Name: Date:

RELATIVE DATING WORKSHEET

1. **Sedimentary Layers** – the Law of Superposition

Sedimentary rocks are formed from the weathering and erosion of other rocks – these can be other sedimentary rocks, igneous or metamorphic rocks. Therefore, sedimentary rocks provide evidence for changes in the Earth.

PRACTICAL – MAKING SEDIMENTARY LAYERS

Ingredients
Two colours of sand
Two beakers – one upright, one at an angle of 45°

A. Into the upright beaker:-

(i) place several spoonfuls of one coloured sand in the measuring cylinder
(ii) place several spoonfuls of another colour sand on top of this
(iii) do these two layers once again so you have four layers

Draw the sequence and label the layers (A, B, C, D) – A being the bottom layer.
The boundary of each change in colour represents a bedding plane.

Labelled Drawing		
a.	Which layer went in first?	
b.	Which layer went in last?	
c.	Which layer is the "oldest" in the sequence?	
d.	What was the overall sequence of events if there was no disturbance (from oldest to youngest)?	

This is the law of Superposition.

Name: Date:

2. THE USE OF FOSSILS - DATING

Fossils have been used to date rocks as they are time markers – many species lived at a particular time and later became extinct. As you saw from (1) above, the deepest rocks are usually the oldest, therefore the fossils found at the base of a rock sequence that has not been disturbed will be the oldest. Complete the following practical.

A. Place the fossils in the appropriate geological time period on the card.

Trilobite – Cambrian		**Armoured Fish – Devonian**	
Brachiopod – Ordovician		**Gastropod – Carboniferous**	
Starfish – Silurian			

	Geological Time Period	
	Carboniferous	Youngest
	Devonian	
	Silurian	
	Ordovician	
	Cambrian	Oldest

a.	Which fossil layer is the oldest (name the geological period)?	
b.	Which fossil layer is the youngest (name the geological period) ?	

We can use fossils to date rocks. Is this an absolute age (we know how many years ago the fossil lived?) or is it a relative date (we know one is older than the other, but not how old they are?).

……

Explain your answer.

……

……

B. Place an extra Trilobite within the Ordovician, and an extra Starfish in the Devonian.

c.	At the end of which geological time period did the Starfish become extinct ?	
d.	During which geological time period did the Starfish evolve and first appear ?	
e.	During which geological time period did the Trilobite evolve and first appear ?	
f.	At the end of which geological time period did the Trilobite become extinct ?	

How does knowing when a fossil lived and became extinct help us date rocks?

……

……

……

Name: Date:

3. HOW DO ROCKS DEFORM and WHAT IS THE CONSEQUENCE FOR THE AGE OF THE LAYERS ?

Rocks can deform in two ways due to pressures and temperatures within the Earth:

(1) soft (ductile) into folds; or
(2) brittle – these are faults

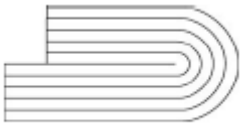
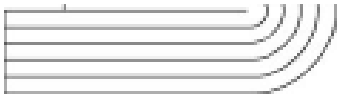
Let us see the end result of ductile deformation.

Ingredients
Three different coloured layers of plasticine

A. Push the plasticine with equal force from each side until it curves upwards like the drawing below - draw in colour and label the layers A, B, C from the oldest upwards.

Labelled Drawing 		Is this an anticline or syncline ?
a.	Which layer is the oldest? Mark it with an "O".	
b.	Which layer is the youngest? Mark it with a "Y".	

B. Push the plasticine further until the fold is overturned as the drawing below – draw and label the layers as above marking the oldest with "O" and the youngest with "Y".

Labelled Drawing 		
c.	Where do the oldest layers occur?	
d.	Where do the youngest layers occur?	
e.	What does this tell you the date of rocks where folds have been overturned?	
Labelled Drawing 		This is a recumbent fold that has been eroded. Put an "O" next to the oldest layer, and a "Y" next to the youngest layer (refer to your drawing above)
f.	As the fold has been eroded, the outcrops look horizontal and at first sight the right-way-up. How could you work out that it was the wrong way up, and therefore represents an overturned fold?	
g.	Rocks are removed during erosion and deposited elsewhere. How could you tell that this deposited rock is younger than the folded rock?	