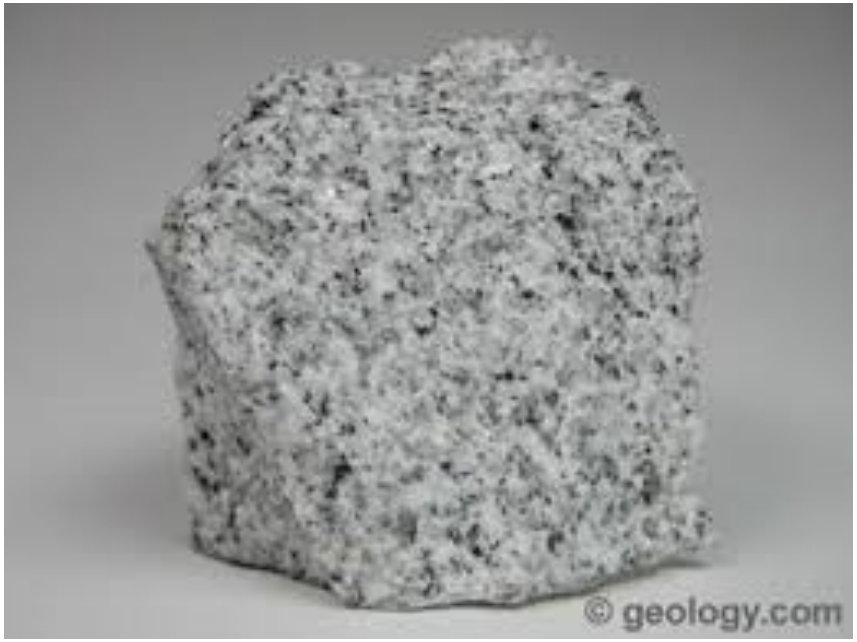
Igneous Rock

- Magma which cools and hardens on earth's surface
- **Granite** (cools slowly inside the earth, hard, coarse, multi-coloured) **(Wicklow Mountains)**
- **Basalt** (cools quickly on earth's surface as temperatures are much lower, heavy, black rock) **(Giant's Causeway, Co. Antrim)**

Igneous Rock

Granite



Basalt

Igneous Rocks

- Put the following key words into a structured paragraph for the formation of Igneous rocks
  - **Magma in the mantle**
  - **Cools quickly (crystals form)**
  - **Granite**
  - **Earth's atmosphere is much cooler**
  - **Basalt**
  - **Cools quickly**
  - **Lava hardens**

Igneous Rock - Formation

- Liquid **magma in the mantle** which can be between 500-900 degrees Celsius forces its way up towards the earth's surface
- Sometimes the magma is unable to break through the earth's crust
- When this happens, the magma **cools very slowly** allowing **crystals to form**
- When the magma cools it **hardens** after millions of years to form **granite** (hard, coarse, multi-coloured rock)
- Wicklow mountains

Igneous Rock - Formation

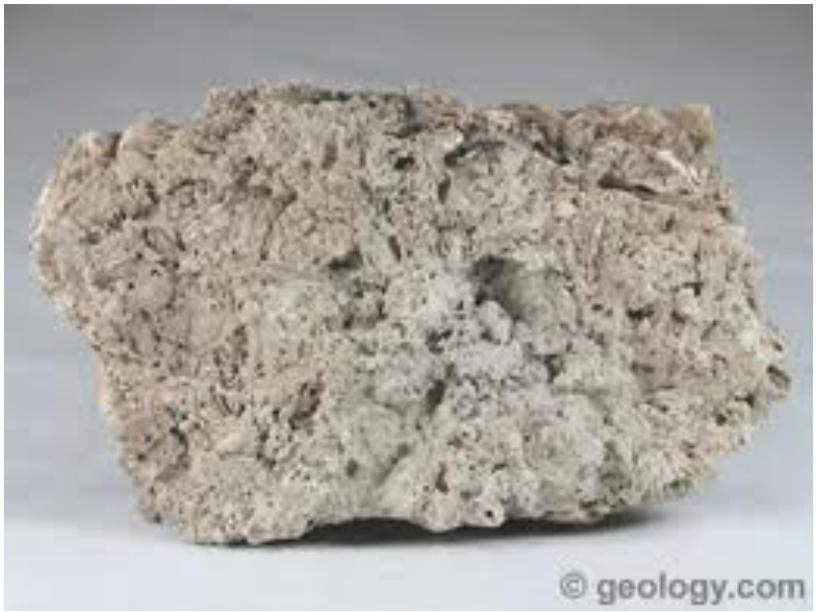
- Sometimes the magma breaks through the earth's crust
- When this happens it **cools very quickly** as the temperature on the earth's surface is far cooler than that of the mantle
- It cools so fast that it **hardens into lava without any time for crystals to form**
- After millions of years the lava is transformed into **basalt** (heavy, black rock)
- Giants Causeway

