

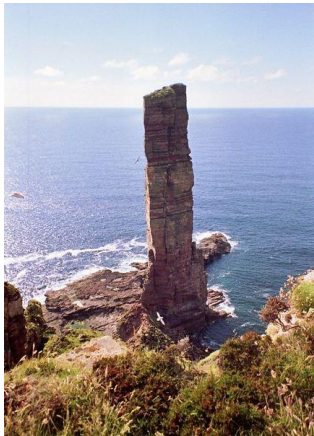
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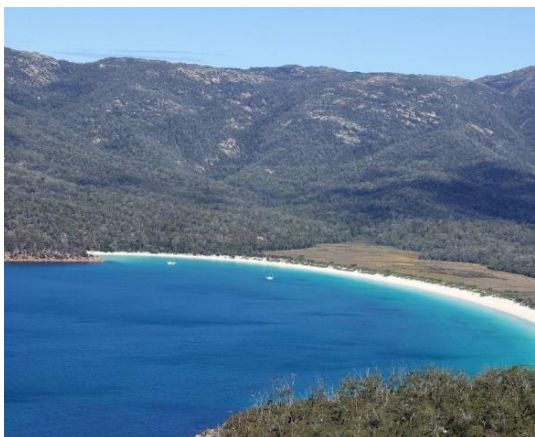
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A case study of a UK coastal landscape

Objective:

To complete a case study of a UK coastal landscape including:

- The geomorphic processes occurring along the coastline
- The main landforms of erosion and deposition found along the coastline

Student activity 1 - Where is the Dorset coastline? What landforms can be found along the Dorset coastline?

Where is the Dorset Coastline?

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© Ordnance Survey, 2010, commons.wikimedia.org/wiki/File:Dorset_UK_locator_map_2010.svg

Key Word Box

South	Somerset	Poole	English Channel
Coast	Wiltshire	Heritage	Lyme Regis
County	Hampshire	Christchurch	Highcliffe
Bordered	Town	Weymouth	Devon
Bournemouth	142km		

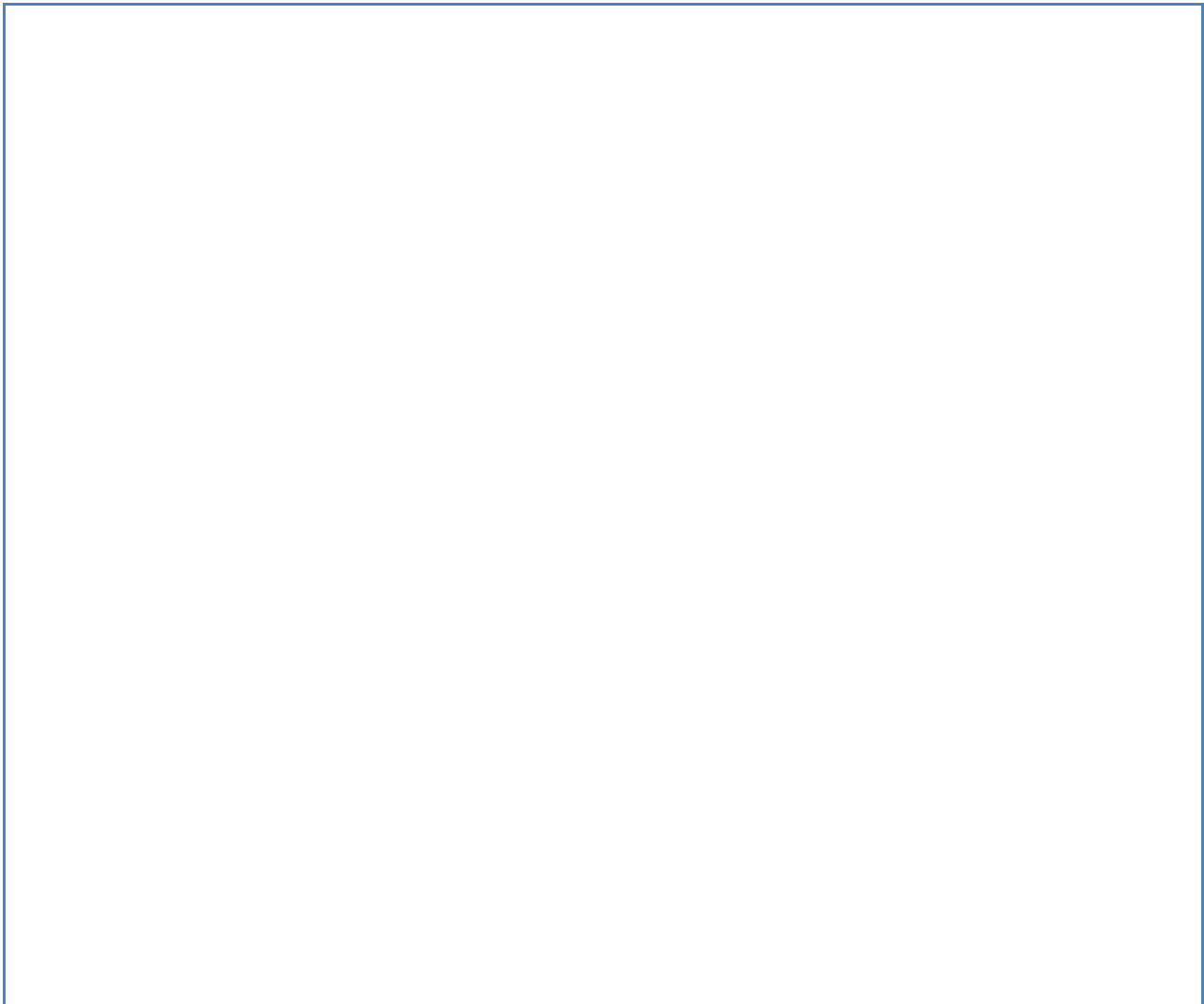
Then:

