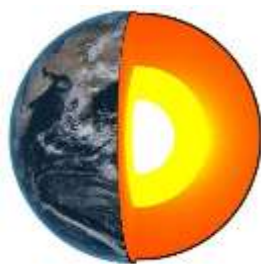


So you want to study Earth Sciences?



A-level Geology

GCSE 'bridging' work, summer 2020

Please bring this to your first lesson when you start in September.

I want you get used to some of the skills needed in this fascinating subject: observation, drawing and research skills.

Activity 1: Drawing Fossils

For drawing, I am not looking for artistic excellence, I am looking for an accurate representation of what you see and what is there. You might think you can't draw, but with sufficient practice anyone can draw fossils, field sketches or minerals under a microscope to a good standard.

I would like you to draw your own versions of the two fossils shown over the page: a **trilobite** and a **brachiopod**.

There is a guide with each photograph, which shows the way to draw the fossils; draw them as accurately as possible in terms of body parts and shapes.

NOTE: in order to make sure you don't just copy them by tracing, I would like you to draw them twice the size they are on the page (you'll need a full A4 sheet for the trilobite and ½ page for the brachiopod).

TIP: You may want to use graph paper to help with the scaling and proportion for this task.

I would also like you to find the appropriate labels for the various body parts, one good online source are the Fossil Focus pages from the British Geological Survey:

<https://www.bgs.ac.uk/discoveringGeology/time/Fossilfocus/trilobite.html>

<https://www.bgs.ac.uk/discoveringGeology/time/fossilfocus/brachiopod.html>

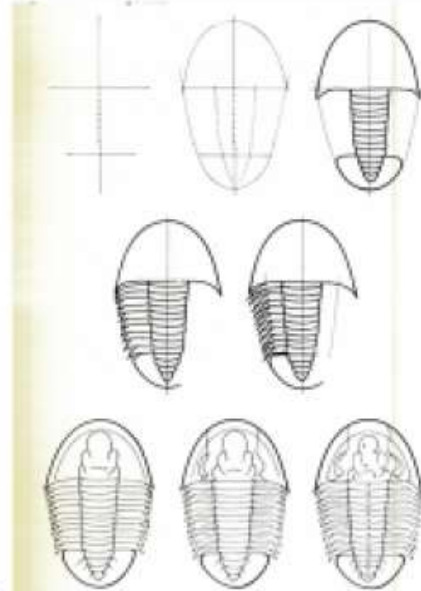
Try and get at least 5 labels for each drawing.

You may want to do further research on this if you want to get further labels.

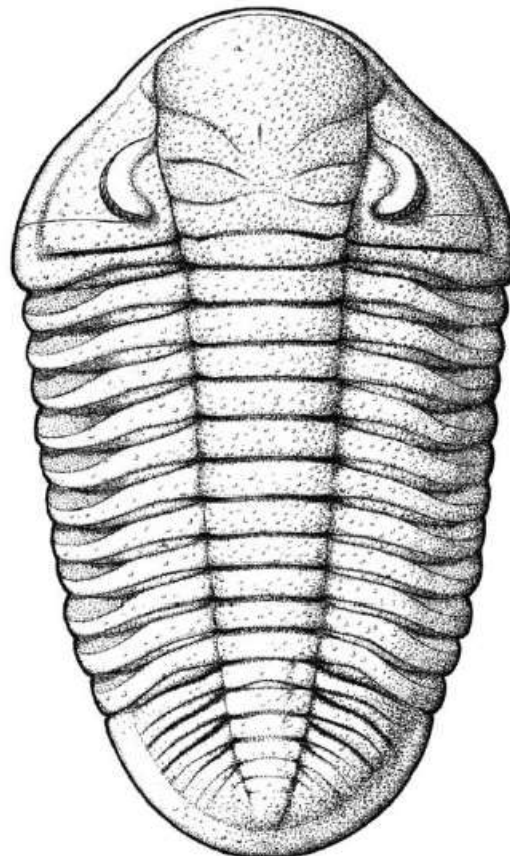
Drawing Trilobites

Trilobites are bilaterally symmetrical in dorsal view. So,

1. Establish the line of symmetry – draw lightly with pencil.
2. Decide whether you need to scale your drawing, so you must measure.
3. Put the scale of your drawing next to the drawing – use a scale bar or a ratio.
4. Establish relative proportions – length, width etc and then of the section, ie cephalon, pygidium etc
5. COUNT the number of segments
6. Divide the thorax space into the correct number – if the trilobite has twenty segment you must draw 20!
7. Carefully draw in the detail so that you trilobite looks like



