treat these animals with respect and make sure someone in your group carries a gun to scare off bears. Dogs that pull sleds are working animals so don't feed or stroke them. Dogs and Arctic foxes might carry rabies. If you are going to hike over glaciers, make sure you have the correct safety equipment – ropes, crampons, ice axes – and hire a guide. Make sure the local authority knows your plans and be prepared for weather conditions that change suddenly. Try not to get too wet, cold or tired. Make sure you have the following equipment: warm clothes, sturdy boots, gloves, a hat, a windproof and waterproof coat, a map, emergency rations (chocolate) and a first aid kit.

How has Christchurch been affected by earthquakes?**► Purpose ◀**

The purpose of this enquiry is to examine how Christchurch, New Zealand has been affected by a devastating series of earthquakes in 2010 and 2011. The enquiry allows pupils to investigate the tectonic setting of New Zealand, as well as the specific detail of the earthquakes, prior to contributing to the live consultation process as part of the earthquake recovery strategy.

The pupils begin by examining why the Ramsay family are living in the jungle. This initial stimulus question immediately introduces a personal story to allow the pupils to build a narrative. The story of Kirk, Wilma and Finn Ramsay revolves around their experience of the damaging but not devastating 2010 earthquake and the February 2011 quake that had significantly greater impact due to the shallow focus and distance from central Christchurch. The damage from the first quake was then magnified by the second. The Ramsay family were present for both and the pupils are asked to consider what led the family to move to Borneo? Central to this first question are the key geographical migration concepts of push and pull factors as well as the cumulative impact of stress from natural hazards. Pupils are asked to consider a range of evidence from the Student Book and the cards prior to developing a written explanation.

The use of a personal story sets the scene for the rest of the enquiry and leads the pupils into Question 3.2 where they are asked to consider why New Zealand has a dynamic environment. Pupils need to spend time examining the photomontage on page 39. This stage is vital to allow the pupils to develop a sense of place prior to examining the complex tectonic setting of the country. Pupils are encouraged to build a picture of the different plate boundaries here using diagrams and maps, before making their own annotated maps using the base map provided. The tectonics are unusual – with a subduction zone under the North Island, a transform fault under much of the South Island, then another subduction zone – this time in the reverse direction. These give rise to many interesting patterns in terms of the location of volcanoes and earthquakes and it is important to spend time analysing these. The deep earthquake map shows a linear pattern that nicely illustrates the Pacific plate subducting at an angle beneath the Indo-Australian plate. Pupils are asked to synthesise this information together into their own paper GIS. This can be done by making several maps and overlaying them.

The main thrust of the enquiry builds upon the knowledge of the tectonics of New Zealand to examine the 2010 and 2011 Canterbury earthquakes in detail. Pupils are first asked to consider why there are shopping malls, cafés and banks made of shipping containers in central Christchurch. These represent a very visible sign of earthquake recovery in the CBD and are one of many projects being initiated to redevelop the city. The pupils are then presented with specific details about the two earthquakes and are asked to use this as a basis for research using a framework provided. This research will be used to support a small group task to produce a short video or presentation on clearly defined criteria. The most successful pupils will allocate clear roles within the group when producing the video or presentation and guidance for this is given in the Student Book.

As part of this task, pupils are asked to investigate post-earthquake Christchurch. Natural disaster recovery does not often make the international news, so the pupils are directed to consider the vast challenges faced by New Zealand in the hours, days, weeks, months and years that followed. The strategic nature of this should be highlighted and could be contrasted with the challenges faced by less economically developed nations that also suffer from earthquakes, such as Haiti. The final part of the enquiry brings the pupils up to the present day and finds Christchurch facing a real challenge – what to do with 630 hectares of riverside residential areas that suffered intensive liquefaction. Over 7300 homes have been purchased by the Crown and will be demolished. Plans for the residential red zone are still being developed and stakeholder views are being considered. Pupils are asked to draw up their own plans for the districts by first examining feedback from residents, prior to developing useful and sustainable uses for this land. As this is a live issue, the pupils can even submit their own plans to the Canterbury Earthquake Recovery Authority and have a real voice in the redevelopment of the city.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Develop contextual knowledge of the location of globally significant places, including their defining physical and human geographical characteristics and how these provide a geographical context for understanding the actions of geographical processes.
- Understand the processes that give rise to key physical and human features of the world, how these are interdependent and how they bring about spatial variation and change over time.
- Interpret a range of sources of geographical information about physical and human processes.

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Human and physical geography

- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in:
 - Physical geography relating to: tectonic processes
 - Human geography relating to: population and urbanisation
- Understand how human and physical processes interact to influence, and change landscapes and environments.

Geographical skills and fieldwork

- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom.
- Interpret topographical and thematic mapping, and aerial and satellite photographs.
- Use Geographical Information Systems (GIS) to view, analyse and interpret places and data.

► Possible assessable outcomes ◀

- A paper-based GIS or annotated map of New Zealand could be assessed for skills as well as synthesis of knowledge and understanding. The short video or presentation also lends itself to peer assessment using the criteria provided in the Student Book. Finally, the submitted plans for the red zone could be assessed for geographical decision-making.

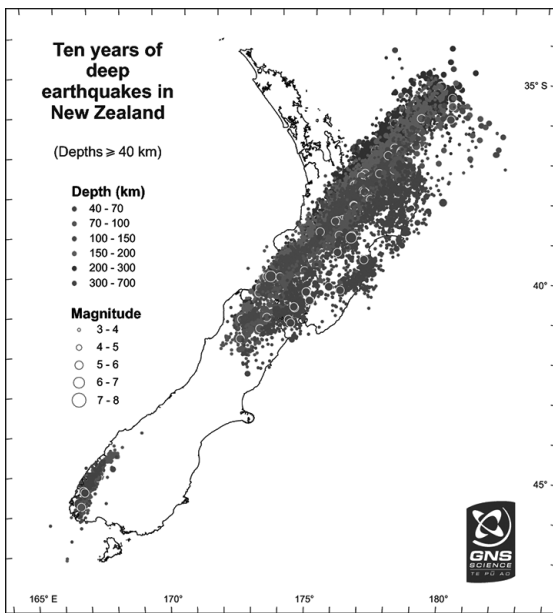
<p>Brunei is on Borneo and is dominated by tropical rainforest.</p>	<p>Brunei is a wealthy country with a small population. There are very low taxes.</p>
<p>Brunei has an equatorial climate with consistently hot weather and high humidity.</p>	<p>Push factors are things that cause people to move away from a place.</p>
<p>Pull factors are things that attract people to move to a place.</p>	<p>Brunei has an education system that is taught in English.</p>
<p>An aftershock is a smaller earthquake that occurs as the faultline settles into its new position after a larger sudden movement.</p>	<p>Christchurch is the second-largest city in New Zealand.</p>
<p>Kirk Ramsay was born in Christchurch and had lived there most of his life.</p>	<p>In September 2010, a magnitude 7.1 earthquake struck west of Christchurch causing very strong shaking, significant liquefaction and damage to infrastructure. The Ramsays were at home asleep.</p>

<p>In September 2010, their house was undamaged but their town of Rangiora suffered extensive damage to shops, roads and rail. Many of their possessions were damaged inside the house.</p>	<p>In February 2011, a second earthquake of magnitude 6.3 hit Christchurch. In the violent shaking 80% of buildings in the city centre were damaged or destroyed. Over 185 people lost their lives. The Ramsays were at work in different parts of the city.</p>
<p>After the 2011 quake, many businesses closed or chose to relocate to Wellington or Auckland on the North Island. Kirk's company was one of these.</p>	<p>The Ramsays knew people that were killed in the 2011 earthquake.</p>
<p>News reports showed that one school was located where the highest ground acceleration (shaking) was felt. Pupils were evacuated onto fields, which then flooded from liquefaction.</p>	<p>In the hours after the 2011 earthquake, Kirk and Wilma could not contact each other, nor could they contact Finn's preschool. Wilma had to walk home across the city as the roads were damaged.</p>
<p>There were thousands of aftershocks after each earthquake. People felt very vulnerable to these and there were some very strong aftershocks in June and December 2011</p>	<p>The December 2011 aftershock caused further damage to homes. The Ramseys ran into the street. Many neighbours were on tears.</p>

Use the information on pages 38–41 of the Student Book to produce your own annotated map or maps of New Zealand that show some of the interesting geographical features, as well as some of the forces at work under the surface. Can you explain why New Zealand has such dramatic landscapes? You could lay maps one on top of the other, fastened on the left hand side, to create a paper Geographical Information System (GIS).

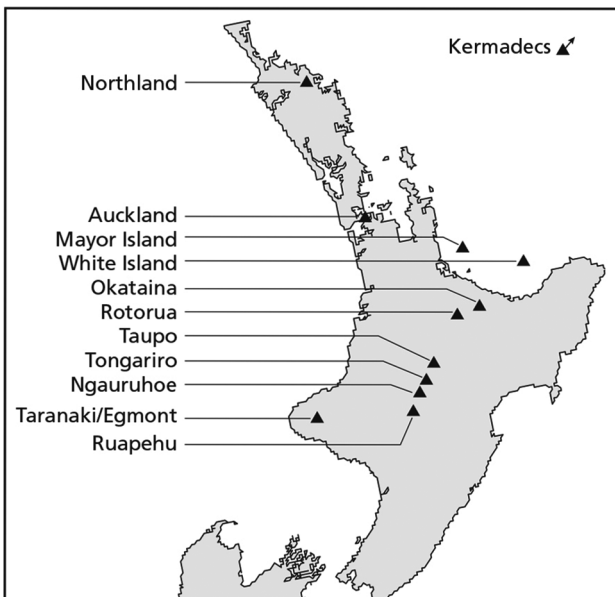
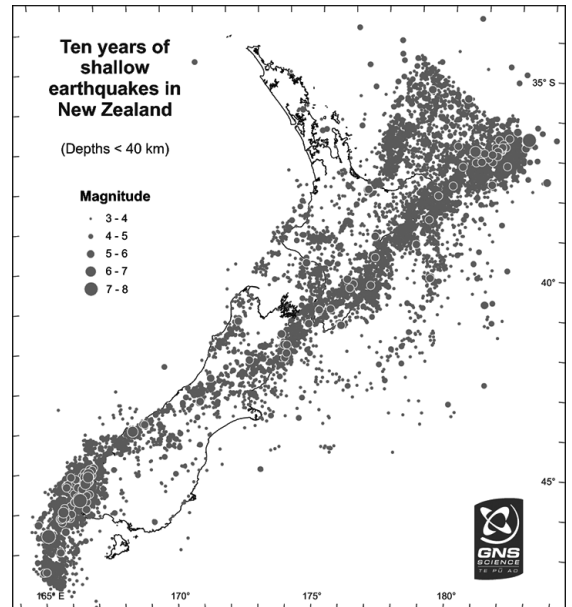


Use the images and colour versions of these maps from page 40–41 of the Student Book to examine the pattern of earthquakes and volcanic activity in New Zealand. Use the 'questions to consider' to guide your thinking.



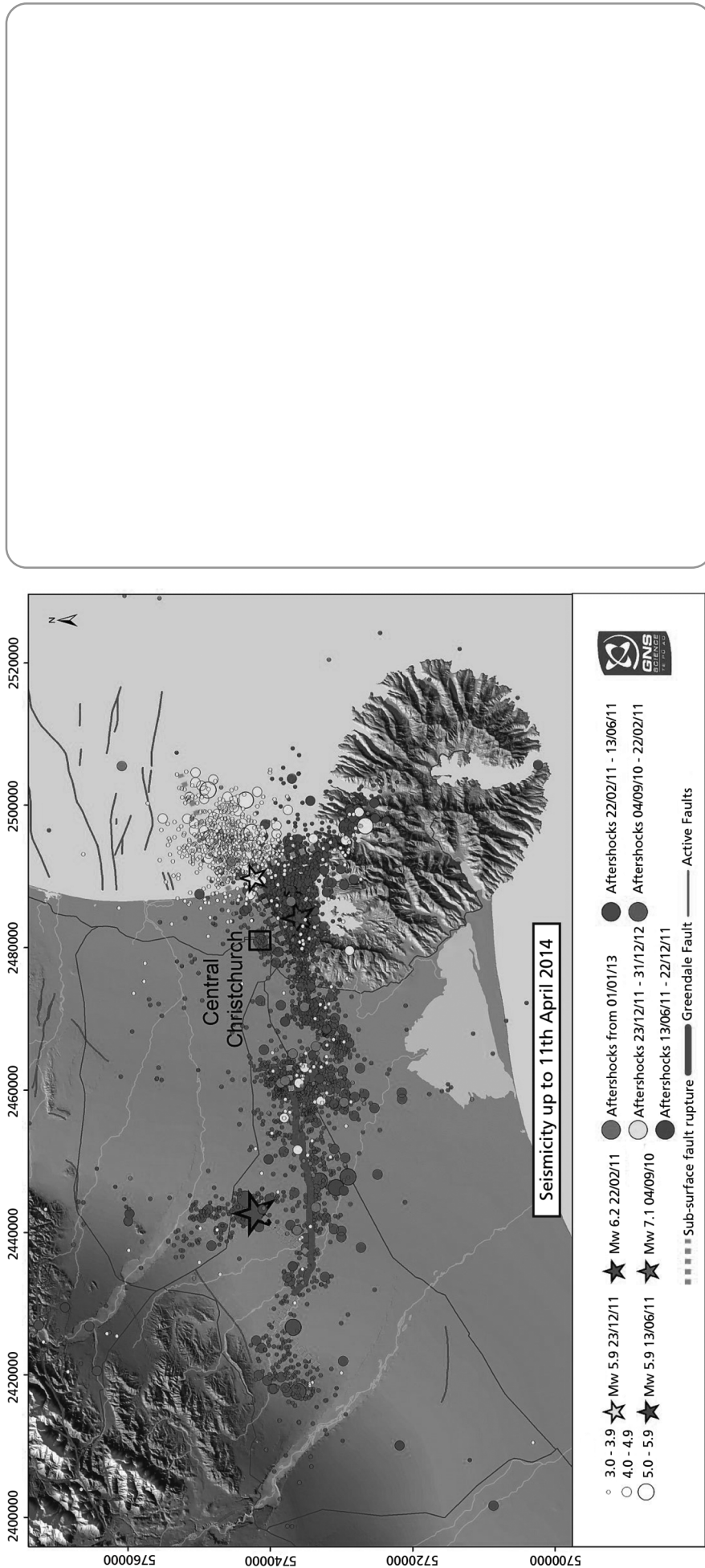
Deep earthquakes

Shallow earthquakes



Volcanic activity

Describe the pattern of earthquakes and aftershocks around Christchurch. How might this affect the recovery strategy? Use the information on pages 44–49 of the Student Book to guide you.