1. Access Google Maps (satellite image) and/or Bing Maps (OS Map)

www.google.co.uk/maps

www.bing.com/maps

2. In the search box type “Dorset or Purbeck coast” and zoom in/out until an appropriate scale of satellite image or map has been located.
3. Insert the satellite image **OR** OS map into the box provided to identify and annotate the following features:
 - Headlands
 - Bays
 - Coves
 - Arches, stacks and stumps (OS Map only)
 - Beaches
 - Tombolos



Geomorphic processes are those which:

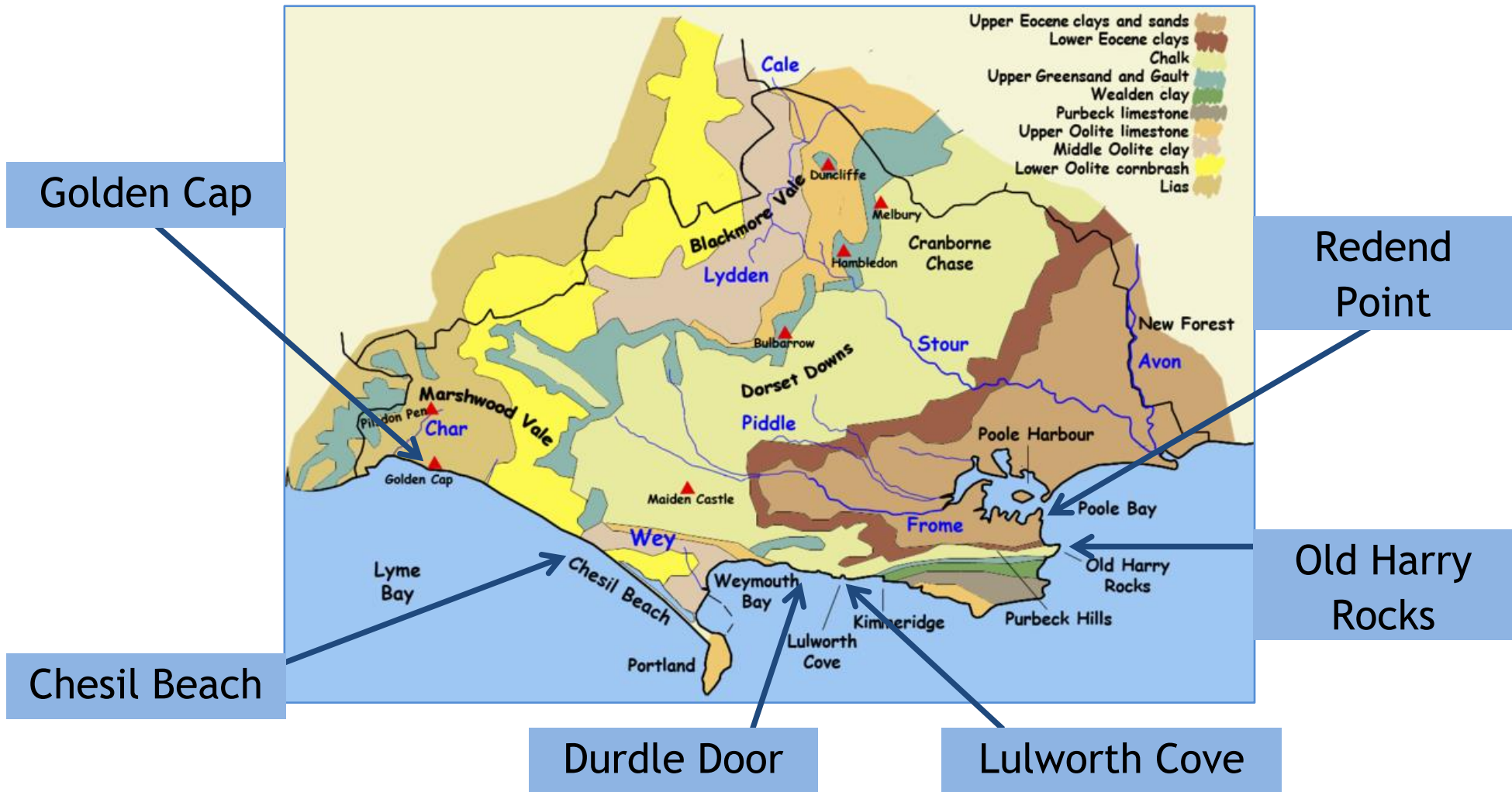
- continually act upon the coastline
- slowly change the shape and appearance of the coastline
- include weathering, erosion and mass movement.

