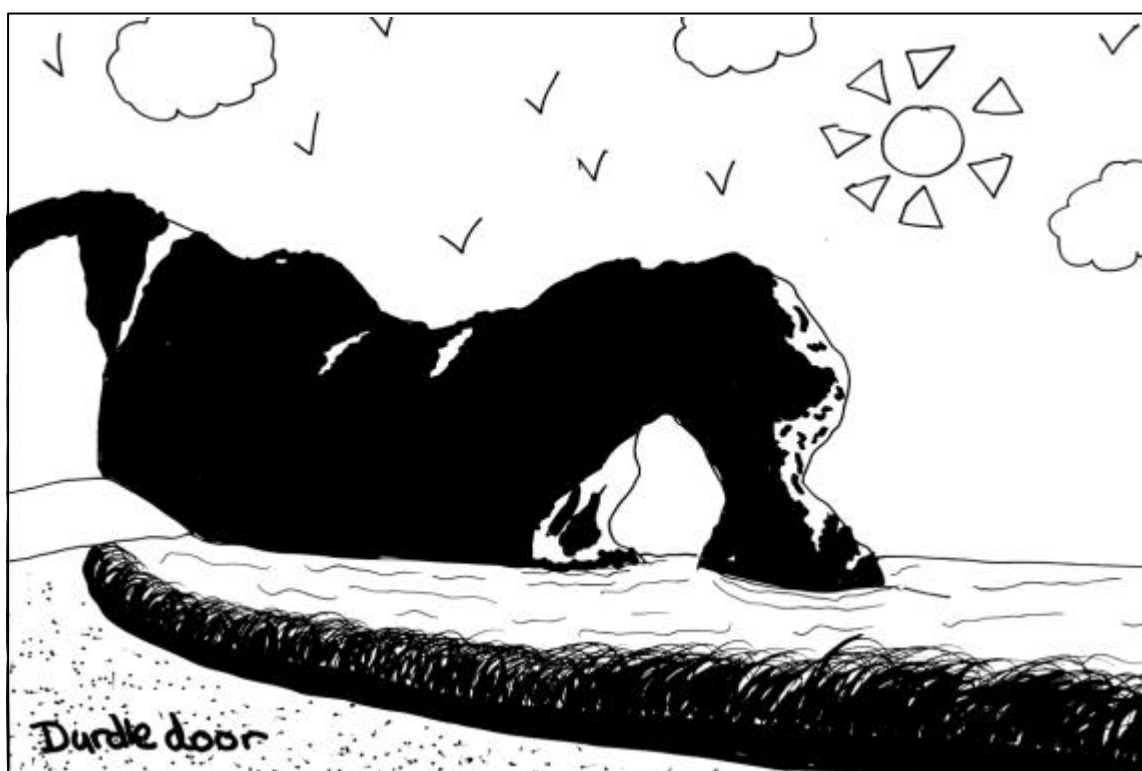


## Unit 23 Investigating Coasts

### Investigating the Jurassic Coast - Lulworth, Isle of Purbeck, Dorset



Emily, Year 5

Compiled by Sarah Welton & Associates

## The Jurassic Coast World Heritage Site

**Teachers' Notes:** Background information on the Jurassic Coast World Heritage Site.

What is the Jurassic Coast like and why?

What are the main features of the Jurassic Coast?  
What processes are affecting it?

Beaches

**Useful links:** Websites, tourist information, educational facilities.

**Erosion in your Classroom:** A classroom activity to demonstrate the processes of erosion.

**Jurassic Picture Gallery:** The stages of erosion

**Speaking the right language:** An activity to practise the use of geographical terms and to stimulate discussion about the causes of coastal change.

