



Firrhill High School



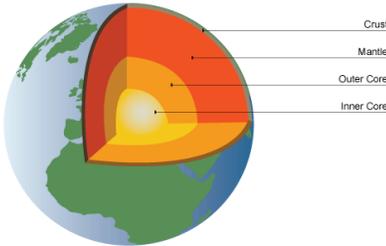
Summary Questions: C3. Chemistry of the Earth

WHAT SHOULD I KNOW?

Success Criteria	Before reading	After reading	Before my test
I can describe the structure of the earth.			
I can name the three rock types.			
I can describe the rock cycle and the weathering of rocks.			
I can explain and describe the properties of the three rock types.			
I can identify rock types by experimentation.			
I can state that rocks contain metals (metal ores).			
I can explain how to extract metals from their ores.			
I can carry out extraction of copper from copper oxide.			
I can carry out a crystal formation experiment.			
I can identify shapes of crystals.			
I can prepare a saturated solution.			
I can state how synthetic polymers are made.			
I can state sources of natural polymers.			
I can identify monomers and polymers.			
I can draw a polymer given the monomer.			
I can relate properties to uses of polymers.			
I can understand the difference between thermosetting plastics and thermoplastics.			
I can state advantages and disadvantages of polymers.			
I can investigate novel materials and their uses.			

THE STRUCTURE OF THE EARTH

The earth is formed of layers.



The structure of the earth is divided into layers. The outer layer is called the crust and is solid. Under this layer is the mantle, a hot liquid area. This is visible when a volcano explodes. The next layer is the outer core, a hot less-liquid area and finally the inner core is solid due to the pressure pushing in on it.

Not all planets have the same structure. Some gas giant planets do not have a solid crust at all and it would be impossible to stand on the surface!

THE ROCK CYCLE

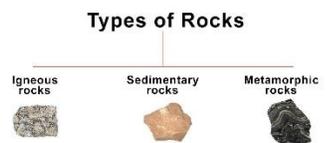
Naming rocks, weathering and the rock cycle.

Rocks are all around us, all rocks can be classified as either igneous, sedimentary or metamorphic.

Igneous rocks → formed in the cooling of lava or magma

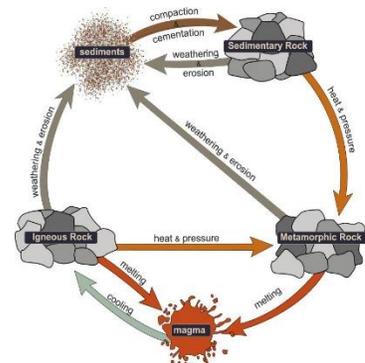
Sedimentary rocks → formed in the layering of small particles under pressure

Metamorphic rocks → rocks under pressure and heat that do not melt



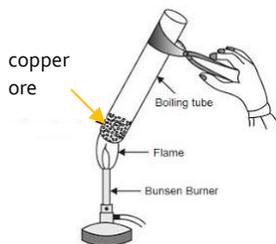
Weathering is the breaking down or dissolving of rocks. Weathering can be physical (caused by ice, water or sand) or chemical (caused by acid rain and salt).

The rock cycle is a process by which one type of rock can turn into another rock. The rock cycle requires pressure, heat and weathering.



EXTRACTING METALS

Removing metals found in rocks



Some metals are found in rocks in element form (i.e. they can be mined). These metals are very unreactive, like gold.

Other metals are found in compound form, this is called a metal ore and the metal must be removed by heating the ore. In class copper was separated from copper ore by heating it over a Bunsen.

CRYSTALISATION

Crystals can be natural or man-made

Crystals are beautiful gems that are always symmetrical (even though they come in many shapes). Natural crystals form in rocks under great pressure for a very long time. **The longer the crystal has taken to form, the bigger the crystal will be.**

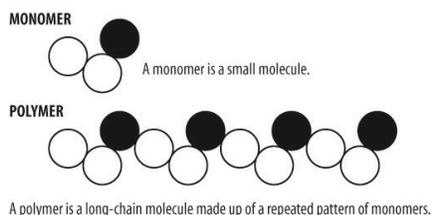
In class man-made crystals were created by first preparing a saturated solution – this is when no more solute (solid powder) can be dissolved in the hot solvent (liquid). The mixture is then filtered and left to cool. Crystals will gradually form **the largest crystals take the longest time to form.**



PLASTICS AND POLYMERS

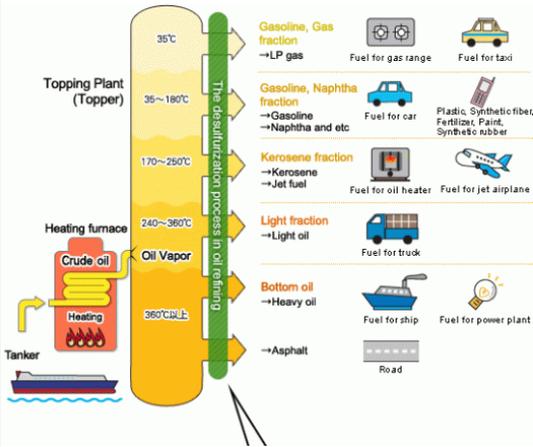
The many uses of plastics and polymers

A monomer is a name given to a small group of elements. Many monomers can join together to form a polymer as shown below.



Sources of Polymers

Natural polymers are common. Starch is an example of a natural polymer, it is made by plants to store energy. Many glucose molecules are joined together to form starch.



Synthetic (man-made) polymers are formed in the fractional distillation of naphtha.

1. Crude oil is heated at the bottom of the distillation tower
2. This produces a chemical called Naphtha that is vented off
3. The Naphtha is then heated even more, breaking down in to small monomers that can then be collected and turned into polymers.

Uses of Polymers

Polymers have many uses.

Polymer	Common use
<i>Acrylic</i>	Menu holders in bars and restaurants
<i>Polypropylene</i>	Pen lids and bottle tops
<i>Polythene</i>	Dip coating metal objects such as coat hooks
<i>Plastazote</i>	Swimming pool floats
<i>PVC</i>	Food wrapping
<i>PLA/ABS</i>	3D prints

Polymers can be thermosetting → Polymers that become rigid when heated and this can't be undone

Other polymers are thermoplastic → Polymers that become more soft when heated and hard when cooled, this process can usually be repeated many times.