Use the framework below to record key information to assist you in your investigation.

Why does Christchurch suffer from earthquakes?

Where is Christchurch located?

What were the social, economic and environmental effects of the earthquakes?

What happened in the 2010 earthquake?

What happened in the 2011 earthquake?

Use the live GIS map at: <http://maps.cera.govt.nz/html5/?viewer=public> to explore the scale of the red zone. Annotate this map to show your outline plans.



When is doing nothing actually doing something?**► Purpose ◀**

The principle objective of this enquiry is to enable pupils to understand the key physical and human processes operating along the coastal margins of Britain together with the broad range of management approaches that are being adopted to adapt to the changes that are occurring as a consequence of their interaction.

Through a case study investigation of Brownsea Island in Poole Harbour in southern England pupils are able to identify and understand the broad spectrum of physical and human processes occurring at different locations all around the British coastline. Brownsea Island is also a microcosm for the many different strategies which are being implemented around the coast to adapt to and manage the impact of change. As the enquiry develops pupils are able to grasp the significance that climate change will most likely have for coastal margins during the remainder of this century and ultimately pupils are placed in the situation of coastal managers in having to decide upon the 'best' approach to managing a section of coast where change is occurring rapidly.

The enquiry begins by challenging the pupils to reflect on the geographical concept of 'islands' before being introduced to one specific island – Brownsea – situated in one of the largest natural harbours in Britain. Some time is spent exploring how Poole Harbour is a very good example of how rias are created as a consequence of eustatic change. During the nineteenth century land was reclaimed from the sea by enclosing a bay with a sea wall. Pupils are able to analyse estate records to discover how it was used for farming. Over time the reclaimed land to the northeast of the island has been slowly flooded once again, a consequence of both the sea wall failing and the internal drainage of two lakes at the centre of the island into the lagoon. Through their investigation, pupils are able to understand how these physical processes have created a unique habitat enclosed within the failing sea wall, which has been designated as an internationally important habitat for birds.

As the enquiry progresses the pupils explore how the physical process of erosion combined with the impact of changes in patterns of weather and climate, brought on through global warming, are impacting the coast. Along the southern coast the cliff line is being seriously eroded whilst to the east the island's only settlement and quay (accommodating 150,000 visitors a year) is now frequently flooded. Although the original policy along the southern cliff line was to 'hold the line' today this has changed to 'no active intervention' and the pupils are able to evaluate the rationale for this. To the east the National Trust is pursuing a policy of 'managed realignment', which involves moving the settlement inland and building a new quay and pier.

The enquiry ends with the pupils reaching and justifying a decision regarding what should be done about the sea wall surrounding the lagoon in the context of local pressures and national policies.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Know and understand how physical and human processes interact around the coast of Britain to present management challenges.
- Appreciate how changes in weather patterns resulting from global warming and climate change are exacerbating the impact of physical and human processes.
- Recognise that on one relatively small island many of these physical processes and impacts of climate change can already be identified and that action has to be taken to manage how the island will evolve in the longer term.
- Understand and evaluate the coastal management strategies that have been adopted already and evaluate and justify the costs and benefits of different management strategies for the northeast coast of the island.
- Weigh up the costs and benefits of different management strategies for the northeast coast of the island, reach a decision and justify the course of action recommended.
- Interpret a range of sources of geographical information about physical and human processes to reach substantiated conclusions and judgements consistent with the evidence and interpret and communicate these in a variety of ways, including through models, maps, numerical and quantitative skills and writing at length.

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Locational knowledge

- Extend their locational knowledge and deepen their spatial awareness of the world's countries including their key physical and human characteristics.

Place knowledge

- Understand geographical similarities, differences and links between places.

Human and physical geography

- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in:
 - Physical geography relating to:
 - rocks, weathering and soils
 - tectonic activity
 - weather and climate
 - the change in climate from the Ice Age to the present
 - coasts.
 - Human geography relating to:
 - economic activity
 - the use of natural resources.
- Understand how human and physical processes interact to influence and change landscapes, environments and the climate and how human activity relies on effective functioning of natural systems.

Geographical skills and fieldwork

- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom and in the field.
- Interpret topographical and thematic mapping, and aerial and satellite photographs.
- Use Geographical Information Systems (GIS) to view, analyse and interpret places and data.

► **Possible assessable outcomes** ◀

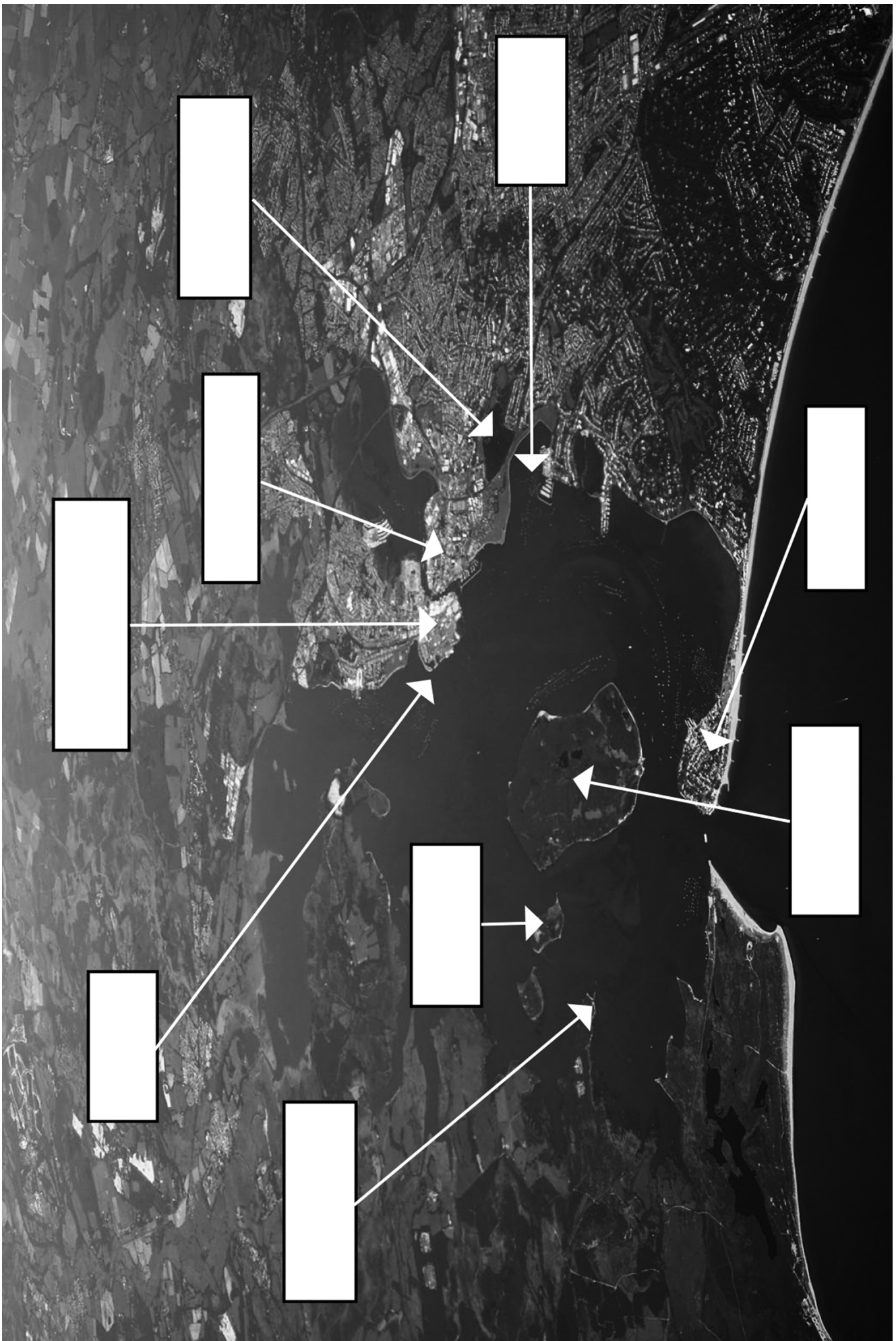
- Annotated diagram of a shield volcano.
- Explanation as to why 75% of the world's volcanoes are found around the 'Pacific Ring of Fire'.
- Photograph analysis of changing coastline linked to specific locations on an Ordnance Survey map.
- Annotated sketch and explanation of coastal erosion causing cliff recession.
- Design of a new pier for Brownsea Island capable of adapting to the changes likely to occur as a consequence of climate change during the remainder of this century.
- A piece of extended discursive writing outlining the costs and benefits of different approaches to managing the change occurring along the northeast coastline of Brownsea Island.

Description of Brownsea Island during the last Ice Age

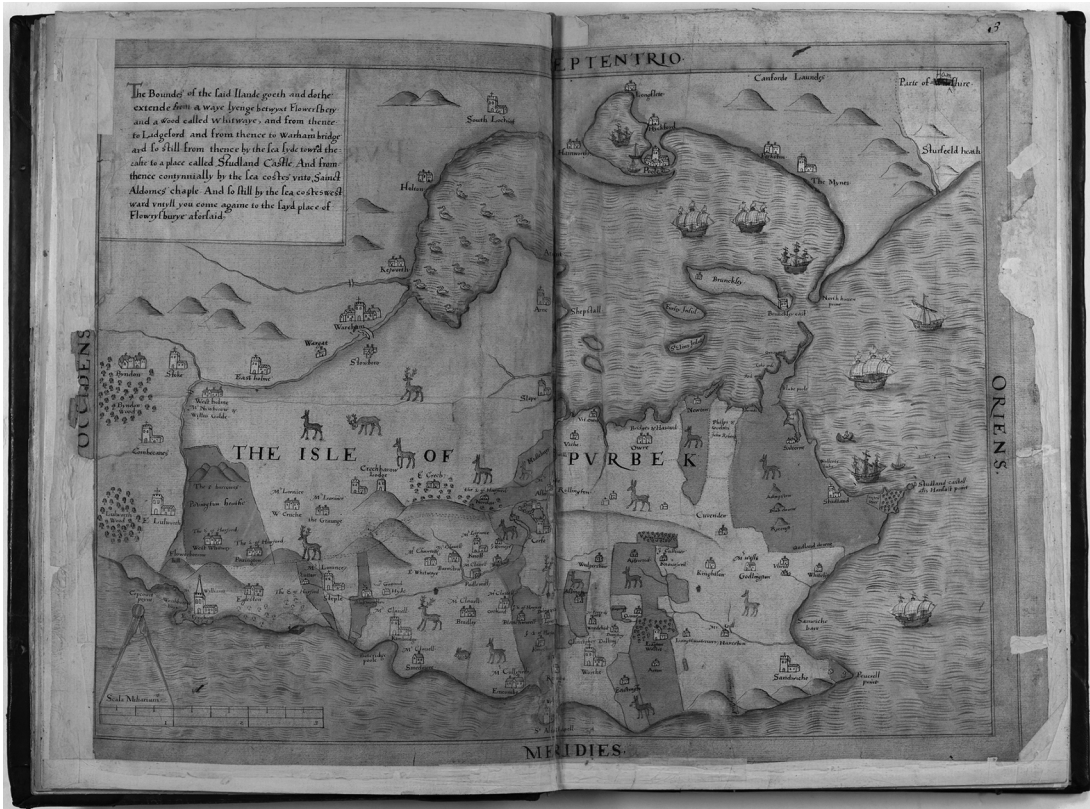
'13,000 years ago Brownsea was a tall rounded hill surrounded by flat treeless tundra with small lakes, rivers and areas of marshland which were frozen all year apart from short summers when the ice melted. It was similar to Siberia today although it would have been very cold. Some trees and shrubs such as birch would have grown on the sheltered lower part of the hill. It would almost certainly have been too cold for humans to have lived here around the hill but they may have passed by occasionally as they trailed after animals to hunt such as red deer and even mammoth and collected shellfish for food along the shore.'

