

# Introduction for teachers

Guide to resource



## About these **FREE** downloadable resources from BDS

*A town announces ambitious plans for expansion and development, but a new dam will be required to ensure a safe, secure water supply. Where should the new dam go? How can the water company balance the needs of different interest groups and the environment?*

This suite of five, free downloadable geography lessons for 11–14 and 14–16 year-olds explores the planning and construction of a new dam in a fictitious location:

1. A new dam	Students must decide on the location for the new dam.
2. A public consultation	Students identify possible issues and impacts that will need to be addressed.
3. Impacts and opportunities	Students devise ways to monitor these impacts and make the most of new opportunities.
4. Constructing the dam	Students select a dam design and manage the effects of construction.
5. Did you succeed?	Finally, students interpret data to compare 'real' impacts and outcomes against predictions.

Detailed lesson plans, student materials and presentation slides allow you to use the lessons 'off the shelf' with minimal preparation.

As they consider each step, students explore important geographical themes of growth, development, sustainability and the interactions between people and their environment.

**Students have the opportunity to:**

- imagine a place geographically and interpret space and place
- identify and understand interactions, networks and flows
- appreciate scales and links and the significance of interdependence
- create and understand sequences of events and their impacts
- use critical and creative thinking and skills of enquiry
- analyse evidence, including mapping, data and written statements
- solve problems and communicate their ideas.

**Alternatively, you can use some or all activities to:**

- lead a collapsed timetable event
- deliver a decision-making exercise
- support gifted and talented students
- prepare students for 14-16 courses
- boost specific geographical skills
- explore geographical careers.

The **British Dams Society** is an Associated Society of the Institution of Civil Engineers. BDS supports the engineering professions in all technical aspects of dams, and helps to educate the public about their uses and importance.

## Who is this resource for?

The lessons are suitable for students aged 11-14 and 14-16 and are of particular use for students aged 13-14 years, to help them consolidate their geographical skills ready for the next stage in their learning.

## What preparation is required?

**You can use each lesson 'off the shelf'. Each one includes:**

- an introduction, learning outcomes and background information
- detailed delivery plan with learning outcomes and assessment ideas
- differentiation and extension ideas
- student learning materials: maps, photos and diagrams, written information, data tables and charts
- presentation slides.

Before you teach the lessons, you may wish to have a separate lesson to identify and draw together the big issues that surround the need for water security, including development, population and economic growth, and climate change, although this is not a requirement.

If you choose to include some of the extension ideas provided in each lesson, including those that add local relevance, some research and preparation will be needed.

You may wish to prepare additional materials to help students to get 'in role' if you choose to deliver lesson 2 using role-play. Students could do this themselves, researching their assigned interest group, or you could prepare additional briefings for each group that provide appropriate detail and background for the students.

## Delivering the lessons as a sequence

Each lesson is timed to take approximately one hour. With younger or less able students, you may wish to adapt some lessons using the differentiation ideas in each one. This could also include splitting lesson 1 into two lessons (one to introduce dams, one to decide on a location), and extending lesson 2 to allow groups more time to prepare and present their ideas for issues to consider. Allow more time if including any extension tasks.

## Delivering as a collapsed timetable event

You can deliver the lessons as a single activity over a school day. This will work best if students work in teams and complete the activities in order, rather than adopting a rotating 'circus' approach. Approximate timings might be:

### *AM* (9.30 - 12.30)

#### Introduction

- A new dam (lesson 1)
- Prepare for public consultation (lesson 2)

### *Break*

- Public consultation (lesson 2)
- Mitigation (lesson 3)

### *Lunch*

#### PM (1.30 - 3.30)

- Select a design (lesson 4)
- Manage construction (lesson 4)
- Did we succeed? (lesson 5)

### *Review*

## Using elements as a Decision-Making Exercise (DME)

You can extract elements of the lessons to use as one or more Decision-Making Exercises (DMEs), for example, in preparation for an examination course.

### Students could:

- take on the role of a planning consultant or water supply engineer, read the background information and options from the lesson 1 materials, select a location for the dam and write a short report for a water company or local council, justifying their decision
- take on the role of a local planning inspector, read the group information cards for the public consultation in lesson 2 (interpreting these as brief submissions from each group), and choose whether or not to give the project the go-ahead, again justifying their decision for an important audience, such as the water company or local community
- as a water company manager, review the data in lesson 5 (students may also need the background information from lesson 1, knowing that the dam was located at site 4) and decide on whether the dam has met expectations in terms of its environmental, water management and economic performance.

You may wish to provide appropriate structure in the form of student instructions, a simple decision-making table or set of criteria, and a marking guide, as appropriate for your students, and curriculum or course specifications.

## Highlighting specific geographical skills

The lessons challenge students to put a range of geographical skills to use. Use them to help students ensure their skills are sufficient to help them bridge the gap between 11-14 learning, and learning towards exams at 16. You can place particular emphasis on skills by using the complete suite of lessons as a 'skills booster' exercise and considering them explicitly during your teaching, or extract specific activities from the main lessons, for example:

### Map skills:

Challenge students to interpret the maps used in lessons 1 and 3 and explain geographically what the maps might tell them about terrain, water catchment and flow etc. Augment this with local mapping and discuss what mapping at different scales can help students learn about your local and regional hydrological cycle.