**Why do we need to manage the Jurassic Coast?** Jurassic Coast 2050

## Teachers' Notes

### A WORLD CLASS COAST!

The Jurassic Coast World Heritage Site is a world-class educational resource. The coastline at Lulworth forms part of a 95-mile stretch of the East Devon and Dorset coastline, which was designated as England's only natural World Heritage Site in December 2001. World Heritage Status was awarded to this narrow strip of coast, lying between the top of the cliffs and the low water mark by UNESCO (United Nations Educational, Scientific and Cultural Organisation). A stone marker was unveiled at Lulworth Cove by His Royal Highness, The Prince of Wales, on 2<sup>nd</sup> October 2002.

World Heritage Status is **very** important – it means that our coastline is considered as important as such famous sites in the World as The Grand Canyon and the Great Barrier Reef – it is ranked alongside these sites as one of the natural wonders of the World. It means that the site must be protected, conserved, presented and passed intact to future generations. This is a huge responsibility for those involved in managing the coast.

### Why is the Jurassic Coast so special?

The Jurassic Coast is one of the most significant earth science sites in the world. In just 95 miles of coastline are exposed in the cliffs, for all to see, are a near-continuous sequence of rocks, telling the story of almost 185 million years of the history of the Earth from the Triassic rocks of East Devon (250 million years old), through the Jurassic time period (200 – 140 million years old) to the Cretaceous rocks in the east (65 million years old), when the last of the dinosaurs died out. The coast also boasts many classical coastal features such as the Lulworth Crumple and Durdle Door and yields superbly preserved fossil remains. Many major contributions to science have been made along this coast for hundreds of years. Now it provides a famous resource for teaching earth sciences – at all levels.

The Jurassic Coast exhibits an unparalleled range of natural features. The variety of landslips, beaches, bays and cliffs results in a constantly changing landscape. The natural processes of erosion and human impacts on this recently designated World Heritage Site make this an excellent section of coast to investigate.

## **What is a Coast?**

The zone where the land and the sea meet.

## **What is the Jurassic Coast like and why?**

Because the underlying rocks are so different – that is the main reason why the Jurassic Coast is a World Heritage Site – the shape of the coast and the wildlife that can be found there are extremely varied. From the oldest 'Triassic' sandstones in East Devon, eroded into spectacular red stacks, to pebble beaches, landslips, where the rocks are soft and unstable, sandy bays and rugged limestone and chalk cliffs. They all have a story to tell.

Don't forget the rocks and features also occur under the sea – a seascape rather than a landscape! They also occur inland – under the Dorset Countryside.

## **What are the main features of the Jurassic Coast? What processes are affecting it?**

The most important event in shaping the Dorset coast took place about 25 million years ago. It was then that the movement of the earth's landmasses caused Africa to collide with Europe, creating immense pressures, which thrust up the major European mountains. Here, on the south coast of England our horizontally lying beds of rock were pushed – as slowly as our finger nails growing – and lifted up and turned on their sides. In some places the pressure was sufficient to turn the rocks almost entirely upside down.

Now the Jurassic Coast is being eroded, mainly by the action of the sea. Waves pound the cliffs, forcing air, water, bits of rock, grit and sand into cracks and holes, gradually making them bigger. Sand and shingle, ground down by the sea, is deposited on beaches. It rarely stays still, however, but is constantly moving along the coast.

Rain, acid in the rain, wind and people also cause erosion.

## Beaches

At Lulworth and Durdle Door, the beaches are made of pebbles.



Photo: Lulworth Estate

Further west, the pebbles of **Chesil Beach** are regularly shifted and graded with the largest deposited at the Portland end (east) and the smallest at West Bay. A local smuggler would know exactly where he was, if he went ashore in a fog, by the pebble size!

**Sandy beaches** are formed in bays where there is less energy in the sea. Sometimes the sand has to be replenished, when the beach is crucial to a resort's tourism. Sandy beaches in the area are at Weymouth to the west and Swanage and Studland to the east.

## Useful Links

The Lulworth Education Programme, taught by experienced field staff, offers study topics that are curriculum led and tailored for all ages. Field staff time, use of the classroom, toilets and free coach parking are available to groups booking in advance. Sessions are charged on a 'per student' basis. Supervising adults are welcomed free of charge.

