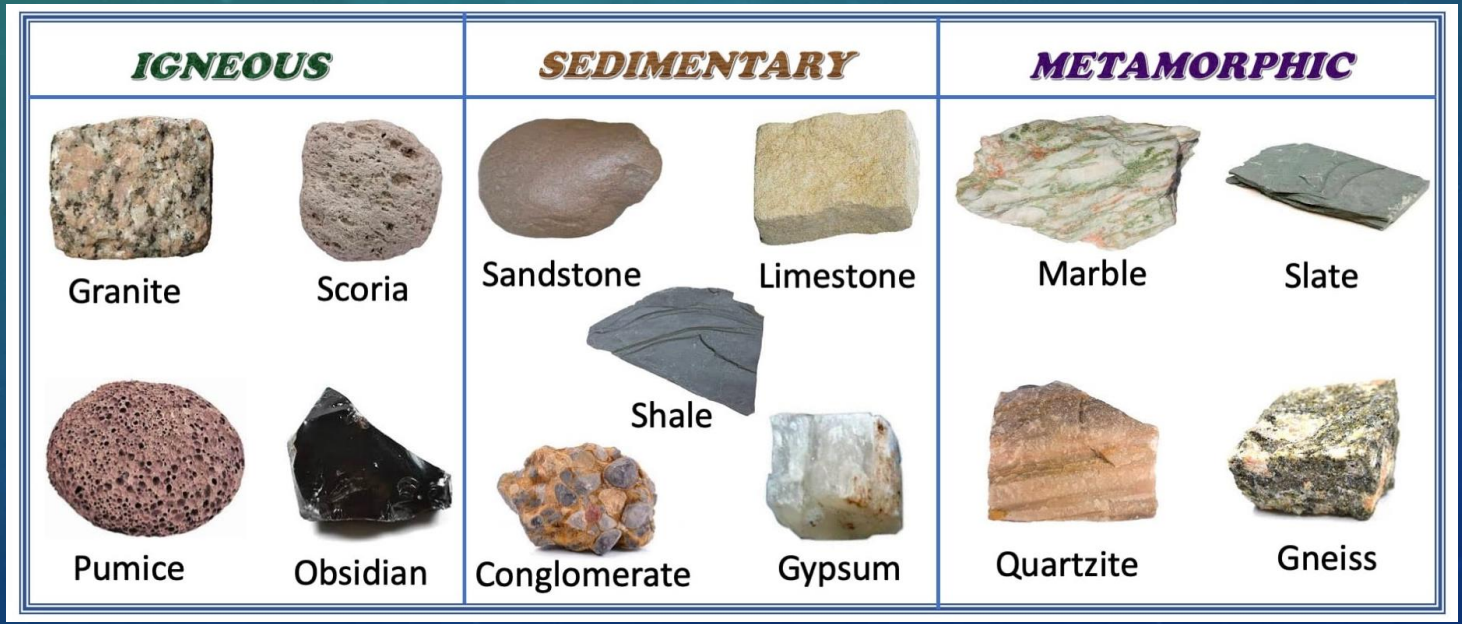
INTRODUCTION TO COASTAL LANDSCAPES

INTRODUCTION TO COASTAL LANDSCAPES

- You may have studied coastal landscapes at GCSE, or another landscape system such as glacial or river
- All 3 systems work in similar ways, with stores and flows of energy and materials through the landscape
- Geology is also an important factor in how the erosive forces of the system can shape the landscape
- Geology is the study of rocks and this has a major influence on many areas of the coast

