Living with a Changing Coast: Secondary learning & teaching programme

Exe Estuary & Poole Harbour

By David Weatherly
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About this resource

Background

The development and delivery of this education programme has been funded by the Living with a Changing Coast (LiCCo) project. This cross-channel project is part-financed by the Interreg IVA France (Channel) – England programme and is led by the Environment Agency (South West Region). The project started in April 2011 and will end in September 2014. It focuses on the Exe Estuary and Poole Harbour in the South West of England and a further five coastal sites in Normandy, France.

The mission of LiCCo is to help coastal communities to adapt to coastal change and climate change impacts, such as sea level rise and erosion, through: -

- Engaging with target audiences in the coastal study sites and supporting their involvement in decision making processes on coastal management;
- Raising awareness of the environmental, social and economic impacts of climate change on coastal communities;
- Considering the challenges and opportunities of climate change in coastal areas and understanding what can be done to prepare and adapt to these.

The UK partners in the project are:-

- Environment Agency (lead partner)
- National Trust
- Exe Estuary Management Partnership (hosted by Devon County Council)
- Dorset Coast Forum (hosted by Dorset County Council)

Additional information is available on the project website: www.licco.eu
Aims of the LiCCo education programme

The purpose of the education dimension of the LiCCo project has been to:

- Provide site based educational activities at the Exe Estuary in Devon and Poole Harbour sites in Dorset to teach local children and young people about the ecology, use, management and natural processes affecting their local coast;
- Develop web based information which is specific to the local coastline and freely available;
- Develop an educational package for schools and other audiences with an interest in coastline management, enabling them to explore and better understand coastal ecology; climate change, coastal management issues; the associated conflicts, risks and costs and the options to adapt to future coastal change.

The educational resources presented here have been written particularly to help children and young people aged between 12 and 14 years investigate key questions such as:

- How and why has the coast changed here in the past, how is it changing today and how might it continue to change in the future, as a result of both natural processes and human impacts?
- How is the coast managed to maintain and improve its special character and diverse ecosystem for future generations and to protect coastal communities, properties and infrastructure?
- How can people adapt their lifestyles and livelihoods to respond to a changing coast and climate?
Design of the secondary Key Stage 3 education programme

The *Exe Estuary and Poole Harbour Secondary Learning and Teaching Programme* has been written and resourced with a strong cross-curricular dimension which links subject disciplines in a purposeful and appropriately challenging way to add insight and intellectual value to the key question led enquiries investigated by the children. A primary programme for Key Stage 2 has been written as a foundation for this resource and the learning enquiries here have been designed to ensure continuity with, and progression from, the primary investigations. The programme enables progression in key subject concepts; knowledge and understanding; skills and attitudes and values whilst being both motivational and relevant to the world of the 21st century. Enquiry based learning is central to the programme. Each of the investigations is key question led and is accompanied by detailed planning documentation and a wide variety of learning and teaching resources which are clearly signposted in the schemes of work. Background information on each topic is provided for teachers so that they can be fully confident in managing learning both in and outside of the classroom.

Each of the key question led enquiries has specific **aims and objectives** relating to that particular investigation. This is followed by detailed **learning and teaching activities** that are designed to interest and motivate pupils and stretch them to achieve the following **outcomes** progressively through the learning and teaching programme:

- Identify
- Recognise
- Respond to and ask simple relevant questions
- Contribute views and opinions
- Use basic vocabulary
- Describe
- Observe
- Reason
- Select
- Classify
- Categorise
- Sequence
- Order
- Use appropriate vocabulary
- Compare and contrast
- Use secondary evidence
- Communicate informed views and opinions
- Use specialist vocabulary
- Apply
- Prioritise
- Analyse
- Demonstrate understanding through basic explanations of cause and effect
- Suggest enquiry questions and routes to investigate them
- Use primary evidence
- Synthesise
• Identify, describe and explain patterns, processes, links and relationships
• Reach substantiated conclusions and make informed judgements
• Demonstrate the development and application of informed attitudes and values
• Reflect
• Evaluate
• Critique
• Predict
• Hypothesise

Listed below are the areas of the statutory programmes of study from subjects at Key Stage 3 which can be delivered through the use of the Exe Estuary and Poole Harbour enquiries. Some of these e.g. in Science and Geography are very precise as they deliver specific areas of knowledge and understanding whilst others, particularly in English e.g. the application of writing conventions, are more generic in the sense that they can be exemplified through any relevant and engaging study in other subjects. From a planning perspective the cross referencing below will assist with ensuring coverage of the National Curriculum programmes of study. It will also enable teachers to approach the Exe Estuary and Poole Harbour enquiries with confidence that statutory requirements are being fulfilled within a creative approach to delivering a highly relevant, engaging and challenging programme.