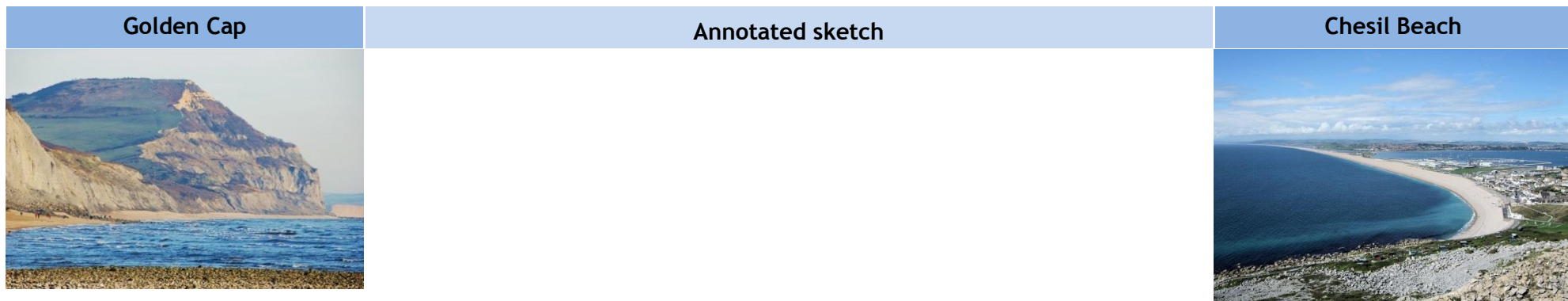
Match each geomorphic process to its correct definition by writing the number of the key word next to its definition, or cutting them out and matching them up:

1. Erosion		A collapse of a mass of sediment from the cliff surface.
2. Weathering		A mass of loose rocks falling down the cliff surface.
3. Mass movement		A rapid movement of mud/soil across steep surfaces often after heavy rainfall.
4. Transportation		The breakdown of the rock surface in its original place by different weather elements that are later removed, often by mass movement.
5. Abrasion		The chemical alteration of the rocks through carbonation, where acids attack the rocks and hydration, where water swells the rocks.
6. Attrition		The movement of sediment along the coastline, often through the process of longshore drift.
7. Hydraulic action		The movement of sediment downhill caused by gravity.
8. Solution		The physical breakdown of the rocks, usually due to freeze-thaw, where water enters cracks in the rock, freezes and expands causing the rock to weaken.
9. Physical weathering		The process in which air becomes trapped in cracks within a cliff surface. The trapped air is compressed causing cliffs to weaken and erode.
10. Chemical weathering		The process where burrowing animals and plant roots attack and weaken the structure of different rocks.
11. Biological weathering		The slow downward movement of rocks and soil across a gentle slope.
12. Rockfalls		The wearing away and breaking up of rocks along the coast.
13. Landslides		Waves smash rocks and pebbles on the shore into each other.

14. Soil creep		When bits of rock and sand in the waves rub against and grind down cliff surfaces.
15. Mudflows		When fine sediment is held in the moving sea water.
16. Traction		When large rock boulders are rolled along the sea bed.
17. Saltation		When rocks such as chalk and limestone are dissolved by the presence of acids in the sea water.
18. Suspension		When sediment is dissolved in the water due to chemicals.
19. Solution		When smaller rocks and stones are bounced along the sea in a leap-frogging motion.

