

Unit 14 Can the earth cope? Ecosystems, population and resources

About the unit

This unit is in two parts: ecosystems, population and resources; and global futures/resource issues. Pupils investigate the global distribution of one or more selected biome, populations and the resources of food production. They find out about the relationships between these three themes and about resulting environmental issues/consequences.

Activities in this unit provide the opportunity for pupils to improve their literacy skills and think about important topical issues linked with citizenship.

This unit is expected to take 12–20 hours.

Key aspects

Geographical enquiry and skills

Pupils will:

- ask geographical questions
- suggest investigation sequences
- collect, record and present evidence
- analyse evidence and draw conclusions
- appreciate values and attitudes
- use atlases/globes/maps
- use secondary evidence
- draw maps, plans and graphs

Knowledge and understanding of places

Pupils will:

- locate places and environments
- explore interdependence and global citizenship

Knowledge and understanding of patterns and processes

Explored through:

- ecosystems
- resource issues

Knowledge and understanding of environmental change and sustainable development

Pupils will study:

- sustainable development

Expectations

At the end of this unit

most pupils will: describe and begin to explain the physical and human processes that contribute to the distinctive characteristics and world distribution of one or more biome, the global distribution patterns of population and an important resource, and understand the nature of interrelationships between them; describe how physical and human processes create geographical patterns and may lead to changes in places and environments; appreciate how resource issues can change places and the links and relationships that make places economically dependent on each other; appreciate that different values and attitudes result in different approaches in managing environments sustainably and that these may have different effects on people and places; suggest relevant questions and a sequence of investigation of ecosystems, population and resources; select and use effectively a range of skills and sources of evidence; present their findings about these issues in a coherent way and reach conclusions that are consistent with evidence

some pupils will not have made so much progress and will: begin to recognise and describe the physical and human processes that contribute to the distinctive characteristics and world distribution of one biome, the global distribution patterns of population and an important resource, and understand that there are links between them; recognise some of the links and relationships that make places economically dependent on each other; explain their own views and recognise how people try to manage environments sustainably; begin to suggest explanations for how human activities cause damage to the environment and recognise how people may try to improve the environment; suggest suitable geographical questions and sequences of investigation of ecosystems, population and resource issues; use a range of skills and secondary sources of evidence and communicate their findings using appropriate vocabulary

some pupils will have progressed further and will: describe interactions within and between the global distributions of biomes, population and selected resources and show how these interactions create geographical patterns and help change environments; understand that many factors, including people's values and attitudes, *eg about GM food*, may influence decisions about environments and that environments and the people who live there are affected by actions and events in other places; appreciate that human actions to improve food production may have unintended consequences for the environment and that considerations of sustainable development may affect the planning and management of such environments in the future; identify geographical questions and sequences for investigation of ecosystems, population and resource issues; select and use accurately a wide range of skills and sources of evidence; evaluate critically sources of evidence for bias, present well-argued reports and begin to reach substantiated conclusions

Prior learning

It is helpful if pupils have:

- used the contents page of an atlas and thematic world maps
- carried out research using a range of sources, *eg internet, CD-ROM, library*
- studied global population distribution
- studied world climatic types

Language for learning

Through the activities in this unit pupils will be able to understand, use and spell accurately words relating to:

- ecosystems, *eg biome, vegetation, climate, distribution, characteristic, natural resources, interrelationships, population, food production, agriculture, nutrition, issue, genetically modified foods*
- public opinion, *eg fact, opinion, nimbyism, probable and preferable futures (others according to case studies selected)*

Speaking and listening – through the activities pupils could:

- discuss and question what they are learning and how it is relevant in other contexts or when using variables

Reading – through the activities pupils could:

- distinguish facts from hypotheses/theories/opinions and how far information is complete and helpful

Writing – through the activities pupils could:

- link ideas and paragraphs into continuous text

Resources

Resources include:

- atlases, photographs and/or video clips showing the characteristics of one or more world vegetation types
- climate graphs for vegetation types
- outline maps of the world
- selection of resources covering a variety of resource issues, *eg textbooks, newspaper articles, internet information as text*
- any clip from BBC's *Question time*
- a cartoon depicting a negative global future (*Thin black lines* and *Thin black lines rides again* have a selection of political cartoons, available from the Development Education Centre (DEC), Birmingham)
- *Thinking through geography* (David Leat, Chris Kingston Publishing, 1988) (includes activities on 'Fact or opinion')

Future learning

This unit lays the foundation for the study of development in unit 16 'What is development?' in year 9, with its focus on distribution at a global scale and its consideration of topical issues. Such background information will also be useful for GCSE work.