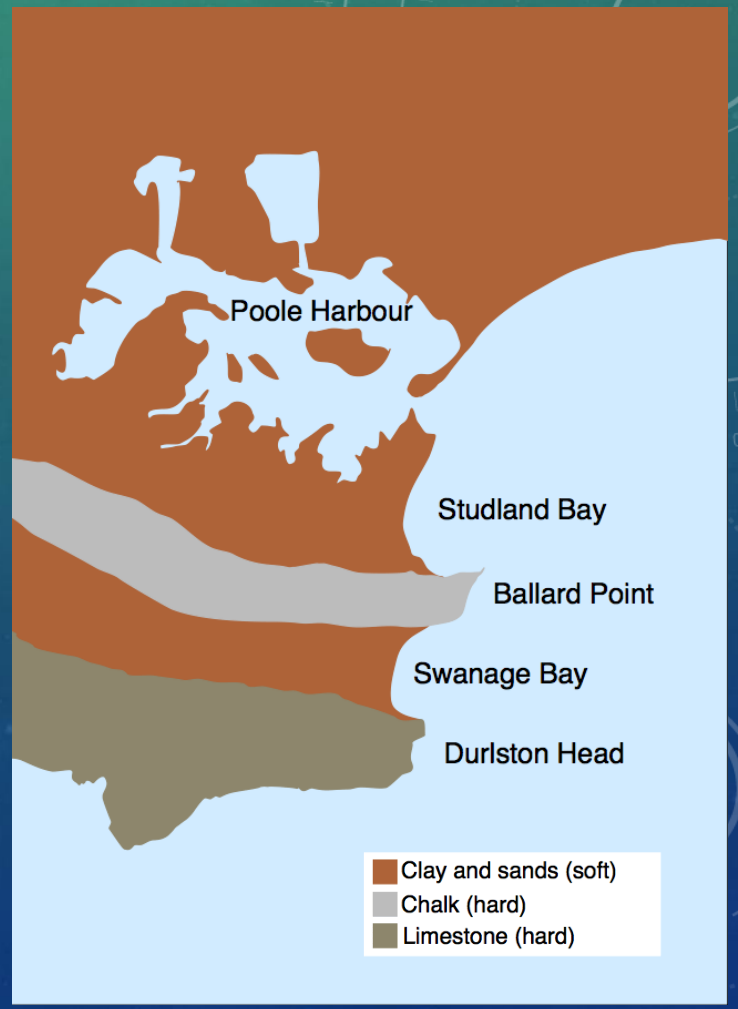
ROCK CLASSIFICATION

- There are 3 types of rocks
- Igneous rocks are those formed by volcanic activity and make up most of the earths crust
- Sedimentary rocks are those, usually younger rocks, formed at the surface of the earths crust by other rocks being eroded and then deposited in layers, often by water
- Metamorphic rocks are sedimentary or igneous rocks that have ben changed by high temperatures or pressure, often within the earths crust



INTRODUCTION TO COASTAL LANDSCAPES

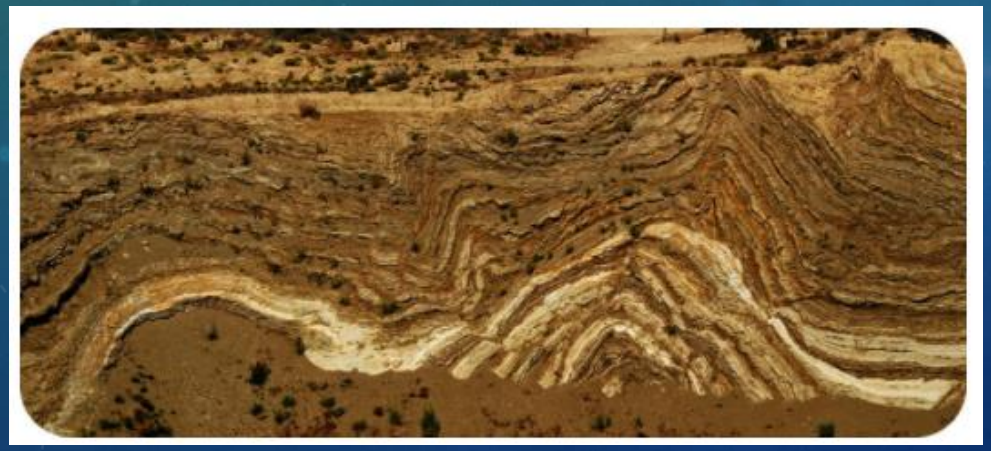
- You will need a good understanding of rock types (lithology) and the structure of them to be able to explain why the landscape has formed in a certain way
- The lithology of rocks varies greatly, especially in the British Isles!
- Some rocks can be described as ‘massive’. These are rocks that are the same composition throughout with no weak points. Typical examples are igneous **rocks** such as granite; and metamorphic **rocks** such as marble
- These are often described as ‘hard rocks’
- At the opposite end of the scale are unconsolidated rocks such as some clays
- These are sedimentary rocks that are loosely arranged or unstratified (not in layers) or whose particles are not cemented together (often called ‘soft **rock’**)
- Where there are hard and soft rocks next to each other they will erode differently and produce bays and headlands



INTRODUCTION TO COASTAL LANDSCAPES

- The structure of rocks (e.g. joints, bedding planes and faults) will affect the **permeability** of rocks and how fast they can **erode** and **weather**
- **Joints** are the natural vertical cracks in rocks, (as seen in this limestone; they have been greatly weathered over time)
- **Faults** are vertical cracks caused when the rocks have been moved as you can see in the sandstone at the bottom. (Note how the layers have been moved from their original positions)
- **Bedding planes** are also in the sandstone; these are the horizontal cracks that divided one layer of sand from another
- Rocks can also be folded when there are tectonic forces strong enough