### Fieldwork skills:

Lesson 3 challenges students to consider the fieldwork skills that will help them to monitor the changes caused by the development of the dam and reservoir. Extend this by identifying suitable local opportunities for students to use these skills for real. For example, measuring or estimating river flow and rainfall, tourism numbers or other visitors to a town, monitoring wildlife populations at a convenient spot (which could include your school grounds), or flows of traffic. Students gather data to present and interpret.

### Data interpretation:

Lesson 5 explores how a range of data can help to answer the complex question of how the dam has succeeded against multiple criteria. It includes many charts that show predicted changes and 'real' measurements. Use this lesson to build or boost students' data skills, enhancing your teaching with real fieldwork data (gathered as suggested above, that adds local realism).

## Highlighting geographical careers

The lessons provide opportunities to discuss the many careers that a geography qualification can lead to. These are not highlighted in the student materials, to ensure that these remain clear and focused, but when delivering each lesson you could discuss relevant roles that might include:

<b>Lesson 1</b>	Hydrologist; planning officer; mapping specialist/cartographer; regeneration officer; town planner; water supply consultant; local government officer; civil engineer; economic adviser; flood protection manager; surveyor; sustainability consultant.
<b>Lesson 2</b>	Planning officer; local government officer; environmental consultant; outdoor leisure manager; wildlife warden; Environment Agency scientist; water supply consultant; rural regeneration consultant; environmental officer; heritage officer; tourist information officer.
<b>Lesson 3</b>	Geographical researcher; civil engineer; hydrologist; heritage officer; outdoor leisure/tourism manager; ecologist; flood protection manager; infrastructure consultant.
<b>Lesson 4</b>	Engineering site planner/manager; sustainability officer; civil engineer; geologist.
<b>Lesson 5</b>	Geographical researcher; civil engineer; hydrologist; heritage officer; outdoor leisure/tourism manager; ecologist; flood protection manager; infrastructure consultant.

**You could:**

- get students to identify roles and think 'in role' as they complete each activity
- challenge students to find out more about specific roles and the range of geographical qualifications that can support this wide range of careers.

## Including GIS in your teaching

Geographic Information Systems (GIS) can enhance your delivery in many ways, particularly to help students envision the environments in which dams and reservoirs may be constructed. Depending on your access to IT and GIS in your lessons, you could:

- locate some famous dams in the UK and abroad (see the British Dams Society and Wikipedia as starting points) and explore their locations in 3D
- explore some real river systems and valleys in the UK and consider their suitability, thinking about simple hydrological principles, such as watersheds, slope, aspect and runoff and how these contribute to the streams, rivers and lakes that students can identify locally and further away
- using information from your local water company, identify the reservoirs that serve your community and where these are found in relation to urban developments.

## Curriculum links

### 11-14

#### England: KS3 Geography

Key concepts: 1.1a, b; 1.2a, b; 1.3a, b; 1.4b; 1.5a; 1.6a; 1.7b

Key processes: 2.1a, d, e, f, g; 2.2a (extension activity); 2.3 a; 2.4a

Range and content: 3a, c, d, f, g, h

#### Wales: KS3 Geography

##### **Skills:**

Locating places, environments and patterns: 2

Understanding places, environments and processes: 1, 2, 3

Investigating: 1, 2, 3

Communicating: 1, 2, 3

##### **Range:**

Variations and changes in quality of life; processes and landforms of rivers; population patterns and change; impacts of economic activity; threatened environments; living sustainably; investigating a topical issue; asking and answering questions to understand a place and why it is changing, its interactions with people and interdependence with other places, sustainable changes and local views on geographical issues.

#### Northern Ireland: KS3 Environment and Society: Geography

Knowledge, understanding and skills: interpret spatial patterns; develop enquiry and fieldwork skills of questioning, planning, analysing and interpreting; use critical and creative thinking skills to solve geographical problems and make informed decisions; develop an understanding of physical processes, interrelations between physical and human environments, their dynamic nature and interdependence, and the need for change to be sustainable.

**Objective 1:** demonstrate an awareness of relationships to other places

**Objective 2:** demonstrate an understanding of how people interact with their environment

**Objective 3:** investigate geographical careers (optional); investigate the impact of conflict between social, economic and environmental needs; explore environmental stewardship.

#### Scotland Curriculum for Excellence: Social Studies

People, place and environment: SOC 3-07a, 3-08a, 3-13a, 3-14a, 4-07a, 4-08a, 4-09b, 4-10a, 4-10b, 4-14a

### 14-16

These lessons will be useful during or in preparation for most GCSE, Standard Grade, National Courses and equivalent qualifications.

#### The main themes covered include:

- River landscapes
- Population and settlement
- Development and industry
- Tourism and leisure
- Sustainability and climate change
- Geographical skills

As described above, the lessons are particularly useful for students who must complete a Decision-Making Exercise (DME) as part of their course, and to review, build and practise important geographical skills in a realistic context.

## About the British Dam Society

The British Dam Society is an Associated Society of the Institution of Civil Engineers. It consists of individual and corporate members. It is open to anyone wanting to share experience or knowledge of all aspects of dams and reservoirs. BDS exists to advance the education of the public and the profession in technical subjects relating to planning, design, construction, maintenance, operation, safety, environmental and social issues.

Find out more about BDS at [www.britishdams.org](http://www.britishdams.org)