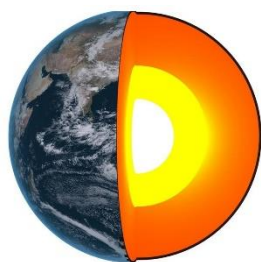


## So you want to study Earth Sciences?



### A-level Geology

## GCSE 'bridging' work, summer 2025

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 practical

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>

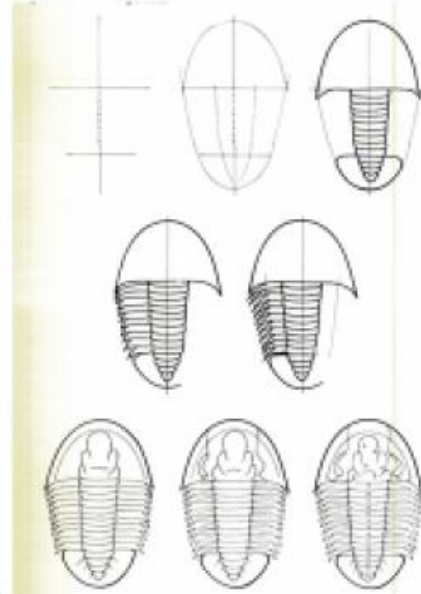
<https://www.bgs.ac.uk/discoveringGeology/time/fossilfocus/brachiopod.html>

- *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.*
- *Add you name and a title for your work, and bring to your first lesson*

# Drawing Trilobites

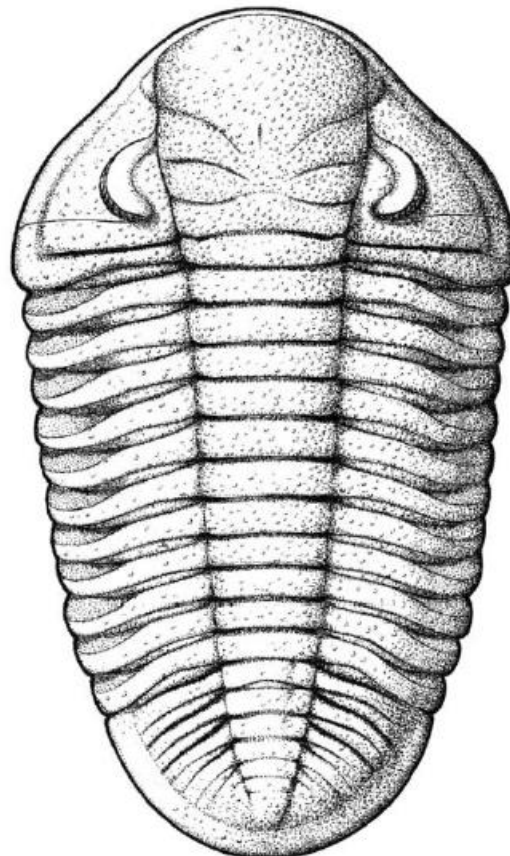
Trilobites are bilaterally symmetrical in dorsal view. So,

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

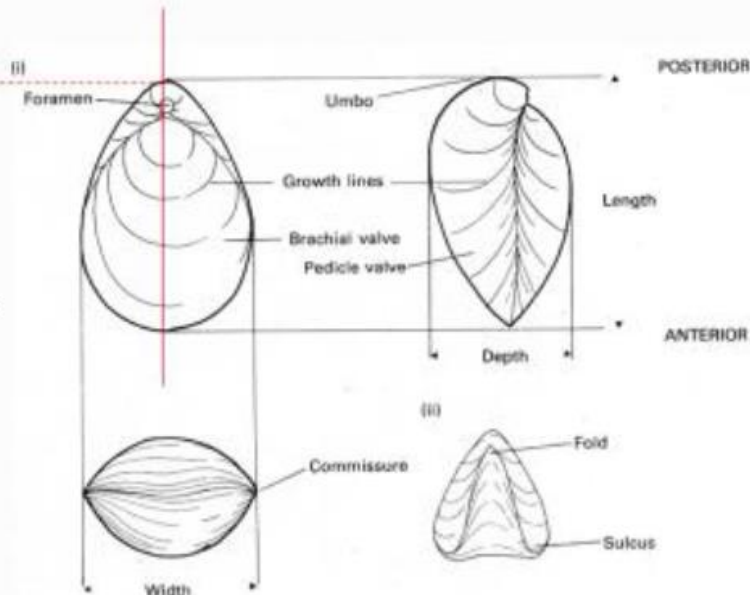
Magnification = x1



## 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

Congratulations! You have completed the first Specified Practical of A-level Geology – **SP17 Drawing accurately scaled and detailed fossil specimens.**

## **Activity 2: Evolution Timeline**

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.

- **Go to the webpage below and read the ‘New Scientist’ article to find out when in Earth’s history, the key events in the Evolution of Life took place.**

Weblink for New Scientist article: <https://www.newscientist.com/article/dn17453-timeline-the-evolution-of-life/>

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 Timeline starting 4.6 billion years ago with the Formation of the Earth and bring to your second lesson:

- 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: Fieldwork: interpretation of local building stone in your area

This activity involves using your field observation skills. I want you to start practicing these as soon as possible because we will be starting fieldwork in September. 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!).

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

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) to bring to the first lesson.

#### ➤ Recording your observations

A good idea is to take a picture of the rock in natural daylight and to draw any features as a sketch with annotations. Put a title at the top, the location and date as well as your name.

Data on crystal or grain shape, size, cement type and hardness would be best recorded in a Table (see below):

#### ➤ I am not interested in the name of the stone (this is relatively unimportant!), but try to include the following observations in your rock description:

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 you think 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). Do this by measuring with a ruler at least 5 visible crystals or grains.

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?

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)? If they are multi-sized record the **range** and the **modal** value.

3. **Fossils** – does the rock contain any **fossils**? Record all of your observations.

4. **Cement** – if you wish you can test the rock to see if it contains **calcium carbonate** as cement (‘rock glue’) sticking the grains together by adding a drop of vinegar to a clean surface to see if there is a reaction (fizzing). Record your result.

You can also try to scratch the rock with the following implements to work out the **hardness**:

- a. A steel blade or steel pin (hardness 5.5)
  - b. Copper coin (hardness 3.5)
  - c. Your own fingernail (hardness 2.5)
5. **Location** – add where you found your rock to your report, try to include a **map reference** from Google or Bing maps, and if you are able to give a **Grid reference** (6 figure) that will improve your report. Make sure you include your images (photos and/or drawing) 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: Interpretation**

Use a rock ID flow-chart weblink below or research your findings online to try to identify which type of rock – sedimentary, metamorphic or igneous you have described and if you are able to identify the name of the rock, this is excellent deduction work.

<https://www.mylearning.org/resources/what-rock---identifying-rocks-flowchart>

A good website is:

<https://www.nhm.ac.uk/take-part/identify-nature/beginners-guide-to-identifying-uk-rock-types.html>



## 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 Environmental Science Teacher