Calymene trilobite

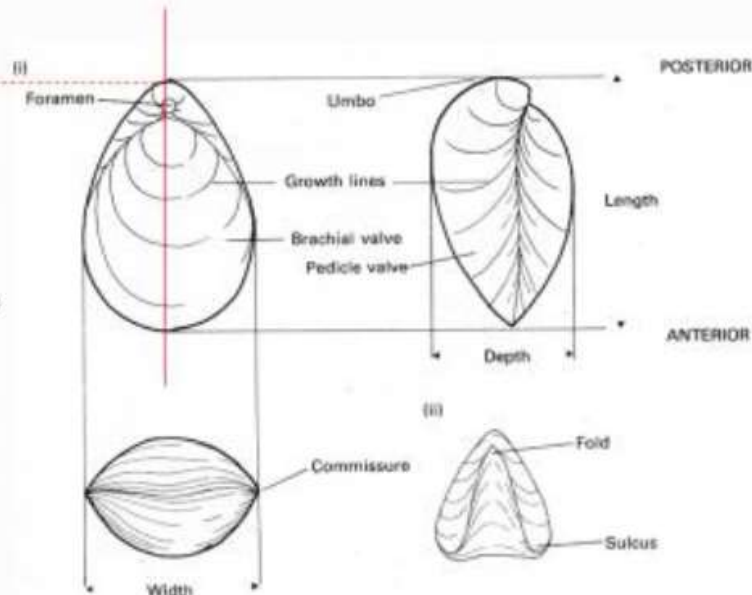


Magnification = x1

Drawing Brachiopods

Start by deciding your scale
Then find the line of BILATERAL symmetry
Working from this line, measure outwards
Draw the line of symmetry on the graph paper
From that line transfer the measurements

Draw good curves – single steady sweeps instead of lots of dashes
Add the morphology of the shell
Fully label with key labels, insides and outsides.



Terebratula brachiopod

Magnification = x3

Activity 2: Evolution Time Line

It is really important in A-level Geology to be able to synthesise complex ideas in Earth Sciences and interpret them for your own understanding.

Read the New Scientist article (pdf) to find out when in Earth's history, the key events in the Evolution of Life took place.

The following events are key leaps forward in the Evolution of Life, but have been jumbled up. I would like you to try to put the following events in the right order along a Time Line starting 4.6 billion years ago with the Formation of the Earth:

- 1. Formation of the Earth**
- 2. Plants move onto land**
- 3. The Cambrian Explosion – when life with hard parts appears**
- 4. Dinosaurs become extinct**
- 5. First birds appear**
- 6. First multicellular life in the oceans**
- 7. When oxygen first appears in the Earth's atmosphere**
- 8. Appearance of cells with organelles i.e. eukaryotes**
- 9. Dinosaurs appear**
- 10. Animals move onto land**
- 11. Appearance of single-celled prokaryotes e.g. bacteria**
- 12. Humans appear**
- 13. First plants with flowers**
- 14. First mammals appear**
- 15. Greatest mass extinction ('Great Dying') ever occurs**



Activity 3: Interpretation of local building stone in your area

This activity involves using your observation skills. I want you to start practicing these as soon as possible. What I want you to do is select a building (e.g. a church or part of a building e.g. a shop front or pillars) made of stone in the local area. You can use other things (gravestones, statues or even a kitchen worktop or fireplace in your own house!).

Take some photographs of the building or object, including close-ups of the rock.

Then try to make a description of that stone (or stones if there are different ones in the building) to produce a brief report on the stone (one page at most).

I am not interested in the name of the stone (this is relatively unimportant!), but try to include the following information:

1. Colour of the stone – be as detailed as possible; it may be the stone has black and white crystals, for example, or may be brown with lighter patches of beige.
2. Description of the grains or crystals – one key thing is what is to decide whether the stone is granular (made of individual fragments) or is crystalline (made of interlocking crystals).

Once you have decided that, try and estimate the average size of the grains or crystals (you can put them into categories e.g. <1mm, 1 mm to 5mm and >5mm).

You should also try and describe the shape of the grains or crystals: are they rounded (no corners) or are they angular? Are they spheres or oblongs?

Finally, if you think they are grains, are they all a similar size (doesn't have to be exactly the same size but not much variation) or are they very different sizes (large grains and small grains)?

3. Add the location of the stone to your report. Make sure you include your images of the rock in the report.

For this exercise you may find a magnifying glass or hand lens would be useful. They are available from various places e.g. from museums and visitor centres or online. There are x10 hand lenses on Amazon for about £5 and magnifying glasses for around £2.

Go further activities

If you are interested in finding out more about the fascinating subject of Earth Sciences, the following are FREE online courses that aimed at an introductory level run by universities:

OpenLearn courses run by the Open University

<https://www.open.edu/openlearn/science-maths-technology/free-courses/?filter=date/grid/672/all/Introductory/all/>

1. Introduction to Geology
2. Volcanic Hazards
3. Life in the Palaeozoic
4. Earthquakes
5. Practising Science: Reading the Rocks and Ecology

FutureLearn courses run by collaboration between universities in the UK and abroad

<https://www.futurelearn.com/subjects/science-engineering-and-maths-courses/earth-science>

1. Extreme Geological Events
2. Causes of Climate Change
3. Climate Change: the Science and Solutions
4. Moons
5. Exploring our Oceans
6. Planets and Life Beyond Earth

Keep in touch by Liking our FB page: GeologyS6FC for more great activities and ideas.

I cannot wait to meet you in September. Have a great summer!

Sara Metcalf

Geology and Applied Science Teacher