For further information check out the website: [www.Lulworth.com](http://www.Lulworth.com)

Group accommodation and classroom/facility providers in the area:

3-D Education and Adventure, Osmington, provides accommodation and courses. [www.3d.co.uk/education](http://www.3d.co.uk/education)

Lulworth Youth Hostel. E-mail: [Lulworth@yha.org.uk](mailto:Lulworth@yha.org.uk)

## Erosion in your Classroom

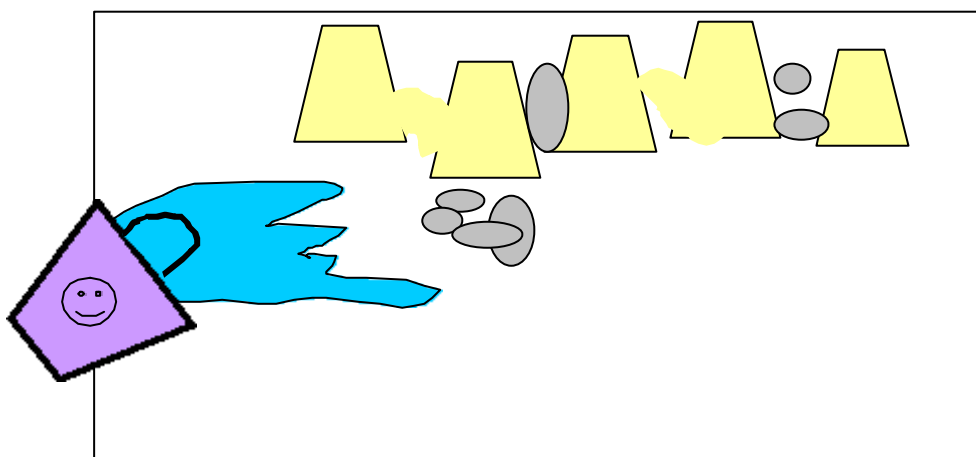
You can demonstrate what happens when the sea erodes the coast, in your classroom.

You will need:

- A large plastic box/tray at least 30 cm deep. A small paddling pool would do.
- Sand
- Pebbles
- Water
- A small bucket or plastic container

What to do:

- Build a coastline with the sand. The easiest (and the most fun!) way is to make a row of sand castles with the bucket and then fill in the gaps. Remember a coastline is not straight – there are headlands, coves and bays.
- Place pebbles at intervals along the coast.
- Once you have made your coastline, splash buckets of water against it, like waves, and see what happens.



Where does the sand go?

Is rock eroded as easily as sand?

What happens when houses are built on the coast?

What happens when you reinforce parts of your coast with pebbles? People build sea defences out of rock.

## Jurassic Picture Gallery

Use the images from the Jurassic Picture Gallery to demonstrate the processes affecting a coast.

The cliffs are eroded mainly by the action of the waves

**The stages of erosion are:**

- The waves hollow out a crack or hole to form **a cave**.
- The back of the cave is eroded away to form **an arch**.
- The top of the arch collapses leaving **a gap** and **stacks**.
- The stacks are eroded to form **stumps**.

## The Jurassic Coast World Heritage Site

Stair Hole immediately west of Lulworth Cove and a five-minute walk from the car park shows all the stages of erosion in one place. Once children have seen stair hole they never forget the stages of erosion. If the sea is rough they can actually see erosion happening.



Photo: Lulworth Estate

## The Jurassic Coast World Heritage Site

Durdle Door is probably the most famous natural rock arch. The rock is Portland limestone, which has been slowly eroded. A cave would have been formed first, followed by the archway we see today.



Photo: Lulworth Estate

Eventually the arch will collapse – no-one knows when. Your guess is as good as anyone's. We think it will eventually crack along the diagonal fault line above the arch, leaving a stack. Can you spot the fault line?