## English

### Reading

Pupils should be taught to:

• develop an appreciation and love of reading, and read increasingly challenging material independently through:
  • reading a wide range of fiction and non-fiction, including in particular whole books, short stories, poems and plays with a wide coverage of genres, historical periods, forms and authors
• understand increasingly challenging texts through:
  • learning new vocabulary, relating it explicitly to known vocabulary and understanding it with the help of context and dictionaries
  • making inferences and referring to evidence in the text
  • knowing the purpose, audience for and context of the writing and drawing on this knowledge to support comprehension
  • checking their understanding to make sure that what they have read makes sense.
• read critically through:
  • knowing how language, including figurative language, vocabulary choice, grammar, text structure and organisational features, presents meaning
  • making critical comparisons across texts
Writing

Pupils should be taught to:

• write accurately, fluently, effectively and at length for pleasure and information through:
  • writing for a wide range of purposes and audiences, including:
    • well-structured formal expository and narrative essays
    • notes and polished scripts for talks and presentations
    • a range of other narrative and non-narrative texts, including arguments, and personal and formal letters
  • summarising and organising material, and supporting ideas and arguments with any necessary factual detail
  • applying their growing knowledge of vocabulary, grammar and text structure to their writing and selecting the appropriate form
  • drawing on knowledge of literary and rhetorical devices from their reading and listening to enhance the impact of their writing
  • plan, draft, edit and proof-read through:
    • considering how their writing reflects the audiences and purposes for which it was intended
    • amending the vocabulary, grammar and structure of their writing to improve its coherence and overall effectiveness
    • paying attention to accurate grammar, punctuation and spelling

Grammar and vocabulary

Pupils should be taught to:

• consolidate and build on their knowledge of grammar and vocabulary through:
  • extending and applying the grammatical knowledge
  • studying the effectiveness and impact of the grammatical features of the texts they read
  • drawing on new vocabulary and grammatical constructions from their reading and listening, and using these consciously in their writing and speech to achieve particular effects
  • knowing and understanding the differences between spoken and written language, including differences associated with formal and informal registers, and between Standard English and other varieties of English
  • using Standard English confidently in their own writing and speech
  • discussing reading, writing and spoken language with precise and confident use of linguistic and literary terminology.
Spoken English

Pupils should be taught to:

• speak confidently and effectively, including through:
  • using Standard English confidently in a range of formal and informal contexts, including classroom discussion
  • giving short speeches and presentations, expressing their own ideas and keeping to the point
  • participating in formal debates and structured discussions, summarising and/or building on what has been said

Mathematics

Working mathematically

Through the mathematics content, pupils should be taught to:

Develop fluency

• consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots
• select and use appropriate calculation strategies to solve increasingly complex problems

Reason mathematically

• explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.

Solve problems

• develop their mathematical knowledge, in part through solving problems and evaluating the outcomes
• develop their use of formal mathematical knowledge to interpret and solve problems

Number

• define percentage as ‘number of parts per hundred’, interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%
• use standard units of mass, length, time, money and other measures, including with decimal quantities
• round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]
• use approximation through rounding to estimate answers
• use a calculator and other technologies to calculate results accurately and then interpret them appropriately

**Ratio, proportion and rates of change**
• change freely between related standard units [for example time, length, area, volume/capacity, mass]
• use scale factors, scale diagrams and maps
• solve problems involving percentage change, including: percentage increase, decrease

**Statistics**

Pupils should be taught to:
• describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers)
• construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.
Science

Biology

Pupils should be taught about:

**Interactions and interdependencies**

**Relationships in an ecosystem**

- the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops
- how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.

**Genetics and evolution**

- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction

Citizenship

Pupils should be taught about:

- the development of the political system of democratic government in the United Kingdom, including the roles of citizens, Parliament and the monarch
- the roles played by public institutions and voluntary groups in society, and the ways in which citizens work together to improve their communities, including opportunities to participate in school-based activities

Computing

Pupils should be taught to:

- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
**Design and Technology**

Pupils should be taught about:

**Design**
- use research and exploration, such as the study of different cultures, to identify and understand user needs

**Evaluate**
- analyse the work of past and present professionals and others to develop and broaden their understanding
- understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

**Technical knowledge**
- understand and use the properties of materials and the performance of structural elements to achieve functioning solutions

**Geography**

Pupils should be taught about:

**Locational knowledge**
- extend their locational knowledge and deepen their spatial awareness of the world’s countries

**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: geological timescales and plate tectonics; rocks, weathering and soils; weather and climate, including the change in climate from the Ice Age to the present; and hydrology and coasts
  - human geography relating to 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 Ordnance Survey maps in the classroom and the field, including using grid references and scale, topographical and other thematic mapping, and aerial and satellite photographs
- use Geographical Information Systems (GIS) to view, analyse and interpret places and data
- use fieldwork in contrasting locations to collect, analyse and draw conclusions from geographical data, using multiple sources of increasingly complex information.

**David Weatherly**

June 2014