Links

The activities in this unit link with:

- other geography units – unit 16 'What is development?'
- ICT – using a mapping package, using internet search engines
- citizenship – considering topical issues, justifying personal opinion
- science – work on food production, habitats, toxic materials in food chains

Ecosystems, population and resources – what are the characteristics and distribution of a major vegetation type?

- to use atlas maps at a world scale
- to use secondary sources of evidence, including photographs
- to investigate the characteristics and distribution of a major biome
- Organise pupils into pairs and give each pair an atlas. Ensure there is a visual barrier between them. One pupil has a world map showing the distribution of the major ecosystems (biome) and the other a blank world map outline. Ask the pupil with the ecosystems map to describe the world distribution of one type of world vegetation, *eg hot desert*, while the other draws it. Ask pupils to check and evaluate the accuracy of their work before swapping roles and describing the distribution of another type of vegetation. A detailed description of the distribution of one vegetation type should be written. Some pupils may need appropriate support such as a structured step-by-step framework for the task of describing world distribution, *eg Even/uneven? Which hemisphere? What latitudes? Coastal or inland? Any distinctive pattern?*
- Ask pupils to use photographs and/or video clips (using freeze-frame as appropriate) to create wordscapes (sequences of adjectives) to describe the characteristics of one or more vegetation type. Then ask them to annotate diagrams or photographs using this vocabulary, including details about structure, named plant and animal species, plant adaptations and seasonal variations (where relevant).
- describe and explain the world distribution of one or more vegetation type
- describe and explain the characteristics of one or more vegetation types
- Some pupils might need prompts from a word bank.
- Language for learning: this activity provides pupils with the opportunity to discuss and question what they are learning and how it is relevant in other contexts, or when using different variables.
- Some teachers may wish to extend the study of ecosystems and how they reflect climate patterns by studying four vegetation belts north/south of the equator.

How is this vegetation type related to climate, soil and human activity?

- to investigate how the ecosystems of a biome are related to climate, soil and human activity
- Show pupils how to 'design your own plant'. Then provide pupils with details of different types of world climate, including graphs and maps, and a set of cards with various plant adaptations, *eg tap root, leaves with drip tips*. Ask them to choose a climatic type, *eg tropical humid (rainforest)*, and select a given number of suitable plant adaptations for that climate. Ask them to draw the plant using only the adaptations chosen and annotate its features, justifying their selection in relation to climate and soil characteristics.
- Build up an annotated flow or systems diagram on the board, to demonstrate the interrelationships between a named vegetation type and climate, soil and human activity. Ask pupils to use this model to create a diagram for their chosen vegetation type.
- describe and explain the range of vegetation adaptations to climate and soils
- describe and explain the relationships which exist between vegetation, climate, soil and human activity
- Homework activity: pupils repeat the activity for another vegetation type.
- Science: links with life processes and living things – habitats, interdependence and organisation adaptations

Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note**How are population and resources interrelated?**

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| <ul style="list-style-type: none"> • to ask relevant geographical questions • to use thematic maps to investigate relationships between population and resources • to draw annotated maps | <ul style="list-style-type: none"> • Discuss with pupils the term 'natural resources' until an appropriate definition is agreed and noted in glossaries, with appropriate examples. • Using a world atlas of thematic maps which show the world pattern of population distribution and other associated resources, ask pupils to generate a series of enquiry questions, <i>eg Do areas of highest population density have the highest nutrition levels/highest rainfall totals? Most coal reserves? Most equable temperatures? Most flat land?</i> • Using an atlas, a large world distribution map, a set of cards with named locations, <i>eg Amazon Basin</i>, and another set of cards with resource information, <i>eg relief, climate, energy reserves</i>, ask pupils to match correctly the two sets – location with information. Then ask pupils to annotate a world map with these cards. • Conduct a debriefing session, and using a diagram to provide an overview, classify the types of resources and identify the interrelationships posed in the enquiry questions. | <ul style="list-style-type: none"> • define natural resources correctly • link global population distribution patterns and various resources | <ul style="list-style-type: none"> • ICT: this activity provides an opportunity for pupils to use a mapping package/geographic information system (GIS). |
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Global futures – what is the world distribution of this resource or where is the resource issue found?