## The Jurassic Coast World Heritage Site

Old Harry Rocks, near Swanage, at the eastern end of the Jurassic Coast are Dorset's most famous stacks. On a clear day, you can see The Needles, Isle of Wight across the water. The Needles are also chalk stacks, which were formed in just the same way. The Isle of Wight and Purbeck were once joined.

### Old Harry Rocks



**Photo: M. Simons, Dorset County Council**

## The Jurassic Coast World Heritage Site

**Coves** are formed when the sea erodes a gap through the hard rock and hollows out the softer rocks behind. Here at Stair Hole we can see embryonic coves.



Photo: Lulworth Estate

## The Jurassic Coast World Heritage Site

**Bays** are formed when coves join up. There were once 3 coves here at Durdle Door.



Photo: Lulworth Estate

### Speaking the right Language!

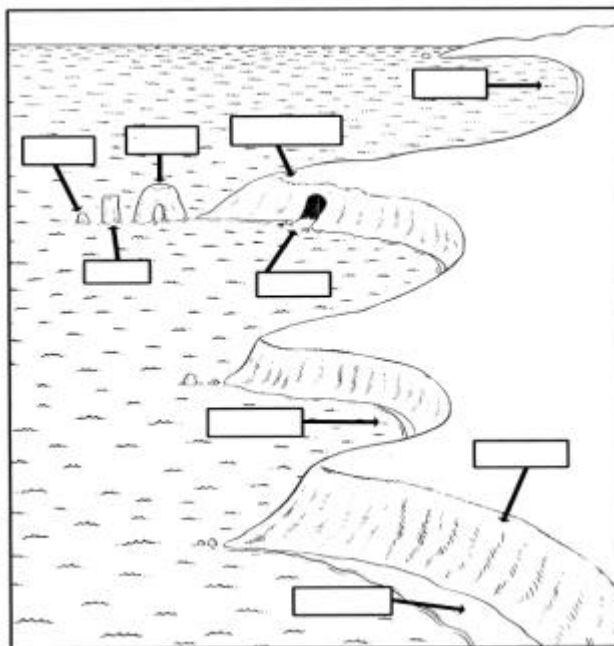
Using this pictorial map of a section of the Jurassic Coast, encourage the children to fill in the correct terms (in the boxes provided). Use this activity to stimulate discussion about the causes of coastal change.