Limestone



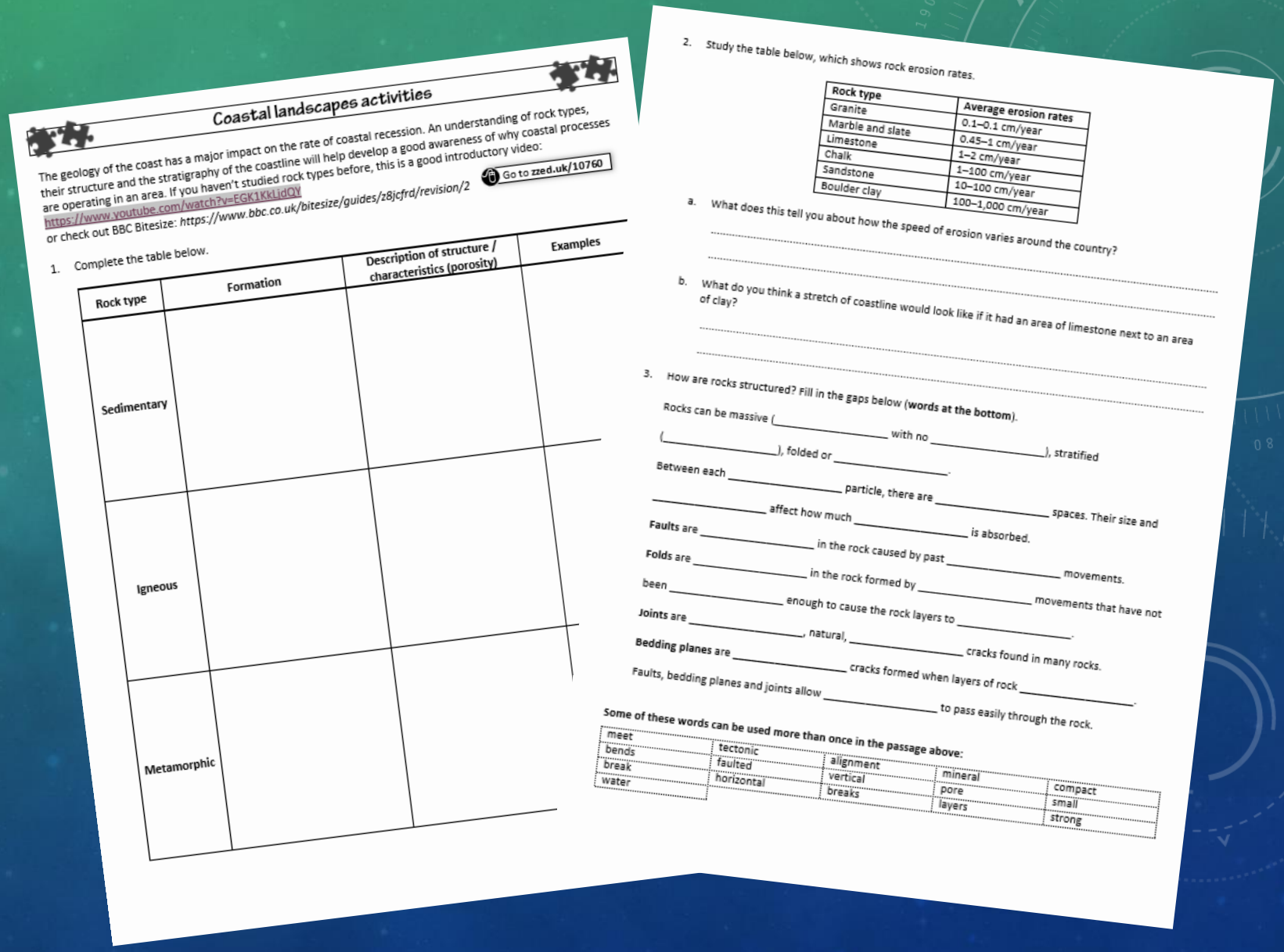
Folded rocks

Sandstone cliff

TASKS

Complete questions 1 to 8 on the worksheet

<u>Stretch and challenge</u>: question 9



Coastal landscapes activities

The geology of the coast has a major impact on the rate of coastal recession. An understanding of rock types, their structure and the stratigraphy of the coastline will help develop a good awareness of why coastal processes are operating in an area. If you haven't studied rock types before, this is a good introductory video:
https://www.youtube.com/watch?v=EGK1KkLjdQY
or check out BBC Bitesize: *https://www.bbc.co.uk/bitesize/guides/z8jcfrd/revision/2*

Go to zzed.uk/10760

1. Complete the table below.

Rock type	Formation	Description of structure / characteristics (porosity)	Examples
Sedimentary			
Igneous			
Metamorphic			

2. Study the table below, which shows rock erosion rates.

Rock type	Average erosion rates
Granite	0.1–0.1 cm/year
Marble and slate	0.45–1 cm/year
Limestone	1–2 cm/year
Chalk	1–100 cm/year
Sandstone	10–100 cm/year
Boulder clay	100–1,000 cm/year

a. What does this tell you about how the speed of erosion varies around the country?

.....

.....

b. What do you think a stretch of coastline would look like if it had an area of limestone next to an area of clay?

.....

.....

3. How are rocks structured? Fill in the gaps below (**words at the bottom**).

Rocks can be massive (_____ with no _____), stratified (_____), folded or _____.

Between each _____ particle, there are _____ spaces. Their size and _____ affect how much _____ is absorbed.

Faults are _____ in the rock caused by past _____ movements.

Folds are _____ in the rock formed by _____ movements that have not been _____ enough to cause the rock layers to _____.

Joints are _____, natural, _____ cracks found in many rocks.

Bedding planes are _____ cracks formed when layers of rock _____.

Faults, bedding planes and joints allow _____ to pass easily through the rock.

Some of these words can be used more than once in the passage above:

meet	tectonic	alignment	mineral	compact
bends	faulted	vertical	pore	small
break	horizontal	breaks	layers	strong
water				