Student activity 3 - What erosion and deposition landforms can be found along the Dorset coastline?





<p>Name of landform:</p> <p>.....</p> <p>Location:</p> <p>.....</p> <p>Formation:</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Name of landform:</p> <p>.....</p> <p>Location:</p> <p>.....</p> <p>.....</p> <p>Formation:</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
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Durdle Door



Annotated sketch



Lulworth Cove



Name of landform:

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Location:

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Formation:

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Name of landform:

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Location:

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Formation:

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Redend Point

Annotated sketch

Old Harry Rocks



Name of landform:

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Location:

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Formation:

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Name of landform:

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Location:

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Formation:

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Teacher notes:

Objective:

To complete a case study of a UK coastal landscape including:

- the geomorphic processes occurring along the coastline
- the main landforms of erosion and deposition found along the coastline.

Starter activity

“Guess the landform” - students should study a series of images of coastal landforms and identify the landforms from the descriptions given.

This can be completed as:

1. [A whole-class activity](#) - selected students of different abilities come up to the front of the class and are given a picture of a landform to describe to the class. Students cannot mention the name of the landform at any point in their descriptions.
2. [Paired/small group activity](#) - as above, but teachers will need a broader range of images to use. In a paired situation, students can sit back to back and take it in turns to describe different images to each other.

Differentiation

[Lower achievers](#) - may be given some key words with the images to help them with their descriptions.

[Higher achievers](#) - should be given the more difficult images to describe and may extend further to include the location of the described landform. Students can also take on the role of the teacher in guiding less able students with their descriptions.

Student activity 1 - Where is the Dorset coastline? What landforms can be found along the Dorset coastline?

Students are asked to describe the location of Dorset using the map provided. A key word box is provided to help students with their descriptions.

Model Answer

Dorset is located on the south coast of England and is bordered by the counties of Devon, Somerset, Wiltshire and Hampshire. The coastline stretches from Lyme Regis to Highcliffe, is 142km long and designated a heritage area. It faces the English Channel and the coastline incorporates the towns of Bournemouth, Poole, Christchurch and Weymouth.

Students are then asked to practice their map skills and identify the following landforms along the coastline.

- Headlands
- Bays
- Coves
- Arches, Stacks and Stumps (OS Map only)
- Beaches
- Tombolos

Differentiation

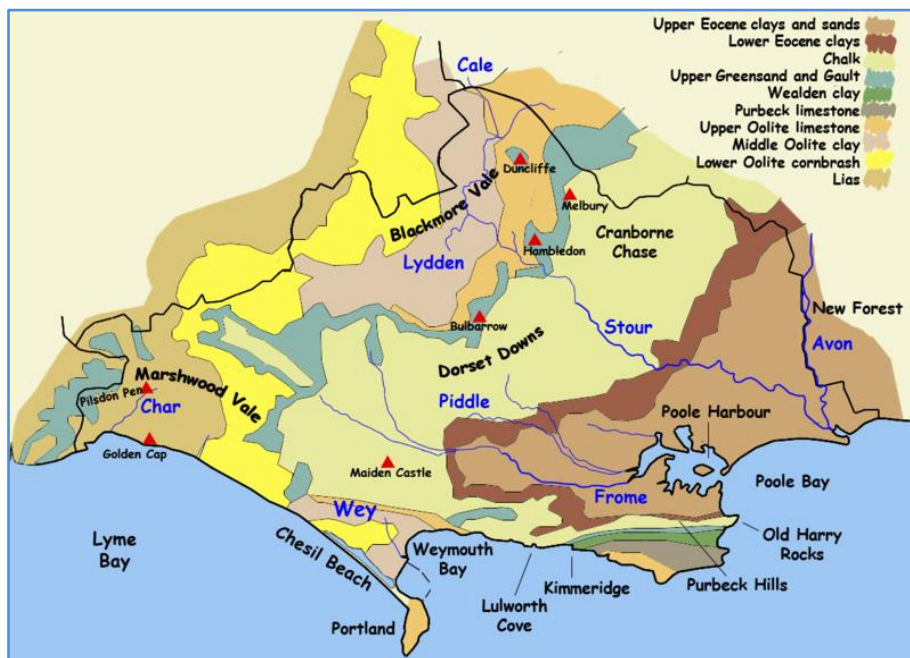
Less able students - a cloze (missing word) description would provide more structure to the initial writing task for students.