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| <ul style="list-style-type: none"> • to respond to and ask geographical questions • to use and draw maps • to describe and explain geographical distributions/patterns in relation to the sources and supply of a resource | <ul style="list-style-type: none"> • Select a resource issue, <i>eg food production</i>, and ask pupils, in groups, to suggest a list of enquiry questions to be investigated. Provide pupils with a limited number of simple world maps showing distributions relating to this issue or access to a mapping package with similar data, <i>eg agriculture, nutrition, population distribution</i>. Ask them to create overlay maps at the same scale and describe and compare in writing the distributions to identify relationships. • Ask pupils to decide what other questions need asking and where the answers might be found. | <ul style="list-style-type: none"> • describe and explain a world distribution pattern relating to one resource issue • describe and explain relationships between global distributions, comparing them in writing | <ul style="list-style-type: none"> • Language for learning: this activity provides pupils with an opportunity to link ideas and paragraphs into continuous text which is organised and coherent, structuring their comparison using appropriate connections, <i>eg on the one hand, on the other, in this case, whereas, in comparison with, in contrast to</i>. |
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Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note**What are the effects on the environment of this resource issue?**

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| <ul style="list-style-type: none"> • to suggest appropriate sequences of investigation • to collect, record and present evidence • to use secondary sources of evidence • to locate places on a world map • to consider the effects on the environment of the use of a resource | <ul style="list-style-type: none"> • Choose a case study about a topical resource issue which links with the global distributions already investigated, <i>eg genetically modified (GM) crops/foods</i>. Provide pupils with a range of text-based resources, <i>eg newspaper articles, internet information</i>, expressing an opinion about the issue, <i>eg some in favour of and some against GM foods</i>. Ask pupils to use highlighter pens (two colours) to identify the 'fact' and the 'opinion' statements within the texts relating to impact on the environment and planning/management. Ask pupils to identify the various interested groups referred to in the text or those who have generated the text, <i>eg scientists, politicians, environmentalists, etc</i>. Fill in a matrix recording the fact and opinion statements (vertical columns) against the relevant groups or individuals (horizontal rows). • Ask pupils to plot all the 'resource issue' locations in the text extract on their world map. • Conduct a class debriefing activity to consider the results of the above activities, <i>eg prevalence of fact or opinion, half-truths, nimbyism, etc</i>. Ask pupils to evaluate the approaches to and outcomes of their work. | <ul style="list-style-type: none"> • accurately distinguish between fact and opinion • accurately attribute views to specific groups and explain how and why they hold these views • identify correctly on a world map locations around the world where a resource issue occurs | <ul style="list-style-type: none"> • Language for learning: this activity provides pupils with the opportunity to distinguish fact from opinion. |
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How can a resource be planned and managed?

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| <ul style="list-style-type: none"> • to carry out a geographical enquiry into resource planning and management of a suitable issue using a completed teacher-modelled activity as a guide | <ul style="list-style-type: none"> • Ask pupils to carry out their own resource enquiry using the teacher model provided. Provide pupils with suitable issues, <i>eg soil erosion, waste recycling and landfill, wind energy, water supply, pollution of seas/lakes</i>. Present the outcome of the research as a series of questions and answers as in a <i>Question time</i> programme involving four representatives from different 'interest' groups, about how to plan and manage a resource. Inform pupils that the dialogue should include fact and opinion and ask them to draw an appropriate map showing the locations investigated. Less able pupils may require more structured help, <i>eg resource pack</i>. | <ul style="list-style-type: none"> • demonstrate understanding of the views of different groups through the question and answer tasks • explain how and why people attempt to manage environments | <ul style="list-style-type: none"> • The outcome might be written/audio or videotaped/performed. |
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Why should we study resource issues?

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| <ul style="list-style-type: none"> • to analyse and evaluate evidence about resource issues and draw and justify conclusions • to appreciate how people's values and attitudes, including their own, affect contemporary issues such as sustainable development | <ul style="list-style-type: none"> • Provide a large outline map of the world and ask pupils to locate all the resource issue studies carried out by the class. Discuss which issues have already had an impact on their lives and which might affect them/their children in the future. How will it affect their lives, the lives of others, their world? • Provide pupils with a cartoon which depicts a negative global future. Discuss this under the question <i>Probable futures?</i> with reference to the range of resource issues investigated. Then ask pupils to discuss the question <i>Preferable futures?</i> and ask them to design a cartoon to illustrate their own preferred future. Ask them to compare the 'two futures' cartoons in writing and then, after discussion, to write their own definition of sustainable development. | <ul style="list-style-type: none"> • explain how human actions, values and attitudes can cause change • identify and explain links and relationships that make places dependent on each other • give an acceptable definition of the concept of sustainable development | <ul style="list-style-type: none"> • Citizenship: this activity provides pupils with an opportunity to think about topical political, spiritual, moral, social and cultural issues, problems and events by analysing information and its sources, including ICT-based resources such as news and pressure group websites; to justify orally and in writing a personal opinion about such issues, problems or events. |
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