Description of Brownsea Island towards the end of the last Ice Age

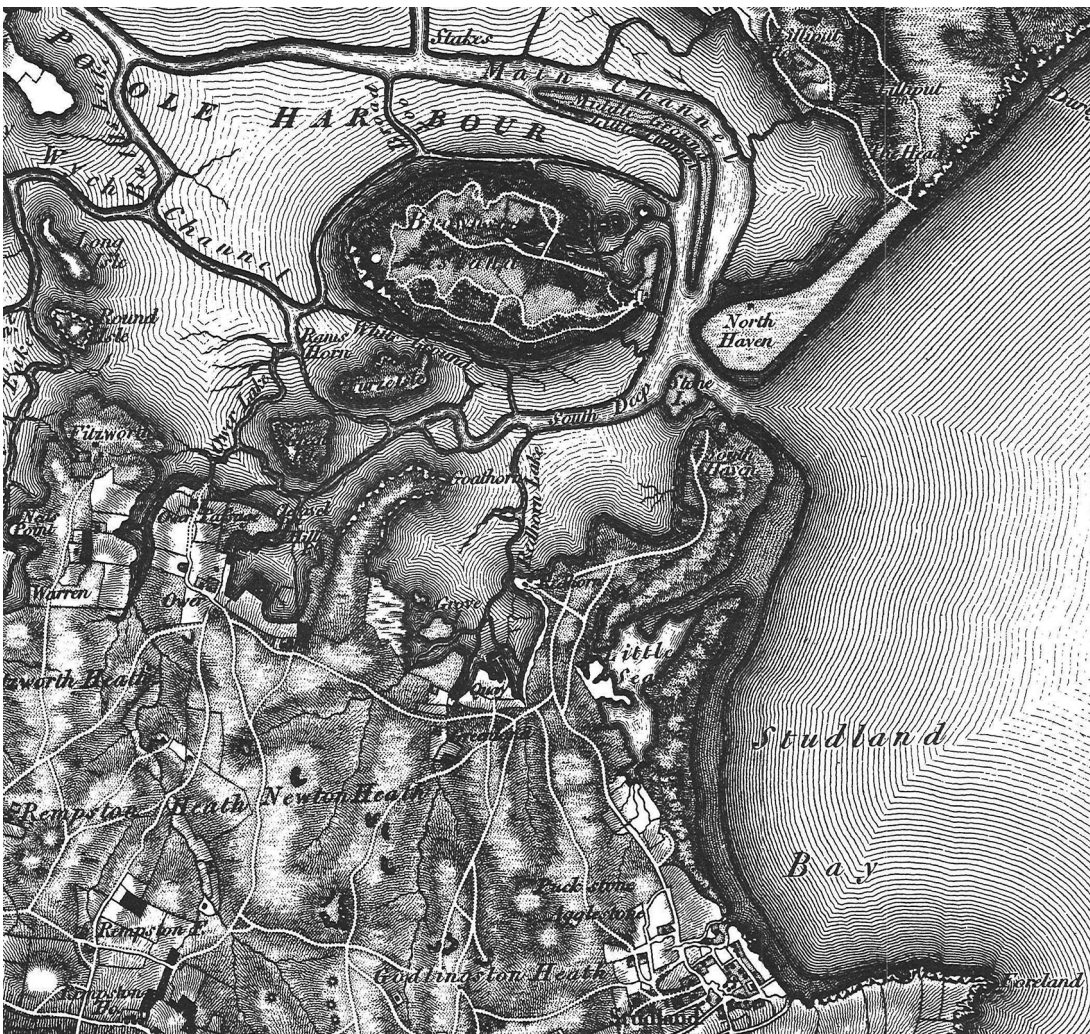
'About 12,000 years ago the climate of the UK began to get warmer. Winters shortened and summers lengthened. As it got warmer huge ice caps and glaciers began to melt and the water flowed into the sea. The land around Brownsea Hill began to flood as water rushed in from the English Channel which was forming to the south. By 9000 years ago all of the land around Brownsea Hill had been flooded and only the very top of the hill (about 25 m) remained above the water which now created Poole Harbour all around the island. Between high and low tide levels beaches made of sand and mud formed around the edge of the island. Saltmarsh and reed beds were also created. Because it was much warmer most of the top of the island was covered in trees such as Scots pine; alder; birch; oak and beech.'



Treswell Survey map of the Isle of Purbeck from 1586:



Ordnance Survey map of Poole Harbour from 1811:



Extract from the Brownsea Island farm estate records 1857:

Description	Land use	Acres
Path paddock	Pasture	1
Church ground	Pasture	5
Part of reclaimed land	Oats, seed and fallow	33
Part of reclaimed land	Fallow	36
Part of reclaimed land	Pasture	10
Part of reclaimed land	Pasture	9
Field, poultry, paddock and shed	Pasture	2
Park field	Clover	6
Field sheds and field yard	Wurzel	8
Cranery field or new ground	Oats, potatoes and fallow	40
Pond field	Barley	11

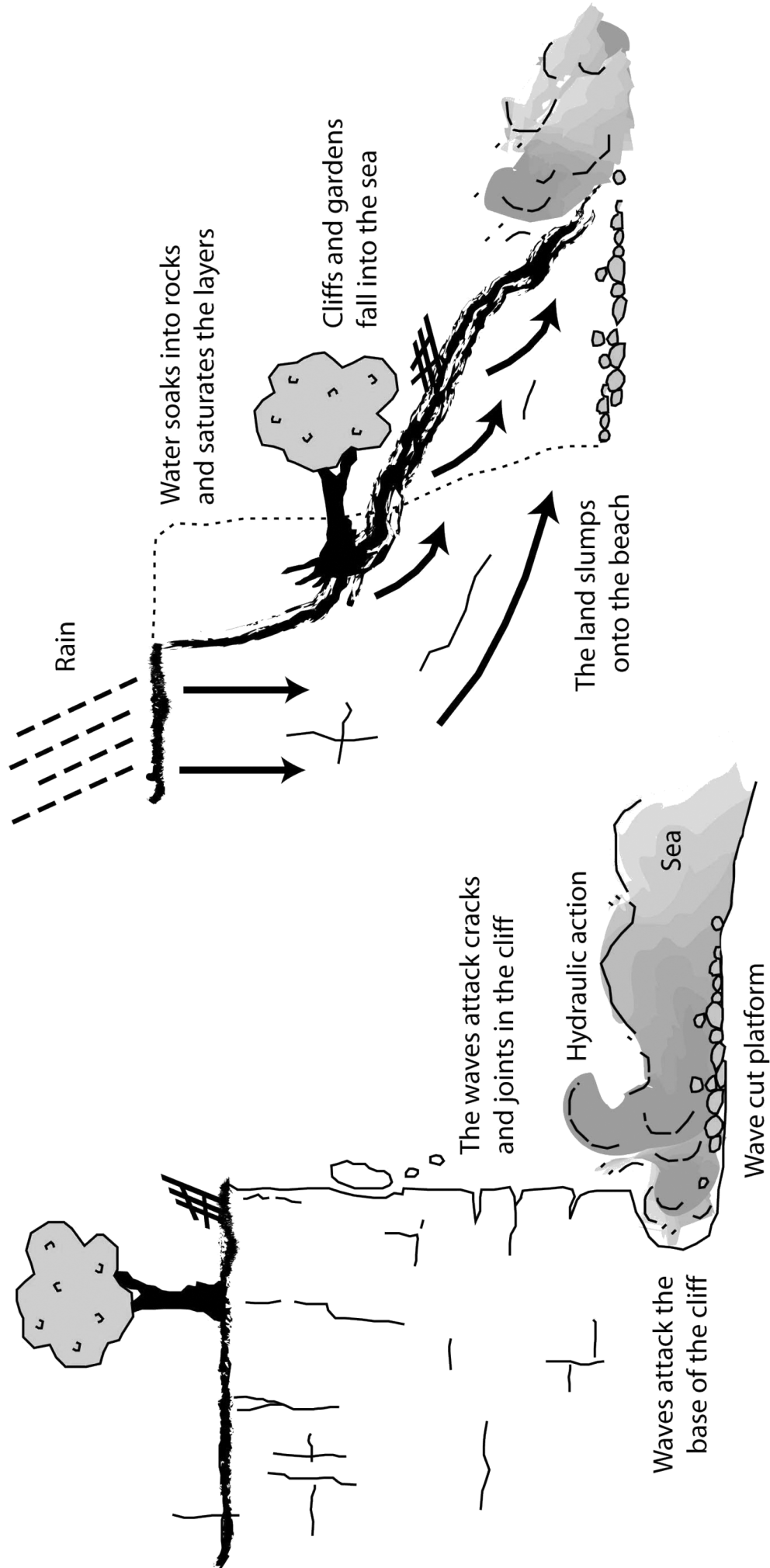
Extract from Birds of Poole Harbour website:
<http://www.birdsofpooleharbour.co.uk/brownsea-webcam>

What am I watching?

‘Autumn and winter on the Brownsea Lagoon is spectacular. Birds start to arrive back from their breeding grounds up north as early as July, but noticeable numbers aren’t reached until end of August and into September. The lagoon has several uses, ranging from a “drive-through” style feeding area for species such as Curlew, Wood and Green Sandpiper, Little Stint and Little Ringed Plover, also as a high-tide roosting zone when most of the harbour is under water.

‘The lagoon boasts internationally important numbers of Black-tailed Godwit, Shelduck and Oystercatcher, and nationally important numbers of Avocet, Redshank and Dunlin. Numbers of Avocet can peak at 1000+ and Black-tailed Godwit 2000+, which is quite an impressive sight, especially when one of the over-wintering Merlin or Peregrines starts hawking over the lagoon. Spoonbill is another lagoon favourite with numbers often reaching 15 birds, with an impressive 28 in autumn 2011.

‘Other species encountered on the lagoon include Knot, Turnstone, Ringed Plover, Spotted Redshank, Greenshank, Bar-tailed Godwit, Teal, Wigeon, Shoveler, Tufted Duck, Little Egret and Grey Heron. The lagoon has a habit of attracting some nice rarities too with species like Western, Stilt and Semipalmated Sandpiper, Caspian Tern, Cattle Egret and Common Crane.’



Mrs Fiona Latherby
Member of Parliament
House of Commons
London

Dear Mrs Latherby

As a constituent of yours I am writing to urge you to support the forthcoming Bill in Parliament, which would have the effect of extending both research and the application of genetic engineering in medical science in this country.

I believe that you have a great opportunity over the next few weeks to contribute to making a momentous decision that will have a huge impact on the lives of tens of thousands of people in the future. Do you really feel it is acceptable in 2015 that we should withhold medical technology from people whose lives could be transformed by manipulating their genes and making their bodies better? Your constituents know you to be a caring and considerate person and I'm sure therefore that you will sympathise with those who could be helped through allowing more genetic experimentation and intervention. How would you feel if you had a member of your family affected by a disease such as cystic fibrosis or Alzheimer's could be offered hope for the future through genetic engineering technology?

As I'm sure that you are aware gene therapy could offer hope also for potential parents blighted by inherited medical conditions through altering a faulty genome in a sperm or egg cell. A few years ago in the UK a mother gave birth to a girl whose embryo had been freed from a genetic form of breast cancer. Such positive changes as this will be inheritable and passed down through the generations. Would you deny such hope to your children? I know I wouldn't.

I do appreciate that many people have concerns over the possible abuse of replacing genes in this way e.g. by creating 'designer babies' with particular physical characteristics, but I'm confident that law makers such as you will be able to put in place effective regulations to determine what should be allowed to be carried out and what should be illegal. None of us will want to see a reduction in the gene pool upon which we all depend for maintaining the diversity of human beings. We can create a better balance here with greater freedoms for scientists to extend their research and to carry out medical trials that are carefully regulated by the government and members of parliament such as you.

The Bill that you will be voting on shortly has the potential both to remove suffering from present and future generations of people on the planet as well as extending life spans for many of us. Please grasp the opportunity that has been presented and vote in favour of the Bill. I appreciate that there are ethical dilemmas to address with genetic engineering and that many people fear where it might lead but this is a once in a lifetime opportunity. You can ensure greater freedoms on the one hand and protective legislation on the other. Do we really want to look back and regret such a lost opportunity in the future?

Yours sincerely,

Louise Cranwell

- When you are writing to persuade, your aim is to make your reader agree with a point of view or convince them of the need to follow advice or take action.
- Persuasive writing includes leaflets, advertisements, holiday brochures, biased newspaper articles or editorials, magazine articles and essays, the script for a television programme.

Text level features often include:

- Different layout features such as bold print, varied font styles, illustrations and photographs to gain attention and make an impact.
- A strong opening statement puts forward an argument or viewpoint.
- The following paragraphs are used to develop the viewpoint with reasons and evidence and start with a clear topic sentence.
- The conclusion sums up the opinion or viewpoint, or makes it clear what action is needed.

Sentence level features often include:

- The first person 'I', 'we' can be used to emphasise a personal opinion.
- The second person (you) can be used to address the reader directly and involve them e.g. 'Would you accept this for your children?'
- The third person (it, they, he, she) can be used to sound more formal or impersonal.
- Mostly use of the present tense e.g. 'UNICEF estimates that over a million babies are dying each year from...' and the future tense to express possibilities or consequences 'More babies will die unless...'
- Short sentences used for impact and to summarise; rhetorical questions used to draw the reader in e.g. 'Will you let this scandal continue?'
- Connectives used to emphasise points e.g. 'above all', 'especially', 'indeed', 'surely' and to stress opinions e.g. 'some people believe', 'in my view', 'on the other hand', 'in contrast' and add examples e.g. 'for example', 'such as'.