More able students - using their prior knowledge consider: how might the Dorset coastline change over time?

Student activity 2 - What is the geology of the Dorset coastline? What geomorphic processes are occurring along the coastline?

Students are asked to study the map provided which shows the geology of the Dorset coastline and consider the following questions:

- 1) What does this show you about the geology of the coastline?
- 2) What might the geology suggest about the risk of erosion along the coastline?



Students should be able to identify that:

- Significant parts of the coastline are made of chalk, clay and limestone
- Chalk, clay and limestone are sedimentary rocks
- These parts of the coastline may be more susceptible to erosion, for example, limestone dissolves in reaction to chemicals in the sea water and chalk is porous and as such is easily penetrable by water.

Differentiation

Less able students - may need reminding about the different rock types and their properties. A colour print-out of the map may help students to identify the different areas of rock.

More able students - which parts of the coastline do you think are most susceptible to erosion and why? Which parts of the coastline do you think should be protected from coastal erosion and why?

Geomorphic processes are those which:

- continually act upon the coastline
- slowly change the shape and appearance of the coastline
- include weathering, erosion and mass movement.

Students are then asked to match each geomorphic process to its correct definition:

Correct Answers

1. Erosion		The wearing away and breaking up of rocks along the coast.
2. Weathering		The breakdown of the rock surface in its original place by different weather elements that are later removed, often by mass movement.
3. Mass movement		The movement of sediment downhill caused by gravity.
4. Transportation		The movement of sediment along the coastline, often through the process of longshore drift.
5. Abrasion		When bits of rock and sand in the waves rub against and grind down cliff surfaces.
6. Attrition		Waves smash rocks and pebbles on the shore into each other.
7. Hydraulic action		The process in which air becomes trapped in cracks within a cliff surface. The trapped air is compressed causing cliffs to weaken and erode.
8. Solution		When rocks such as chalk and limestone are dissolved by the presence of acids in the sea water.
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10. Chemical weathering		The chemical alteration of the rocks through carbonation, where acids attack the rocks and hydration, where water swells the rocks.
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16. Traction		When large rock boulders are rolled along the sea bed.
17. Saltation		When smaller rocks and stones are bounced along the sea in a leap-frogging motion.
18. Suspension		When fine sediment is held in the moving sea water.
19. Solution		When sediment is dissolved in the water due to chemicals.

Student activity 3 - Erosion and Deposition Landforms along the Dorset Coastline

Students are then asked to study three different stretches of the Dorset coastline and complete the following:

- Name the landform being shown, e.g. headland, bay, cave, arch, tombolo etc.
- Describe the location of the landform.
- Explain how the landform has been created - explanations should refer to the processes of erosion involved in the formation.
- Practice sketching skills - choose one of the landforms from each stretch of coastline and produce an annotated sketch in the box provided.

Students can be provided with additional information about each of the landforms to help them complete this task. This can be teacher-led or students can be provided with an information sheet or research it for themselves using the websites below.

Useful websites

en.wikipedia.org/wiki/Golden_Cap
www.nationaltrust.org.uk/golden-cap
www.chesilbeach.org/
en.wikipedia.org/wiki/Chesil_Beach
en.wikipedia.org/wiki/Durdle_Door
www.lulworthonline.co.uk/about-lulworth/durdle-door/#.WWJHQrKt8
www.lulworthonline.co.uk/
en.wikipedia.org/wiki/Lulworth_Cove
en.wikipedia.org/wiki/Old_Harry_Rocks
www.bbc.co.uk/education/clips/zdmb4wx

Differentiation

[Less able students](#) - may benefit from a simplified information sheet with key information about all of the different landforms along the Dorset coastline.

[More able students](#) - may then consider the importance of the coastline for different groups of people, e.g. local residents, tourists, environmentalists etc

Plenary

Several copies of the plenary dice template should be printed off, on different coloured paper or card.

Students may work in pairs or small groups and take it in turns to roll the dice and answer the questions.

Differentiation

This task can be easily differentiated by changing the questions on the template. Three different versions of the dice could be created for lower, middle and higher ability students.

- Red paper/card - lower ability students
- Yellow paper/card - middle ability students
- Green paper/card - higher ability students

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© Ian Stannard, 2011, commons.wikimedia.org/wiki/File:Hurst_Castle,_near_Milford_on_Sea,_Hampshire,_England-20Oct2010.jpg

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© ThoWi, 2006, commons.wikimedia.org/wiki/File:Tombolo_St_Ninians_5940.JPG

© Steinsky, 2007, commons.wikimedia.org/wiki/File:Dorset_geology.png

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