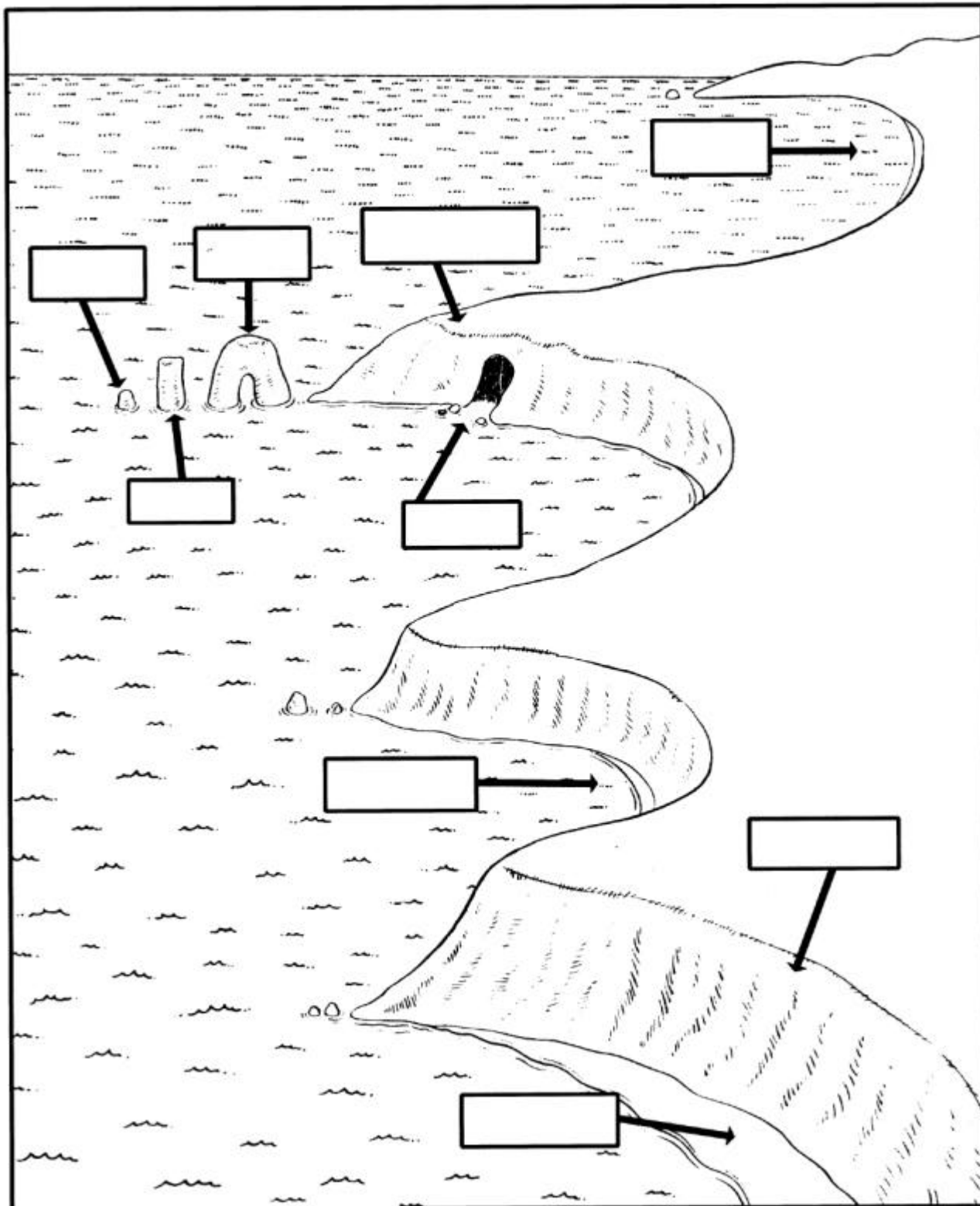
Terms:

- Coast
- Cliff
- Headland
- Bay
- Cove
- Beach
- Cave
- Arch
- Stack
- Stump
- Gap

Vocabulary to be used in discussion:

- Erosion
- Transportation
- Deposition
- Rock
- Sand
- Shingle
- Waves





## People and the Jurassic Coast

Human activity can affect the coast in lots of ways.

### **Why do we need to manage the Jurassic Coast?**

Because there is potentially so much pressure on the coast – for traditional use e.g. farming and fishing; access; tourism and recreation; development; transport – it is ever more important to plan for the future and manage the coast.

### **Who decides what happens to the Jurassic Coast?**

Because the Jurassic Coast is a World Heritage Site, there is an obligation to manage it properly. Locally, the coast is managed by:

- County, District and Parish Councils
- English Nature and other conservation organisations – sites which are of importance for nature conservation and geology
- Land-owners, including the National Trust and the Ministry of Defence
- Port Authorities
- Crown Estates (below low water mark)

### **How will the World Heritage Site affect the environment and the people who live there?**

Encourage the children to discuss whether they think World Heritage status is a good thing for the Jurassic Coast and the people who live there. Points to consider might be

- Increased pressure for tourism (including school visits!) and its impact on the coast
- An obligation to look after the coast
- International links
- Financial benefits

## The Jurassic Coast in 2050



Photo: Tony Bates, Dorset Wildlife Trust

To facilitate class discussion on the importance of planning and managing a coastline, use this photograph of an undeveloped section of the Jurassic Coast. Encourage the children to imagine what this coast might look like in 2050. They could draw their futuristic developments and activities onto the photograph.

Remember...to encourage them to think about where activities and developments might take place e.g. a tourist resort might need a beach.

Discuss their coasts of the future. Is this what they want to happen?

The Jurassic Coast World Heritage Site



Sarah Welton 2004