Word level features often include:

- Use of emotive language to gain a reaction from the reader and to make judgements e.g. 'appalling suffering', 'inhumane conditions', 'a disgrace', 'a disaster'.
- Use of rhetorical devices to emphasise points and make ideas memorable e.g. repetition, alliteration, similes and metaphors or the use of humour and exaggeration.

Why do most Australians live on the edge?

► Purpose ◀

This enquiry has been written to support pupils to fully understand the wide range of physical and human factors that influence population distribution. The investigation focuses on Australia, which possesses one of the most spatially concentrated populations in the world. Through the learning activities pupils are able to identify and understand the significance of the wide range of environmental, historical, cultural and economic factors that have combined over the past three hundred years to determine its patterns of population distribution and density.

Firstly pupils are able to evaluate the significance of physical factors such as climatic conditions and soil fertility. This also provides an opportunity for pupils to compare and contrast the pattern of settlement of indigenous groups with that of the population as a whole and to suggest reasons for the similarities and differences observed. Pupils are encouraged to recognise that settlement patterns are determined largely by the opportunities or constraints that environments present.

As the enquiry progresses, pupils are able to see the unfolding influence of historical geography on settlement patterns by understanding how Australia was perceived by its colonial power and Britain's reasoning behind the settlement of that country. More modern immigration patterns are also studied and pupils are able to reflect upon where, to this day, most modern immigrants end up living in Australia. Detailed consideration is also given to the influence on population distribution of economic factors such as the importance of trade and the potential offered by the 'outback' for farming and the mining of minerals. Through analysing the impact of each environmental, historical, cultural and economic 'layer' on influencing where people chose to live and why, pupils are able to fully appreciate the significance of how they have all combined to create such a spatially concentrated people.

The enquiry then takes the pupils one step further. Having understood where most people are living in Australia and why, pupils are introduced to the efforts state and national governments are making to create a more balanced distribution of people in the country. Pupils are able to evaluate the rationale behind such an approach and to appreciate the kinds of things that are involved in regional development and economic diversification programmes, either at state or national level. In particular, they investigate the strategies introduced by the state of New South Wales to populate its interior and come to understand how incentives are offered as a means of attempting to overcome the constraints, real or perceived, that 'the outback' presents to human habitation.

Finally, the pupils end their enquiry by looking in depth at the huge Pilbara region of New South Wales, known simply as the Pilbara. Dominated economically by mineral mining, particularly of iron ore, the Pilbara has been identified as a priority for economic diversification both as a means of attracting in-migration from elsewhere in Australia and from abroad, and also in order to keep the existing population, especially the young, in the area. A final activity sees the pupils preparing a short presentation to be made to the Chief Executive of the Pilbara Development Commission about how they would go achieve the objective of diversifying the economy and growing the region's population based on the brief of priorities they have been given.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Appreciate how a wide range of physical and human processes operate together and over time to influence patterns of population distribution and density.
- Understand that environments offer opportunities and constraints for development and that incentives are offered to migrants to compensate for challenges.
- Develop contextual knowledge of the location of globally significant places, including their defining physical and human geographical characteristics.
- Understand the processes that give rise to key physical and human features, how these are interdependent and how they bring about spatial variation and change over time.
- Interpret a range of sources of geographical information about physical and human processes to reach substantiated conclusions and judgements consistent with the evidence and interpret and communicate these in a variety of ways, including through models, maps, numerical and quantitative skills and writing at length.
- Reflect on their own worldview of current geographical issues and challenges and communicate their feelings and ideas appropriately.

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Locational knowledge

- Extend their locational knowledge and deepen their spatial awareness of the world's countries including their key physical and human characteristics.

Place knowledge

- Understand geographical similarities, differences and links between places.

Human and physical geography

- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in:
 - Physical geography relating to:
 - rocks
 - weather and climate.
 - Human geography relating to:
 - population and urbanisation
 - economic activity
 - the use of natural resources.
- Understand how human and physical processes interact to influence and change landscapes, environments and the climate.

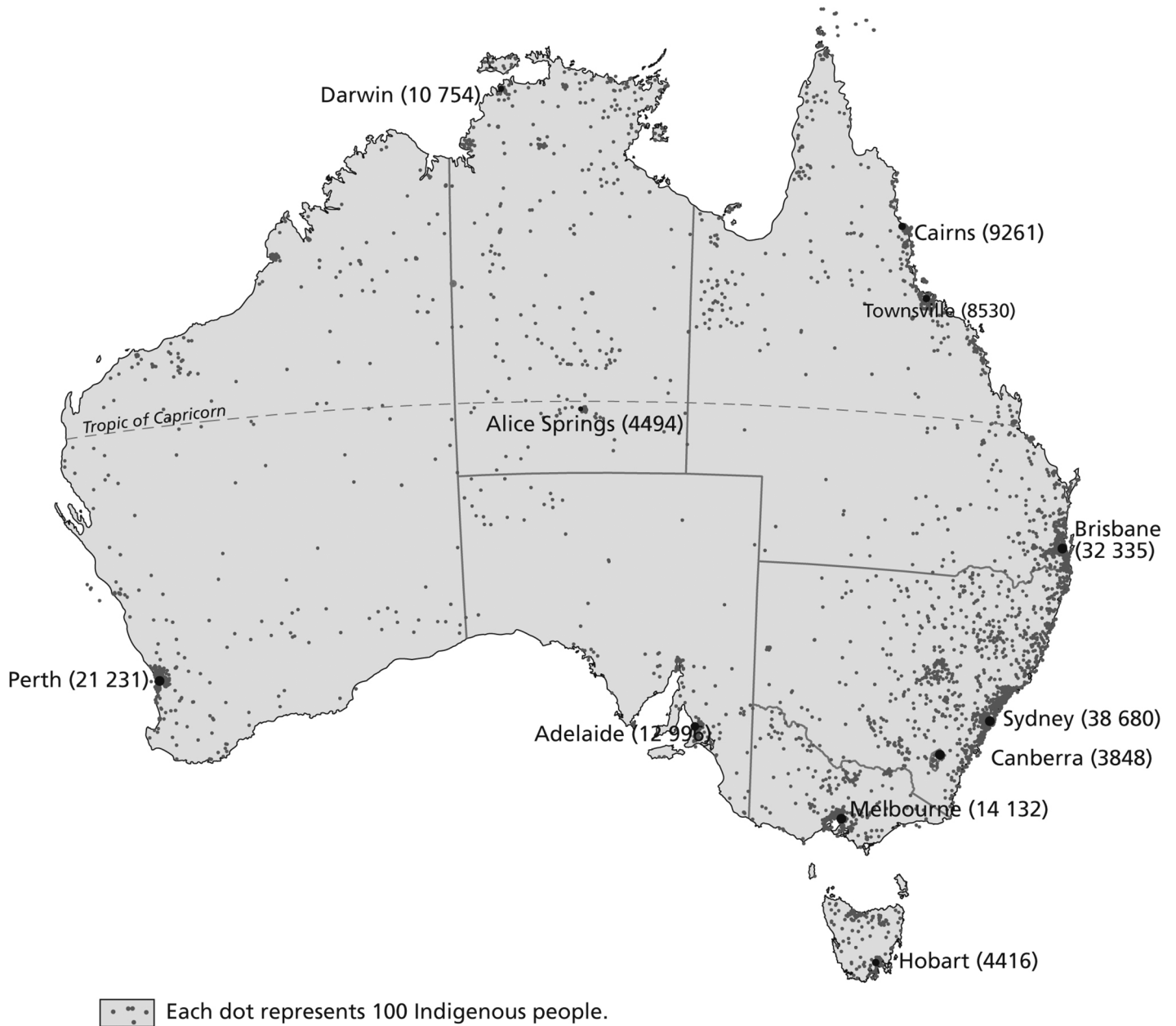
Geographical skills and fieldwork

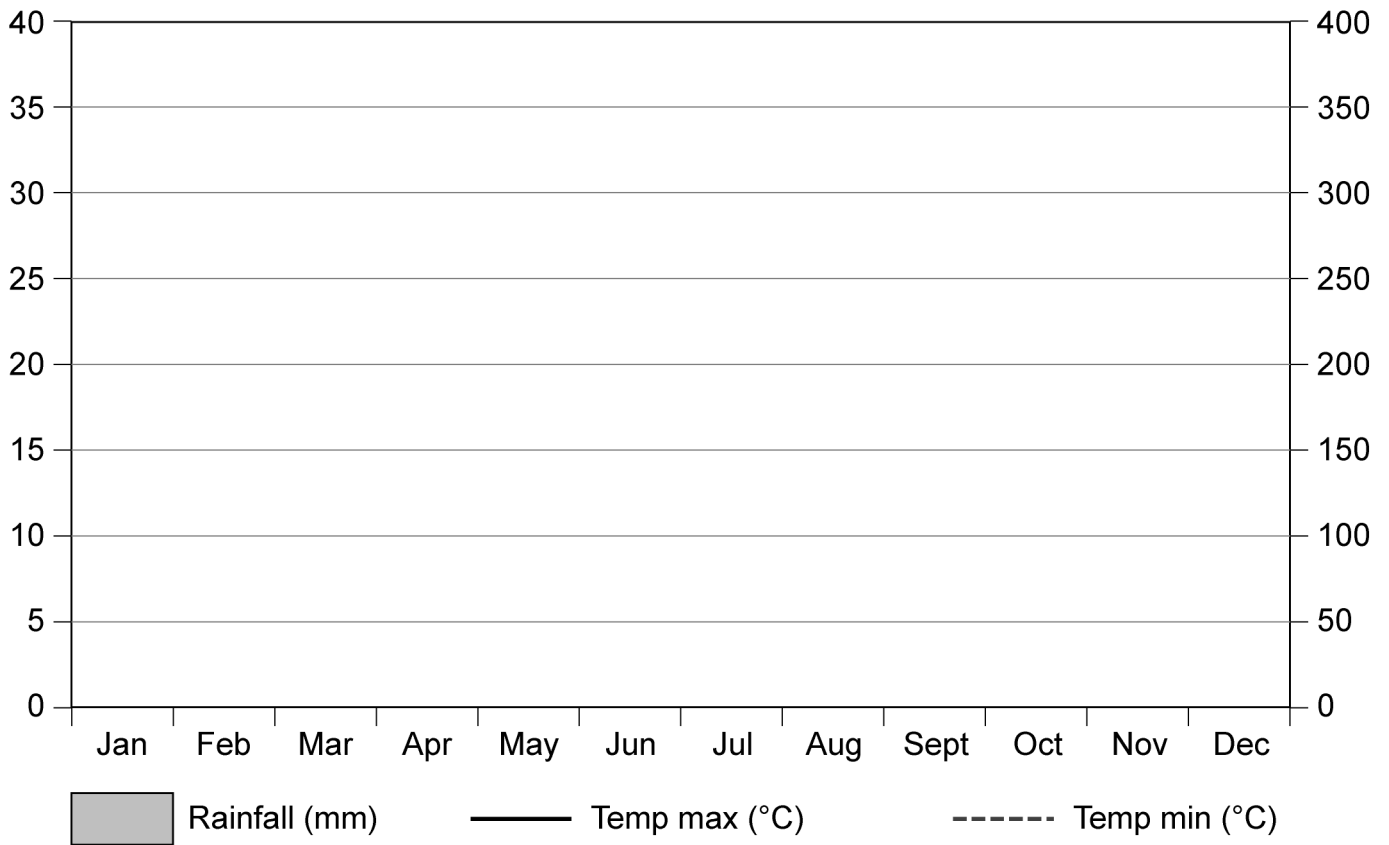
- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom and in the field.
- Interpret topographical and thematic mapping, and aerial and satellite photographs.
- Use Geographical Information Systems (GIS) to view, analyse and interpret places and data.

