

Rock Cycle - Teacher Background

The Earth and mankind are inseparable. Every molecule of our body is derived from our planet. The food we eat, the tools we use and the clothes we wear are also all derived from rocks. These rocks were formed when the disc of dust from which our planet formed first coalesced from cosmic dust about 4.5 billion years ago. Since then, apart from energy from the Sun and the occasional meteorite or asteroid, nothing has been added. Since the materials of Earth were originally derived from the explosion of a distant star and we are made from this too, we really are “star stuff”. Unfortunately for our egos so is an ant or a banana.....

Human	
Element	%
Oxygen	65
Carbon	18
Hydrogen	10
Nitrogen	3
Calcium	1
Phosphorous	

Earth's crust	
Element	%
Oxygen	46.6
Silica	27.7
Aluminium	8.1
Iron	5
Calcium	3.6
Sodium	2.8

In the past human survival was not dependent on our strength, tough hide or sharp teeth and claws. We had none of those advantages. Our brains and hands helped us to understand and use rocks to make tools, weapons and create fire on demand. Our understanding of soils led us on to discover agriculture and to develop civilization. Our intelligent use of Earth's resources is dependent on understanding the processes and time scale of their creation and recycling.

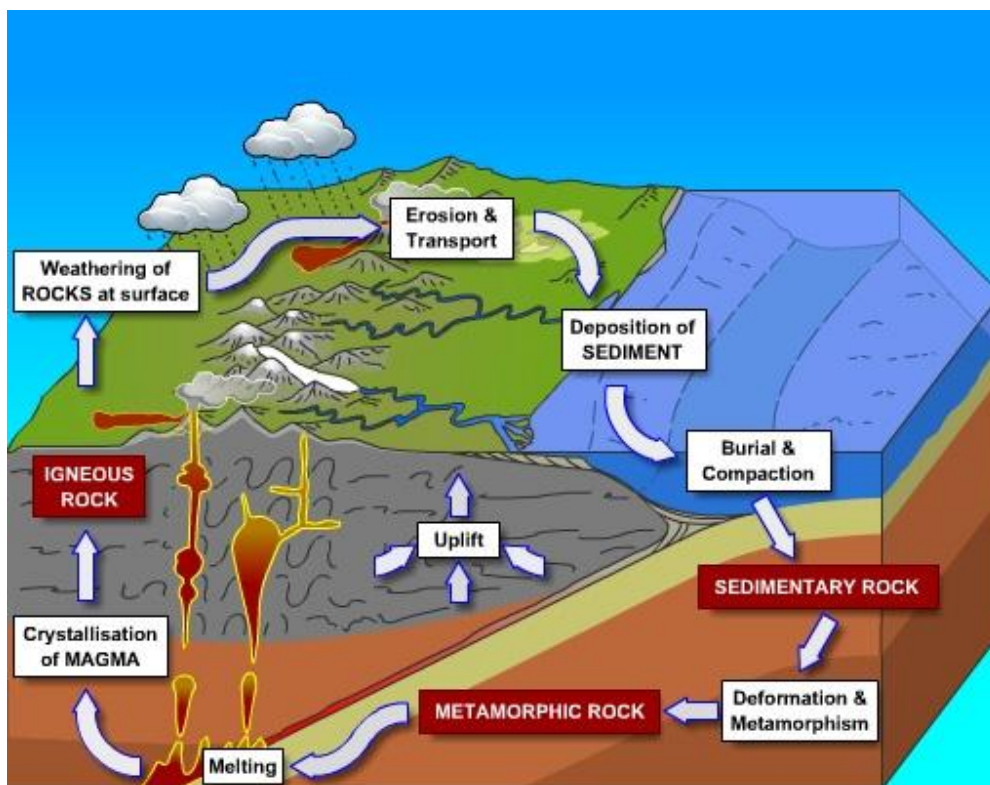
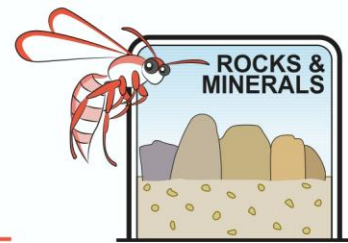


Image courtesy of Geological Society UK



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The “Rock Cycle” describes how materials are cycled through our planet. The major driving force is heat which causes convection currents. As materials are heated they become less dense and rise. When they start to cool they become denser and sink down again.

At the surface of the planet heat from the Sun causes air to expand and winds are created. These winds can bring rain and snow. These quickly move materials and sculpt our planet’s surface. Below the surface, residual heat from the formation of the planet and heat from the breakdown of radioactive materials also cause convection currents particularly at the crust mantle interface. These movements of partially melted rock are important in recycling material from within the Earth to the surface. These currents however take geological time in comparison with surface processes.

Although we traditionally start teaching the rock cycle at the “weathering” stage and follow all the processes round until rock is uplifted to the surface again, not all parts of the cycle need to be completed.

In a tectonically active area like the Pacific rim of fire, weathered material may be deposited as sediment and rapidly drawn down into the earth only to be erupted out of a volcano and be rock again in a relatively short period of geological time.

The inland of Western Australia has two large blocks of ancient rocks called the Pilbara and Yilgarn cratons (the pink masses on the geological map). These have been relatively unchanged for over two and a half billion years.