Sedimentary Rocks

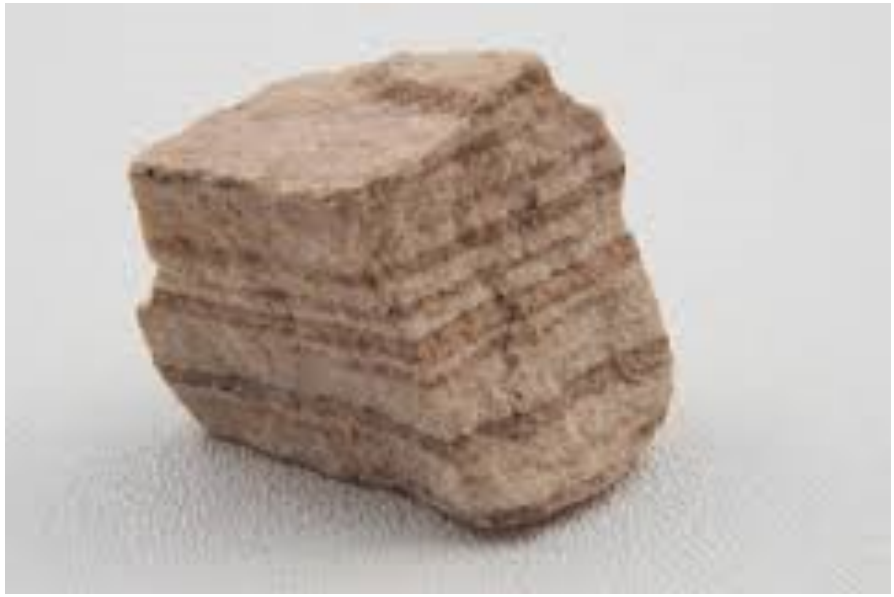
- Formed from compressed remains of dead plants and animals and other rocks
- These “sediments” often fall into rivers where they are transported to the sea where they are deposited at the bottom of the seabed
- This process repeats itself, causing layers or **strata** to form
- The pressure from the sea above **compresses** the sediments over thousands of years until they turn into sedimentary rocks

Sedimentary Rocks

Limestone



Sandstone



Sedimentary Rocks

- Put the following key words into a structured paragraph for the formation of sedimentary rocks
  - **Layers compressed together**
  - **Dead remains of plants and animals**
  - **Rivers transport material**
  - **Deposited on sea beds**
  - **Limestone, sandstone**
  - **Exposed mountains lose material**
  - **Wind and rain**

Sedimentary Rocks - Formation

- Sedimentary rocks are formed from **the compressed remains of dead plants and animals and other pieces of rock**
- Wind and rain cause loosen sediment on exposed mountain peaks, allowing them to fall into passing rivers
- These **rivers transport the sediment** away downstream along with **remains of dead plants and animals**

Sedimentary Rocks - Formation

- As the rivers enter sea, the sediments **are deposited on the sea bed**
- The downward pressure of the ocean along with the repeated deposition of sediments causes the sediments to be **compressed together** over millions of years to form layers of **sedimentary rocks** such as Limestone and Sandstone
- The youngest rocks are on the top, while the oldest are on the bottom

Metamorphic Rocks

- Form due to great heat or pressure
- Plate movements can cause some areas to experience tectonic activity
- Magma can “**bake**” sedimentary rock over thousands of years causing them to change or “**morph**” into metamorphic rocks
- Sandstone can change into quartzite
- Limestone can change into marble

Metamorphic Rocks

Marble

Quartzite

Metamorphic Rocks

- Put the following key words into a structured paragraph for the formation of Metamorphic Rocks
  - **Rocks are baked**
  - **Magma**
  - **Heat/pressure**
  - **Density and textures change**
  - **Marble and Quartzite**

Metamorphic Rocks - Formation

- Metamorphic rocks are rocks which were formed **by great heat or pressure**
- When igneous or sedimentary rocks come into contact with magma **these rocks are baked** over many years
- The **density and textures of the rock can change** from fine to coarse or vice-versa
- If the pressure is great enough, Igneous rock can be changed directly into metamorphic rocks
- **Limestone** – changes to marble
- **Sandstone** – changes to quartzite

Exercise

- Imagine there is a quarry to be located in your area
  - Write out the arguments for and against this proposal