► **Possible assessable outcomes** ◀

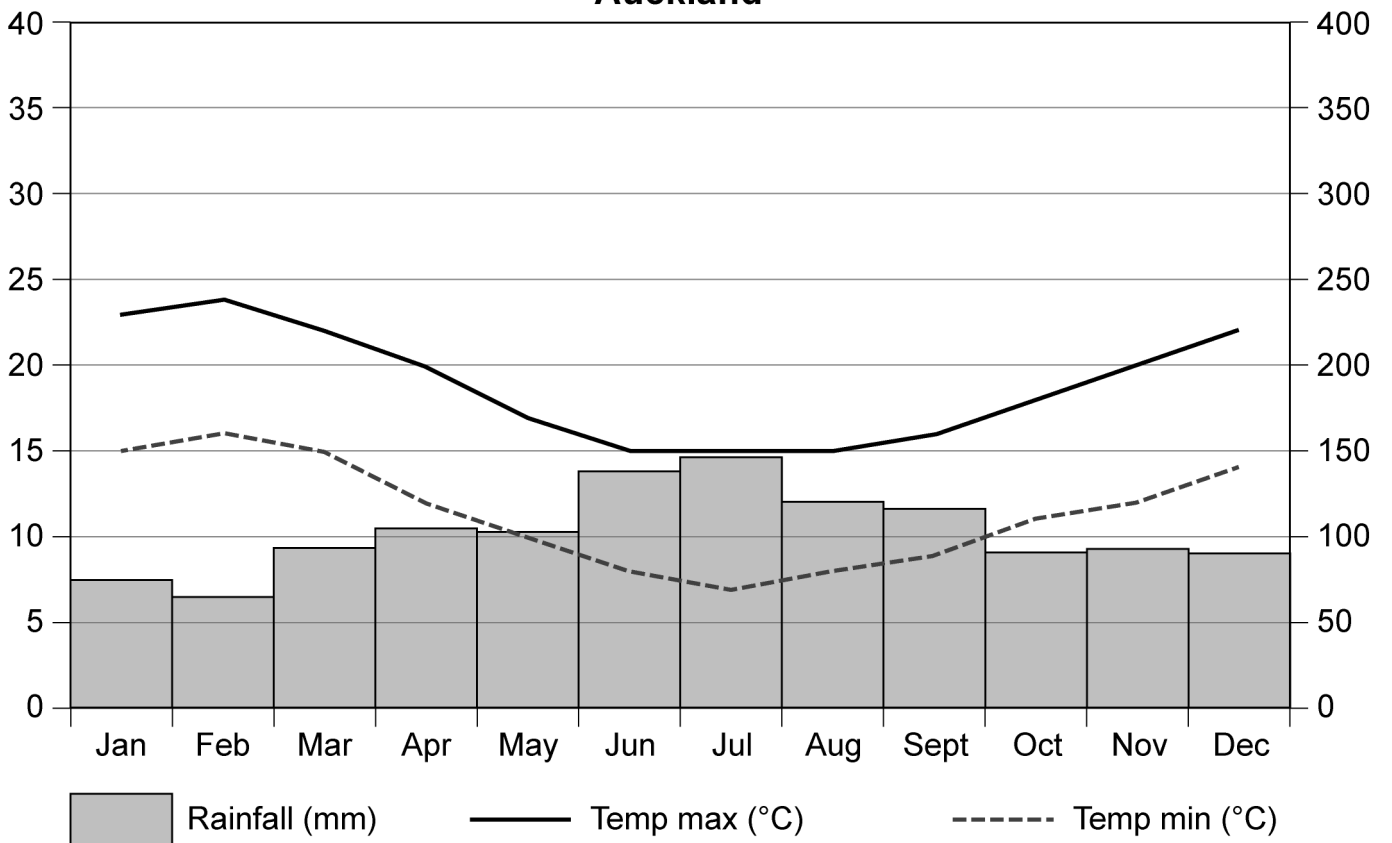
- The construction and evaluation of the effectiveness of a choropleth map.
- Construction and interpretation of a range of climate graphs.
- Identify and evaluate the environmental, social and economic costs and benefits associated with open cast (strip) mining.
- Construction and interpretation of proportional bars.
- Design and produce a newspaper advertisement for use in India.
- Plan, design and present a ten-minute presentation recommending approaches to economically diversify the Pilbara and attract migrants to the Pilbara region.







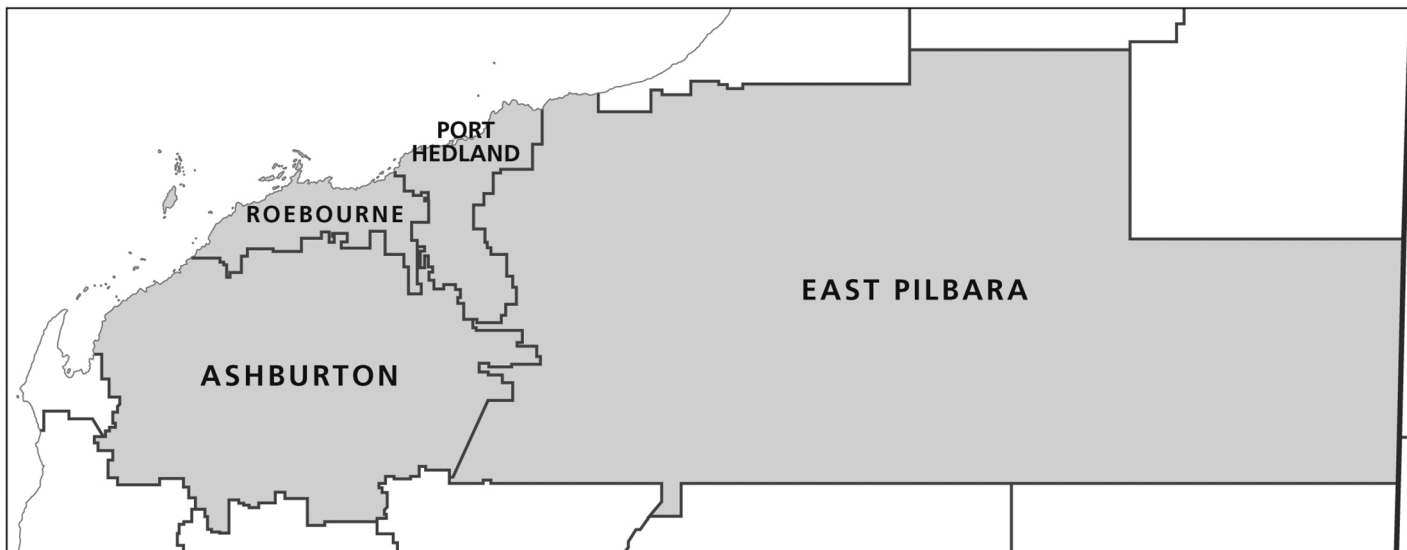
Auckland



Analysing climatic data for Australia

	Darwin	Bourke	Perth	Alice Springs	Sydney
Temperature of warmest month (or months)					
Temperature of coldest month (or months)					
Range of temperature (difference between the warmest and coldest months)					
Number of months growing season (temperatures 6°C or more)					
Amount of precipitation in wettest month (or months)					
Amount of precipitation in driest month (or months)					
Total precipitation for the year					

Advantages (potential social, environmental and economic advantages of process)	Disadvantages (potential social, environmental and economic disadvantages of process)



	Population	Youth (0 – 15)	Seniors (65+)	Labour force	Qualifications	Employment
The Pilbara region	63 thousand people	20.10% 	1.90% 	54.10% Full time 43.1% Part time 6.6% Unemployed 1.4%	8.5% Bachelor degree or higher	Mining Top industry of employment
Roebourne	22 thousand people	21.40% 	1.90% 	52.10% Full time 41.1% Part time 7.1% Unemployed 1.4%	9.0% Bachelor degree or higher	Mining Top industry of employment
Port Hedland	15 thousand people	22.40% 	2.50% 	50.20% Full time 39.6% Part time 6.7% Unemployed 1.9%	8.6% Bachelor degree or higher	Mining Top industry of employment
East Pilbara	11 thousand people	16.00% 	1.60% 	57.30% Full time 47.0% Part time 5.6% Unemployed 1.2%	7.7% Bachelor degree or higher	Mining Top industry of employment
Ashburton	10 thousand people	18.40% 	1.40% 	60.40% Full time 48.2% Part time 6.7% Unemployed 1.0%	8.0% Bachelor degree or higher	Mining Top industry of employment

Pilbara Development Commission: Outline brief from Chief Executive



Your recommendations to the PDC will take the form of a ten-minute presentation to the Chief Executive and the Board of Directors. This is not long, therefore you must be careful to ensure that you get key messages and advice across clearly before you run out of time. The Chief Executive is a stickler for time keeping. In your presentation the PDC particularly wants you to make recommendations for what could be done about:

- Creating a more even gender balance in the region, currently 62% of the population is male and the gender gap is widening year on year.
- As well as being predominantly male, the Pilbara workforce is an ageing one. The younger working age groups of 20 to 34 years are underrepresented as the table on the right indicates.
- Upgrading the region's infrastructure of services and amenities to both attract and retain workers, particularly the badly needed younger age groups.
- Providing the right mix of different housing types that potential migrants might be looking for given that some will be young and single and others may well have families of different sizes.
- Changing the perception many Australians have of the Pilbara being a remote backwater of the country, which is way behind the times.
- Preventing people leaving the region when they retire. This impacts the region because they then take their savings and significant spending power somewhere else.
- The large number of younger women with children currently living in the Pilbara who would like to work at least part time but currently have few if any opportunities to do so.
- The lack of 'community spirit' and sense of identity people have with the area.

Workers in Pilbara region by age

15-19	1150
20-24	3984
25-34	12,811
35-44	11,764
45-54	10,105
55-64	4673
65-74	457
75-84	11
Over 84	0
Total	44,956

To support your preparation and thinking the following sites will help to get you started:

<http://www.rdapilbara.org.au/>

<http://www.pdc.wa.gov.au/>

<http://www.futuredirections.org.au/publications/northern-australia/31-pilbara-prospects-2020-developments-and-challenges-for-the-region.html>

<http://www.economicprofile.com.au/pilbara>

What is being done to save Allerford?**► Purpose ◀**

Running through all the stages of this enquiry is the core theme of people-environment relationships – in particular, the management of environmental risk and potentially hazardous naturally occurring events in the context of the likely impacts of global warming.

The village of Allerford in the coastal north Somerset area of Exmoor National Park is in many ways an archetypal ‘chocolate box’ English village. But beneath the perceived rural and idyllic charm the village is under a very real threat. Through interrogating a range of ‘before’ and ‘after’ images and the Ordnance Survey map of the area, the pupils are able to identify the threat of flash flooding from the surrounding rapid run off catchment area of the River Aller and Horner Water. In their study of the catchment area and the underlying risk factors, the pupils extend and apply a range of map work and graphical skills to both describe and interpret the geomorphology of the landscape.

The pupils are encouraged to reflect upon the ways in which climate change through more concentrated rainfall patterns, combined with the likelihood of an increased frequency of severe weather events such as southerly winter storms, could make the likelihood of a flash flood at Allerford more probable. In particular some time is spent considering the link between a warming global atmosphere and the possibility of heavier rain.

The village of Lynmouth which remains the scene of Britain’s worst ever river flood in 1952, is just a few miles along the coast from Allerford. The pupils are supported to investigate the human and physical causes of the catastrophe that occurred there as well as to identify the similarities which exist between Lynmouth and Allerford thus the overarching title of the investigation: ‘preventing history repeating itself’.

Just like Allerford, Lynmouth is situated at the mouth of a rapid runoff catchment system and the course of both the East and West Lyn rivers is short, narrow and steep. After evaluating the causes of the Lynmouth flood, the pupils investigate the response of local and national authorities to prevent such an event occurring again and are introduced to the concept of ‘hard’ and ‘soft’ engineering.

Finally, the investigation returns to the River Aller and the flood management work of the Holnicote Project and the combined development work of the Environment Agency and the National Trust. Here, the pupils are challenged to compare and contrast the approaches to flood management adopted in the Holnicote Project with those of fifty years ago at Lynmouth. Pupils come to see how modern-day river management is very much about working with natural processes and regulating water flow rather than imposing capital-intensive hard engineering projects such as dams and reservoirs as potential solutions. An important aspect of the Holnicote Project is how, after decades of drainage for extensive farming and peat cutting, the water holding capacity of the high moorland areas of the Aller and Horner Wood headwaters are being restored through ‘re-wetting’ projects. During the heaviest rainfall period for almost fourteen years during the winter of 2013/14 the village of Allerford did not flood.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Know and understand how physical and human processes interact in river catchments to present management challenges.
- Appreciate how probable changes in weather patterns resulting from global warming and climate could combine to make the threat of hydrological flooding in rapid run off catchments more acute in the future.
- Recognise that in terms of lives lost, the River Lyn flood in 1952 in terms of lives lost, remains the most serious river flood event in British history and that following the tragedy a wide range of 'hard' preventative engineering projects were created here.
- Understand and evaluate the river management strategies being applied to the River Aller and Horner Water and compare and contrast them with Lynmouth.
- Understand the processes that give rise to key physical and human features of the world, how these are interdependent and how they bring about spatial variation and change over time.
- Interpret a range of sources of geographical information about physical and human processes to reach substantiated conclusions and judgements consistent with the evidence and interpret and communicate these in a variety of ways including through models, maps, numerical and quantitative skills and writing at length.
- Reflect on their own worldview of current geographical issues and challenges and communicate their feelings and ideas appropriately.

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Locational knowledge

- Extend their locational knowledge and deepen their spatial awareness of the world's countries including their key physical and human characteristics.

Place knowledge

- Understand geographical similarities, differences and links between places.

Human and physical geography

- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in:
 - Physical geography relating to:
 - weather and climate
 - the change in climate from the Ice Age to the present
 - hydrology.
 - Human geography relating to:
 - economic activity.
- Understand how human and physical processes interact to influence and change landscapes, environments and the climate and how human activity relies on effective functioning of natural systems.

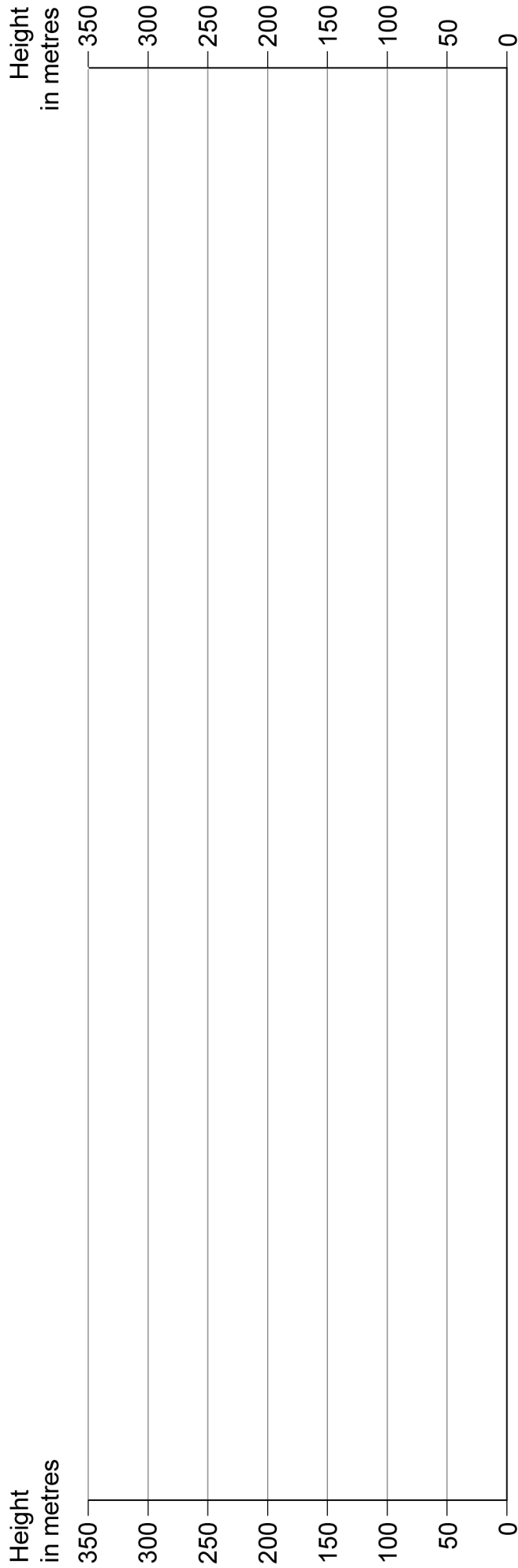
Geographical skills and fieldwork

- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom and in the field.
- Interpret topographical and thematic mapping, and aerial and satellite photographs.
- Use Geographical Information Systems (GIS) to view, analyse and interpret places and data.

► **Possible assessable outcomes** ◀

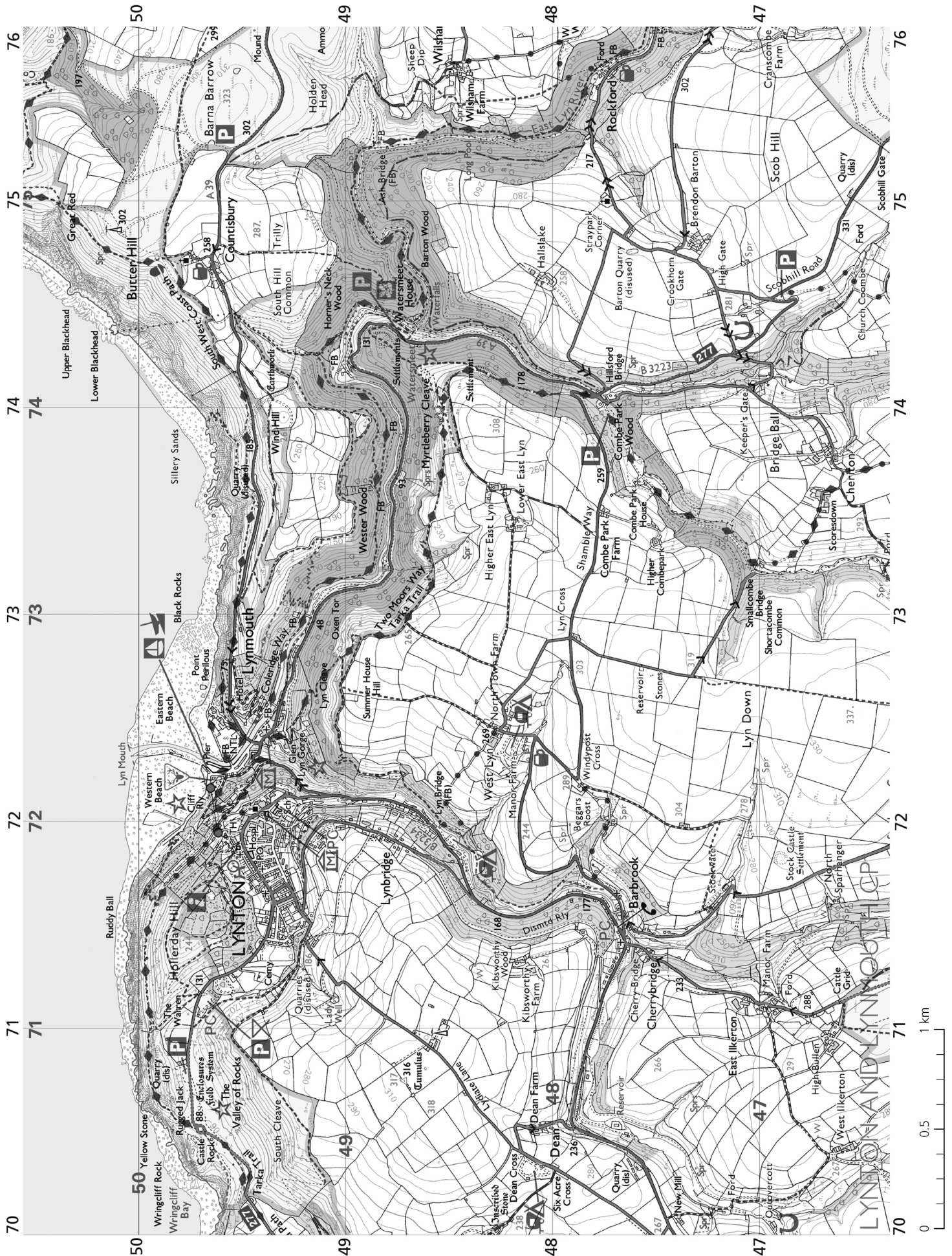
- 'Before' and 'after' interpretation of Allerford village photographs exercise to identify potential risk from flash flooding.
- Annotated cross section of the relief of the River Aller valley.
- Factors which contributed to causing the Lynmouth flood exercise.
- Annotated black and white version of OS map extract of Lynton and Lynmouth.
- Model of the catchment area of the River Lyn for the new Pavilion Centre.
- Design brief of personal flood management idea for urban areas.

Annotated cross-section of Ordnance Survey map of Allerford from 887446 to 914481

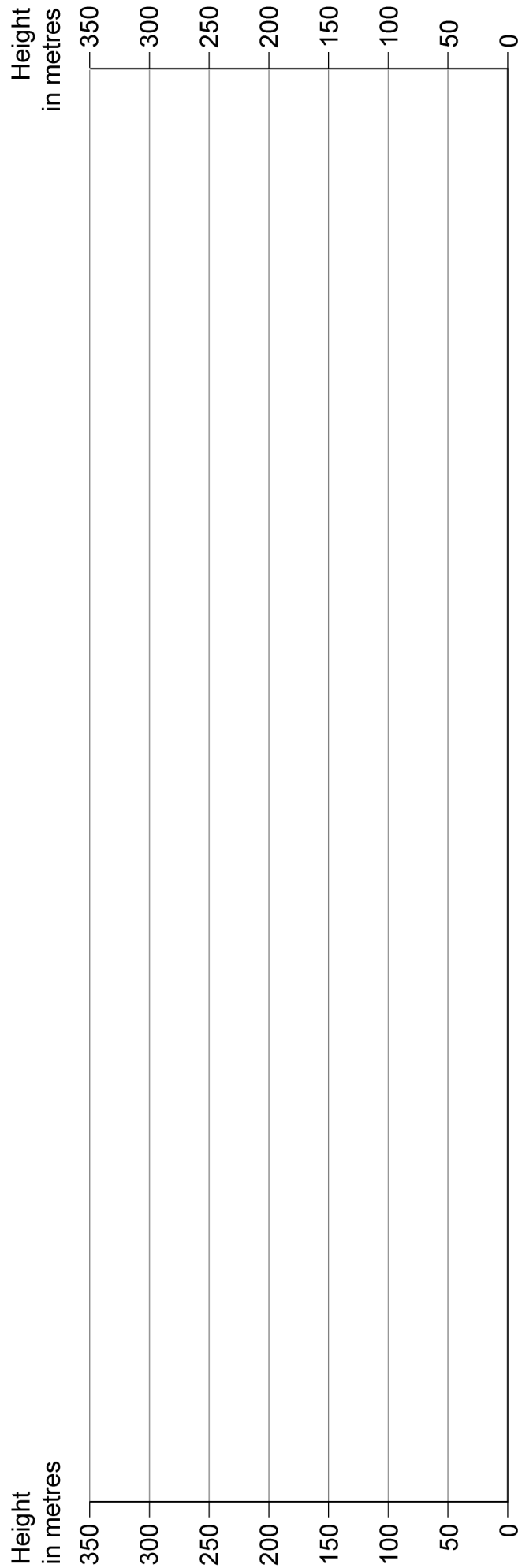


Contributing factor	Impact
<p>The confluence (the point where the rivers merge before flowing out into the Bristol Channel) of the East and West Lyn rivers is located at the centre of the settlement of Lynmouth.</p>	
<p>When Lynmouth began to become a popular coastal resort for visitors from all over Britain in Victorian times, the course of the River West Lyn was diverted away from its original channel. This was done to allow hotels and houses to be built on the flat land that was made available once the river had been diverted. The river was redirected into a new man-made, narrow and restricted channel so that it could flow into the sea.</p>	
<p>Both the East and West Lyn rivers flow down from high moorland to the sea through heavily wooded valleys. During the height of the flood thousands of large trees were ripped away from the banks of the river by the swollen and turbulent water and carried on downstream towards Lynmouth.</p>	
<p>Many bridges along the East and West Lyn rivers such as in the village of Barbrook became blocked solid with trees and other debris which acted together to dam the rivers so that millions of tonnes of water built up behind.</p>	
<p>When the floodwater reached the confluence of the East and West Lyn river in Lynmouth the new narrow outlet channel of the West Lyn river could not cope with the massive volume of water which built up. Consequently the water returned naturally to follow the course of its original channel out to the sea despite the fact that many homes and other properties had been built on it over the intervening years following its redirection.</p>	
<p>As it crashed down through the East and West Lyn rivers, the floodwater plucked out hundreds of huge boulders weighing up to forty-six tonnes from the river bed and adjacent banks and carried them away down to the village of Lynmouth.</p>	

Contributing factor	Impact
<p>Many of the blocked bridges, like the one at Hillsford on Farley Water, a tributary of the East Lyn, eventually gave way under the massive pressure of flood water that had built up behind the dam of debris.</p>	
<p>On 15 August, a massive thunderstorm resulted in 230 mm of rain falling across the high moorland catchment area of the East and West Lyn rivers in just fourteen hours. This is equivalent to 22.5 billion litres of water.</p>	
<p>During the first fourteen days of August, 152 mm of rain had already fallen on the East and West Lyn catchment and consequently both the shallow topsoils and the thicker underlying peat were already saturated before the massive thunderstorm which was to come on 15 August.</p>	
<p>Much of the underlying rock which forms the catchment area of the East and West Lyn on Exmoor is impermeable which means it does not allow water to percolate through it.</p>	
<p>Both the East and West Lyn rivers flow down to the Bristol Channel through very steep sided gorges with narrow channel widths which consequently have little capacity to cope with sudden heavy periods of rainfall such as that which occurred on the night of August 14–15.</p>	
<p>Because of the very narrow valleys of the East and West Lyn, the only available flat land for building in Lynmouth has always been very close to the rivers. Consequently most homes, hotels and services such as shops in the village have been established over the years only a few metres from the water.</p>	

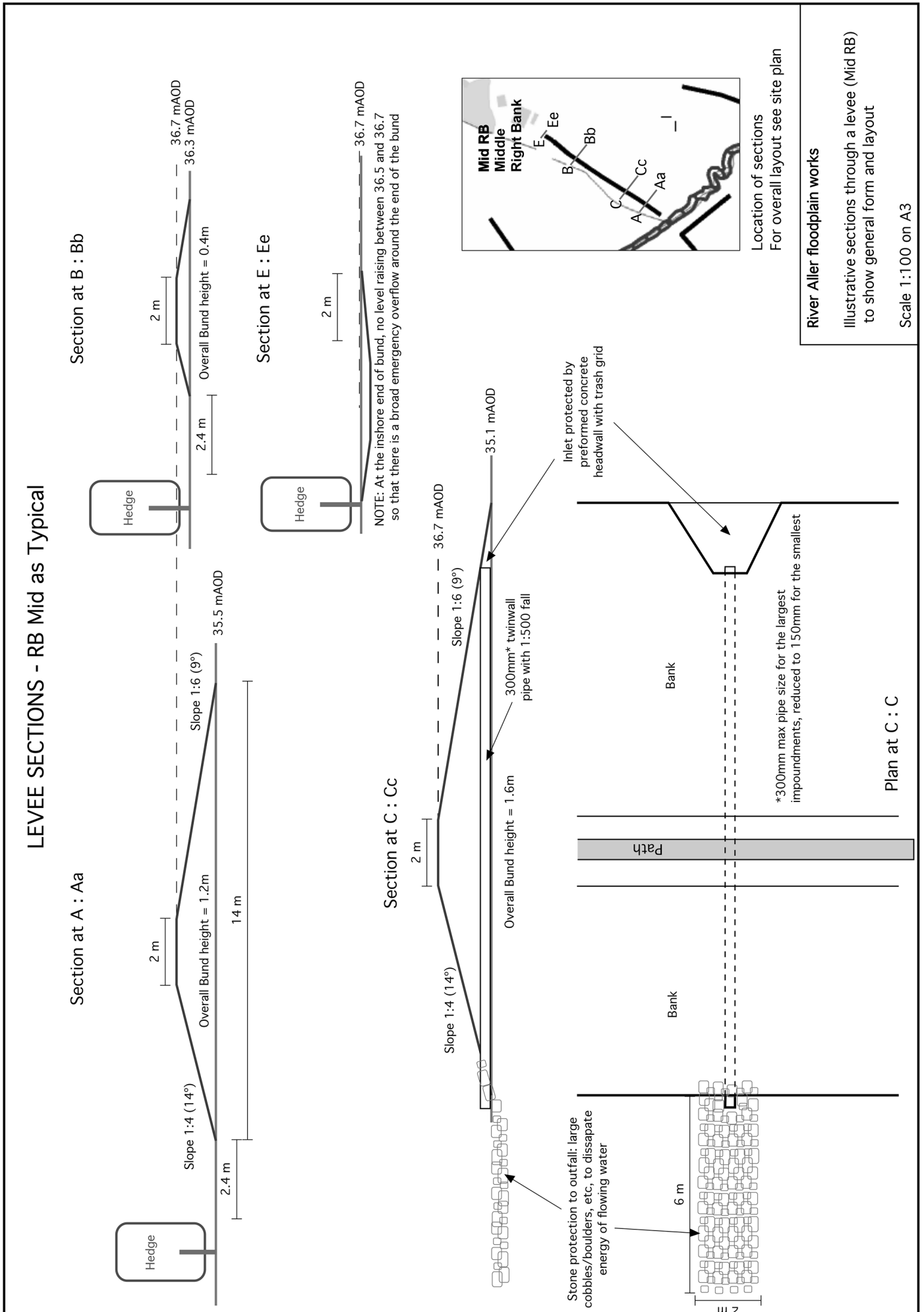


Annotated cross-section of Ordnance Survey map of Lynmouth from 706485 to 748494



Lynmouth flood management plan recording sheet

What was done to manage the threat of future flooding (evidence from the images)	How this would contribute to reducing the threat to residents and property from future floods



What should the European Union do about its declining population?**► Purpose ◀**

This investigation is designed to highlight to pupils that the world has not one, but two population problems; the first is the rapid population growth in the poorest countries of the world and the second is the declining population in the European Union. The main focus is on the latter of these and the enquiry enables pupils to investigate the causes, implications and solutions to this situation.

The enquiry begins by describing what is happening to the population of the European Union. The activities in the Student Book, which are supported by the sheets in the Teacher Book, introduce the countries of the EU, particularly focusing on the date of accession and the varying levels of development between the twenty-eight member countries. This question also introduces the Demographic Transition Model, asking pupils to consider the stage at which each of the countries are currently located. The traditional four-stage model is introduced and then extended to incorporate Stage 5 and to suggest Stage 6. The sheet 'Designing a new demographic model' provides some background to both the Demographic Transition Model and the alternative model suggested for use in LEDCs. It moves forward by encouraging the pupils to design their own models to bring the DTM up to date.

Question 7.2, 'What are the causes of this decline?', discusses the key statistics and attempts to explain the low death rates, declining birth rates and pattern of migration found in the European Union. The A8 accession of countries in 2004 is briefly discussed but the debate is then brought up to date with a discussion of the impact of Bulgaria and Romania's accession in 2014. The implication of the decline in population is then investigated; whilst positive impacts are highlighted, the focus is on the ageing population and the problems that such a demographic structure can cause. Pupils are asked to consider the advantages and disadvantages before suggesting potential practical solutions to the problems. Discussion surrounding the effectiveness or potential support for each of their suggested solutions, particularly focusing on individual choice versus the good of the country, could be explored.

The enquiry then turns its attention to the solutions for a declining population, focusing firstly on migration and then on strategies for increasing birth rates. Some of these are taken from other parts of the world and vary in their creativity (and success!). The assessment asks pupils to create a presentation to answer the question posed at the beginning of the enquiry: 'What should the European Union do about its declining population?' Pupils should focus on creating a presentation which provides some background to the situation and which describes and explains their solutions in a clear and effective way. They should think about their mode of presentation and also how they use diagrams, images and text to get their message across.

The final part of the enquiry looks specifically at the situation in the UK, which has, contrary to many of the EU countries, seen an increase in population, both naturally and through migration. Reasons for this trend are identified and pupils are encouraged to research a country in the EU in a similar position.

► Aims ◀

Through this enquiry, pupils will be challenged and supported to:

- Develop contextual knowledge of the location of globally significant places, including their defining physical and human geographical characteristics, and how these provide a geographical context for understanding the actions of geographical processes.
- Understand the processes that give rise to key physical and human features of the world, how these are interdependent and how they bring about spatial variation and change over time.
- Interpret a range of sources of geographical information to reach substantiated conclusions and judgements consistent with the evidence and communicate these in a variety of ways, including through maps, numerical and quantitative skills, writing and presenting.

► Links to Key Stage 3 subject content ◀

Pupils should be taught to:

Human and physical geography

- Understand through the use of detailed place-based exemplars at a variety of scales the key processes in:
 - Human geography relating to population.

Geographical skills and fieldwork

- Build on their knowledge of globes, maps and atlases and apply and develop this knowledge routinely in the classroom.
- Draw conclusions from geographical data, using multiple sources of increasingly complex information.

► Possible assessable outcomes ◀

- The creation of a presentation to describe and explain what the European Union should do about its declining population.

Title: _____



1995



2004



2007



2013

- Use the table at http://en.wikipedia.org/wiki/European_Union and an atlas to shade the map on page 69 in order to show the year of accession to the European Union of the twenty-eight member countries. Don't forget to complete the map key and add a title.
- Which countries in Europe are not members of the European Union? Why do you think they have made the decision not to be part of this group?
- Seven countries are on the waiting list to join the EU. Read about them here: <http://www.bbc.co.uk/news/world-europe-11283616>

Whilst none of the countries of the European Union could be described as less economically developed countries (LEDCs), there is a significant difference between the most and the least developed. We can use a variety of development indicators to assess the level of development of the European Union countries. The table below shows the countries ranked in order of the Human Development Index, which compares life expectancy, literacy, education, standards of living and quality of life on a scale of 1 (highest level of development) to 0 (lowest level of development). The other columns in the table illustrate development based upon gross domestic product per capita (GDP per person) and Happiness Planet Index (the higher the number the happier the country). You can watch a video introducing this indicator at <http://www.happyplanetindex.org/>

Rank	Country	HDI (2014)	GDP per capita in US\$ (2013)	Happy Planet Index (2014)
1	Netherlands	0.915	47,617	43.1
2	Germany	0.911	45,085	47.2
3	Denmark	0.900	58,930	36.6
4	Ireland	0.899	47,400	42.4
5	Sweden	0.898	58,164	46.2
6	United Kingdom	0.892	39,351	47.9
7	France	0.884	41,421	46.5
8	Austria	0.893	49,074	47.1
9	Belgium	0.892	45,387	37.1
9	Luxembourg	0.892	111,162	29.0
11	Finland	0.879	47,219	42.7
12	Slovenia	0.874	22,059	40.2
13	Italy	0.879	34,619	46.4
14	Spain	0.869	29,118	44.1
15	Czech Republic	0.861	18,861	39.4
16	Greece	0.853	21,910	40.5
17	Cyprus	0.845	26,352	45.5
18	Estonia	0.840	18,478	34.9
19	Lithuania	0.834	14,172	34.6
20	Poland	0.834	13,432	42.6
21	Slovakia	0.830	16,893	40.1
22	Malta	0.829	20,839	43.1
23	Portugal	0.822	21,029	38.7
24	Hungary	0.818	12,560	37.4
25	Croatia	0.812	13,530	40.6
26	Latvia	0.810	13,947	34.9
27	Romania	0.785	9,499	42.2
28	Bulgaria	0.777	7,296	34.1

- Can you group the countries using the data in the table above? How have you organised the groups? How many are there?
- Do you think that the difference in the level of development between countries within the EU is a problem or an opportunity? Why do you think this?
- In the case of the European Union, is it correct to say that money equals happiness?

Key terms:

Overall population change: natural change plus net migration.

Births (per 1000 per year): the number of people born in the country per 1000 of the population in a year.

Deaths (per 1000 per year): the number of people who die in the country per 1000 of the population in a year.

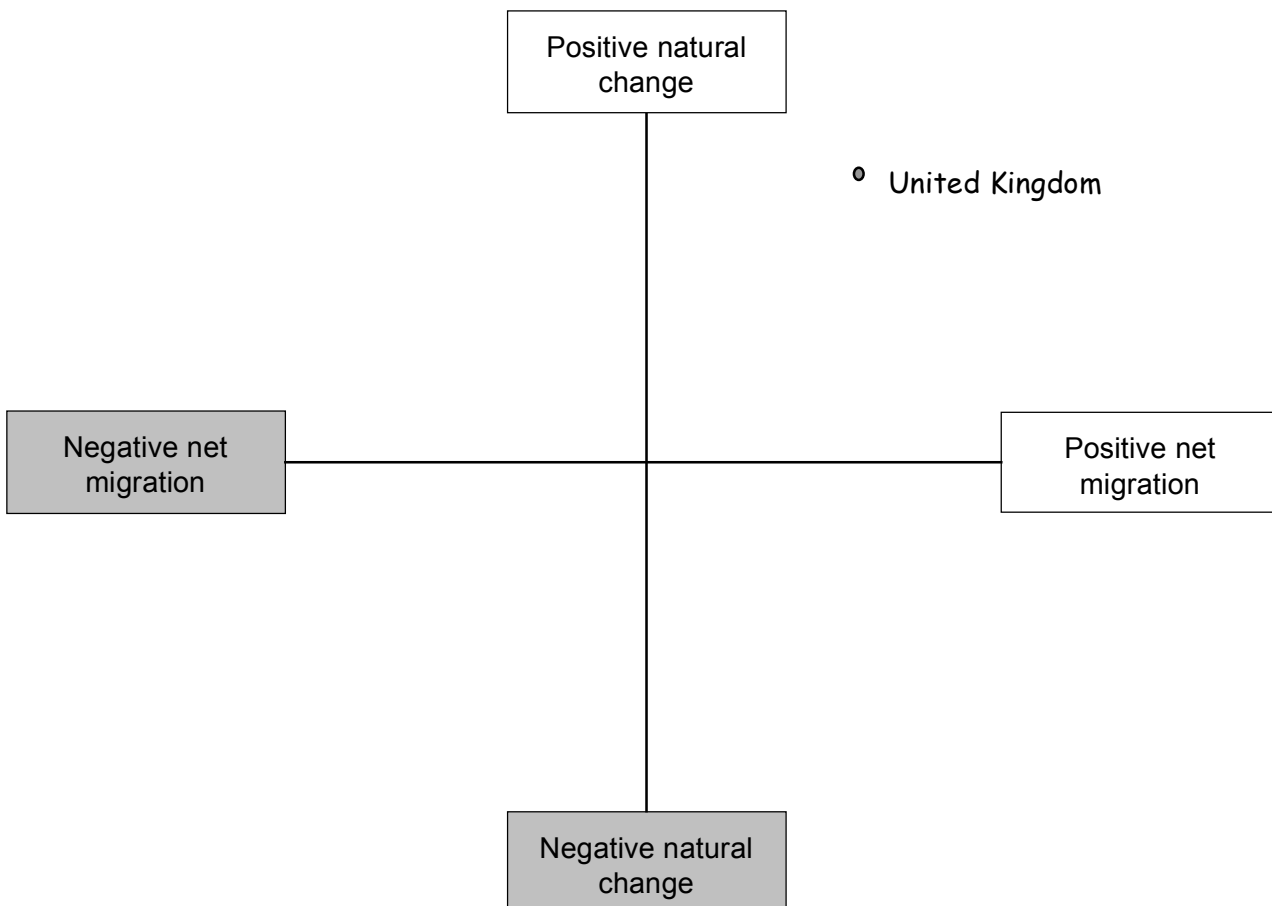
Natural Change (per 1000 per year): the birth rate minus the death rate.

Net migration (per 1000 per year): the difference between the number of people moving into the country and those moving out.

Use the table of population data in the student book to help you to answer the questions below.

- Overall, there are _____ countries in the European Union where the population is growing and _____ where the population is declining.
- However, if we just take natural change into account then there are _____ where the population is growing and _____ where the population is declining.
- There are _____ countries which have positive net migration (there are more people arriving than leaving) and _____ countries which have a negative net migration (there are more people leaving than arriving).

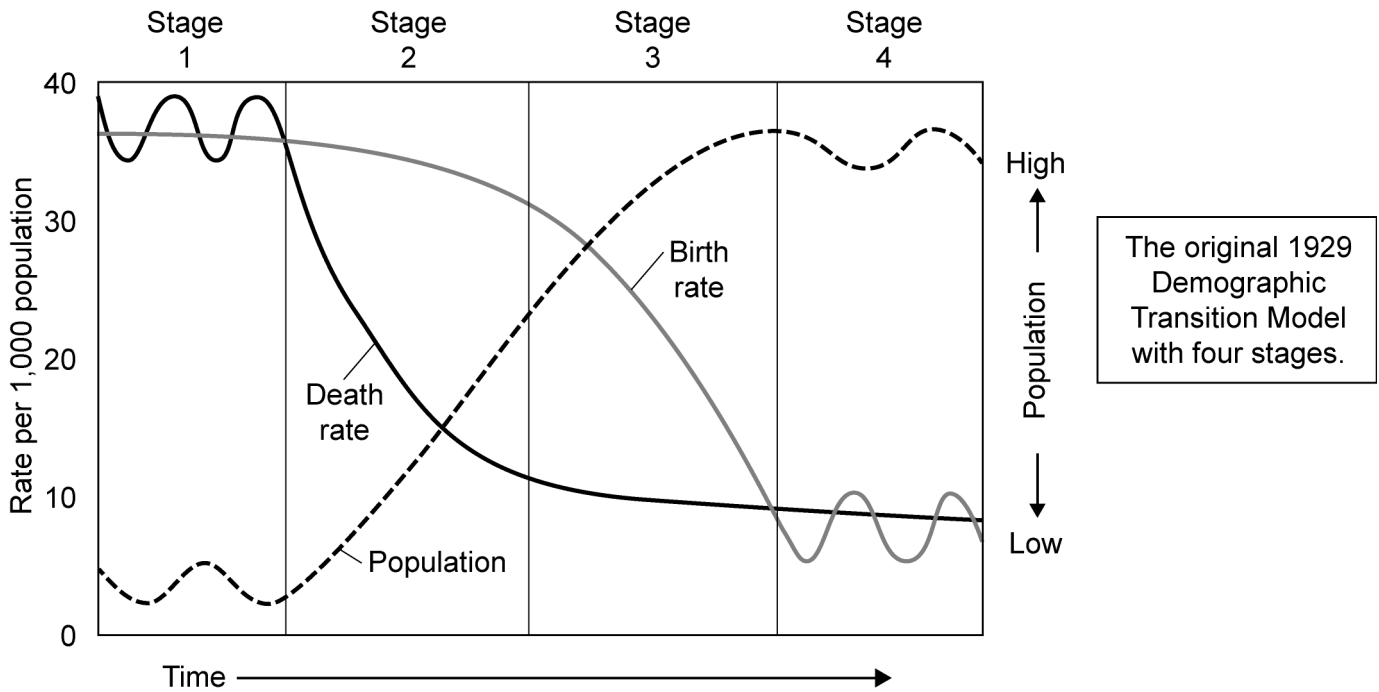
Sort the twenty-eight countries in the table into the correct part of the diagram. The United Kingdom has been done for you.



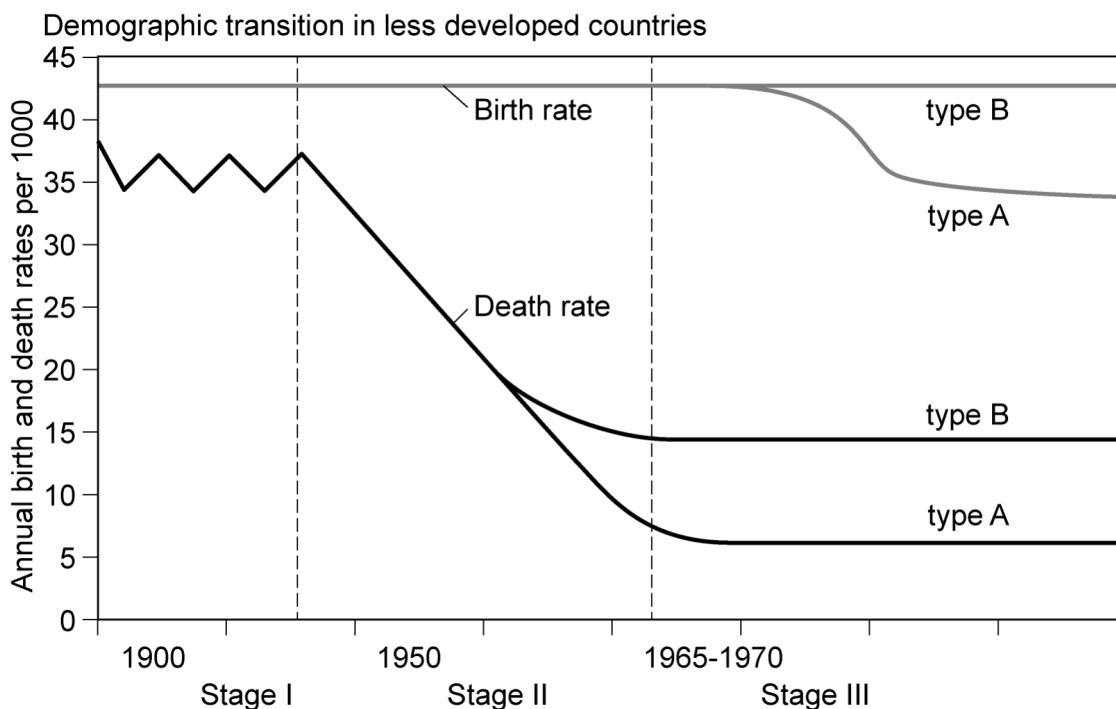
Have a look at the demographic transition model in the student book. Can you work out at which stage each of the European Union countries are currently at? The first two have been done for you.

Country	Birth rate (per 1000 per year)	Death rate (per 1000 per year)	Stage of the Demographic Transition Model
Belgium	9.99	10.76	Stage 4/5
Bulgaria	8.92	14.30	Stage 5
Czech Republic	9.79	10.29	
Denmark	10.22	10.23	
Germany	8.42	11.29	
Estonia	10.29	13.69	
Ireland	15.18	6.45	
Greece	8.80	11.00	
Spain	9.88	9.00	
France	12.49	9.06	
Croatia	9.49	12.13	
Italy	8.84	10.10	
Cyprus	11.44	6.57	
Latvia	9.79	13.60	
Lithuania	9.36	11.55	
Luxembourg	11.75	8.53	
Hungary	9.26	12.72	
Malta	10.24	8.96	
Netherlands	10.83	8.57	
Austria	8.76	10.38	
Poland	9.77	10.37	
Portugal	9.42	10.97	
Romania	9.27	11.88	
Slovenia	8.54	11.25	
Slovakia	10.01	9.70	
Finland	10.35	10.51	
Sweden	11.92	9.45	
United Kingdom	12.22	9.34	

Warren Thompson, an American geographer, devised the Demographic Transition Model by plotting birth and death rates in industrialised countries over 200 years. However, he did this in 1929. So, whilst still useful, the model is becoming less relevant to the populations of today. Many GCSE and A level geography syllabuses talk of explaining 'Stage 5' of demographic transition, a stage which was omitted from Thompson's original model. However, some geographers go further to suggest that some countries may be heading for a new 'Stage 6', where very advanced countries with high HDI are seeing increases in fertility.



However, if the Demographic Transition Model is a poor fit for today's more economically developed countries (MEDCs), it is a very poor fit for LEDCs who have higher birth and death rates than MEDCs ever did and have whizzed through Stage 2 into 3, with little hope of ever reaching Stage 4. As a result, Berelson has created a model for LEDCs which has three rather than four, five, or even six stages and which divides LEDCs into two types: Type A who have experienced economic development and have seen their birth and death rates decline in Stage 3; and Type B who are typically low income LEDCs with high birth rates maintained and death rates that have levelled off, but are still at a higher rate than Type A countries.



The enquiry suggests that increasing migration between countries in the EU (and further afield) may help to halt population decline. Such movement creates advantages and disadvantages for both the origin and destination countries. Complete the table below with some of your suggestions.

	Advantages	Disadvantages
Country of origin		
Country of destination		

Now, sort these into economic advantages and disadvantages and social advantages and disadvantages. You may want to highlight each with a different colour.

What conclusions can you draw from your table? For example, are the advantages and disadvantages for the country of origin mainly social, economic or a combination of the two? Do the advantages outweigh the disadvantages for both countries or is one losing out?

The UK government has said that it will hold a referendum in 2017, if it is re-elected, which will ask the public whether or not the UK should remain a member of the EU. You can read more about this at <http://www.bbc.co.uk/news/uk-politics-25152028>.

Purely thinking about the issue of migration, do you think that not being a member of the EU would make the population situation in the UK better or worse? Why do you think this?

1.	Stage 2	Stage 3	Stage 5	Stage 6
2.	Bulgaria	Cyprus	Estonia	Latvia
3.	Education	Lifestyle	Healthcare	Migration
4.	Birth rate	Fertility rate	Replacement rate	Death rate
5.	UK	Poland	Czech Republic	Slovenia
6.	Elderly population	Childcare costs	Taxes	Workforce
7.	One child policy	Yotaro	Family Day	Adverts
8.				

1 The odd word out is _____
 because _____

2 The odd word out is _____
 because _____

3 The odd word out is _____
 because _____

4 The odd word out is _____
 because _____

5 The odd word out is _____
 because _____

6 The odd word out is _____
 because _____

7 The odd word out is _____
 because _____

8 The odd word out is _____
 because _____



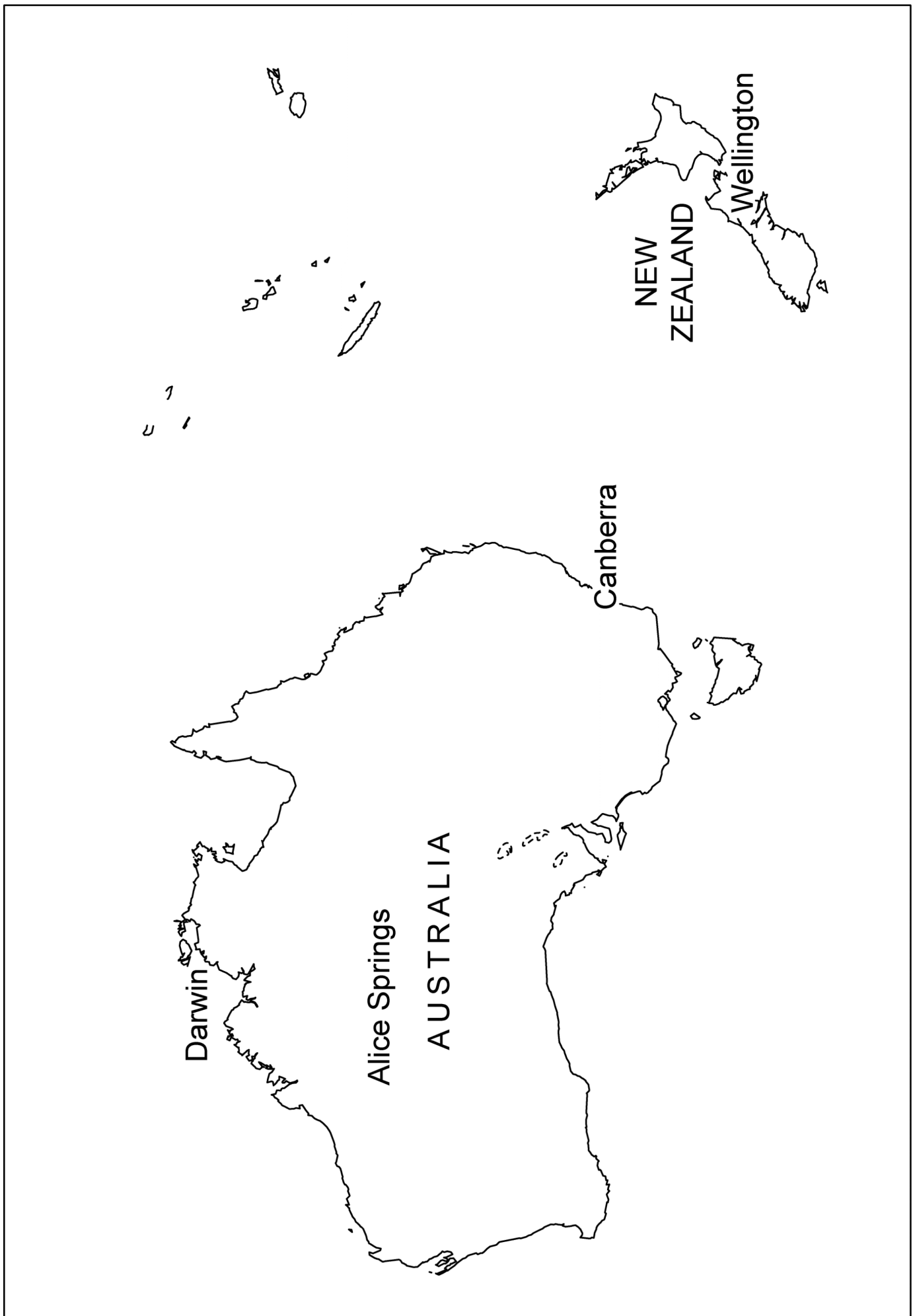
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