

Scary scorpions

Make your own scorpion and imagine how it lived

Show the pupils the photograph below and point out the strange marks on the sandstone rock face. Tell them to imagine this nearly vertical rock face as horizontal, and on top of another rock which has since been eroded away. What made the marks in the underlying rock? The sediment that made the rock you see now, filled in the marks and so preserved them.



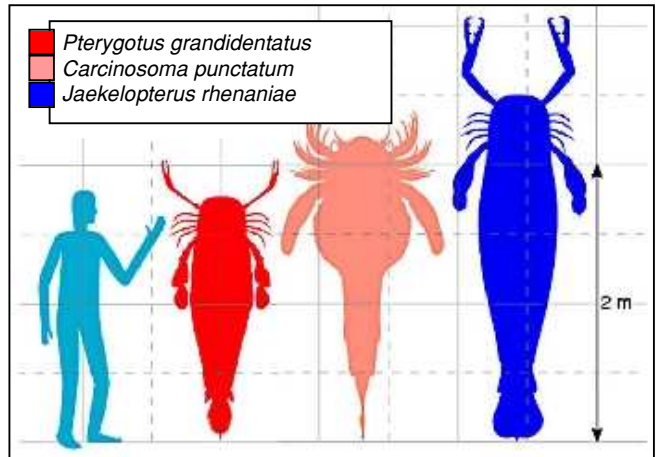
*Hibbertopterus trackway, Fife coast, Scotland with Dr. Martin Whyte from Sheffield University for scale
Photo: Dr. Dee Edwards, 2005*

The marks were made by three pairs of legs and a tail. The tail has left a drag mark in the centre. The trackway is 6m long and there is 0.9m between the outside leg grooves, so whatever animal made the track was big,

We know that the trackway was made by an aquatic scorpion. Scorpions (Eurypterids) are an extinct group of arthropods - animals with jointed exoskeletons like modern crabs, shrimps, lobsters and the fossil trilobites. They first appeared almost 470 million years ago and, in the Silurian period (about 430 million years ago), they became the largest predators in the sea. This group of creatures lived in the sea and in deltas for a very long time - over 200 million years, but died out about 250 million years ago. How long have modern humans lived on Earth? *Less than one million years.*

Most aquatic scorpions were only a few centimetres long but some species grew to lengths of over 2 metres. They had a long, jointed body and a set of claws at the front for grabbing and tearing prey. They had two pairs of jointed walking legs followed by a pair of swimming 'paddles' for moving through the water and digging in the mud. They also had a long tail and some had a spike on the end. It is probable that the tail could be whipped around from side to side, perhaps to spear and inject venom into prey which the creature had caught in its claws. They are

known as 'scorpions' because it is believed that some had a 'sting in the tail' like modern land scorpions.

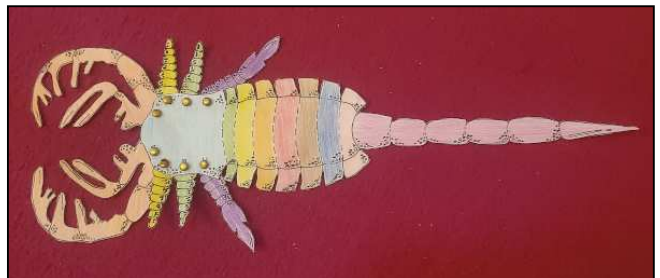


Sizes of large aquatic scorpions compared to an adult human. The colours are purely imaginary.

© From Slate Weasel, Public domain, via Wikimedia Commons

Ask the pupils to:

- colour the parts of their scorpions, (on the large diagrams on pages 3 and 4). Realistically, they may have looked like modern day lobsters but they can be imaginative with colours;
- carefully cut out all the shapes;
- fasten the pieces together with split pins;
- imagine your scorpion is much longer than you are tall.



Finished sea scorpion Elizabeth Devon

In groups of three or four, discuss the following:

- what do you think your scorpion ate? *It had a lot of choice as the Silurian seas were teeming with life - corals, brachiopods (similar to shell fish), bryozoans, crinoids (sea lilies) some fish, most of which were jawless, like the modern hagfish or lampreys, and even smaller sea scorpions;*
- how did your scorpion catch its food? *It could grab and tear its prey with its claws. It could spear its prey with its tail and maybe inject venom;*
- was your scorpion mainly a predator or was it mainly prey? *Definitely a predator;*
- what senses did your scorpion have? *We can assume that its senses were like those of lobsters*

today - they can see and their antennae and legs can sense their surroundings, they react to low frequency sound but they cannot smell;

- if you had a time machine and went back 430 million years to the Silurian seas, would you be scared? Yes, . . . but maybe you are braver than us?
- would your scorpion try to eat you? Yes;
- if you fought with your scorpion and killed it, how

could its remains be fossilised? Its remains would fall to the sea bed where it would be quickly scavenged by other animals until just hard bits of its body were left. If, however, it were suddenly covered by a large amount of sediment (mud or sand), washed into the sea from a nearby river in flood, then it might be fossilised and preserved for millions of years.

The back up:

Title: Scary scorpions

Subtitle: Make your own scorpion and imagine how it lived

Topic: An introduction to fossil aquatic scorpions; bringing the animal back to life and investigating the Silurian seas.

Age range of pupils: 7 to 12 years

Time needed to complete activity: the time taken for colouring, cutting out and making the scorpion will vary according to the age group and care taken - say 20 minutes. The discussion could take a further 15 minutes.

Pupil learning outcomes: Pupils can:

- explain that aquatic scorpions were similar to modern day lobsters;
- state that aquatic scorpions lived millions of years ago;
- describe that the size of aquatic scorpions varied from a few centimetres to over 2 metres long;
- explain that because they had claws and a whip-like venomous tail, the large ones, at least, were predators;
- describe what it may have eaten and what it could sense;
- imagine life in the Silurian seas.

Context: This activity can be carried out in any lesson about aquatic creatures, extinct animals or past environments. Pupils are encouraged to imagine how the extinct animal lived and how it fitted in its own ecosystem.

Following up the activity:

Research could be carried out about life in the Silurian seas.

Using the internet, aquatic scorpion fossils could be investigated.

A Silurian diorama could be constructed.

Underlying principles:

- Scorpions (Eurypterids) are extinct aquatic animals belonging to the Phylum Arthropoda.
- The earliest fossils known date from 467.3 million years ago (Ordovician).
- They were the apex predators of the Silurian seas.
- Some species became very large in the Silurian period.
- They became extinct in the Permo-Triassic mass extinction event of about 250 million years ago.
- Their size varied from tiny, a few centimetres, to very large, over 2 metres long.
- The large ones were predators as indicated by their claws and long thin, probably venomous, tail.

Thinking skill development:

A pattern emerges as the paper scorpion is coloured, cut-out and fastened together correctly. Discussion of the trackway and the animal's lifestyle involves metacognition. Cognitive conflict may occur when the size of the animal is compared to an adult human. Relating the paper model to a living aquatic scorpion involves bridging.

Resource list:

- copies of the model
- colouring pencils
- scissors
- glue
- split pins

Useful links:

'What was it like to be there? - bringing a fossil to life'
https://www.earthlearningidea.com/PDF/37_What_like_to_be_there_fossil.pdf

Source:

Developed by Elizabeth Devon of the ELI Team from a copy of the cut-out scorpion. Unfortunately the source of the original drawings is unknown. Thanks to Dr. Dee Edwards for information about the *Hibbertopterus* trackway.

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SEA SCORPION sheet 1

Colour in the body parts

Cut around them

Glue the tail (*sheet 2*) to the body

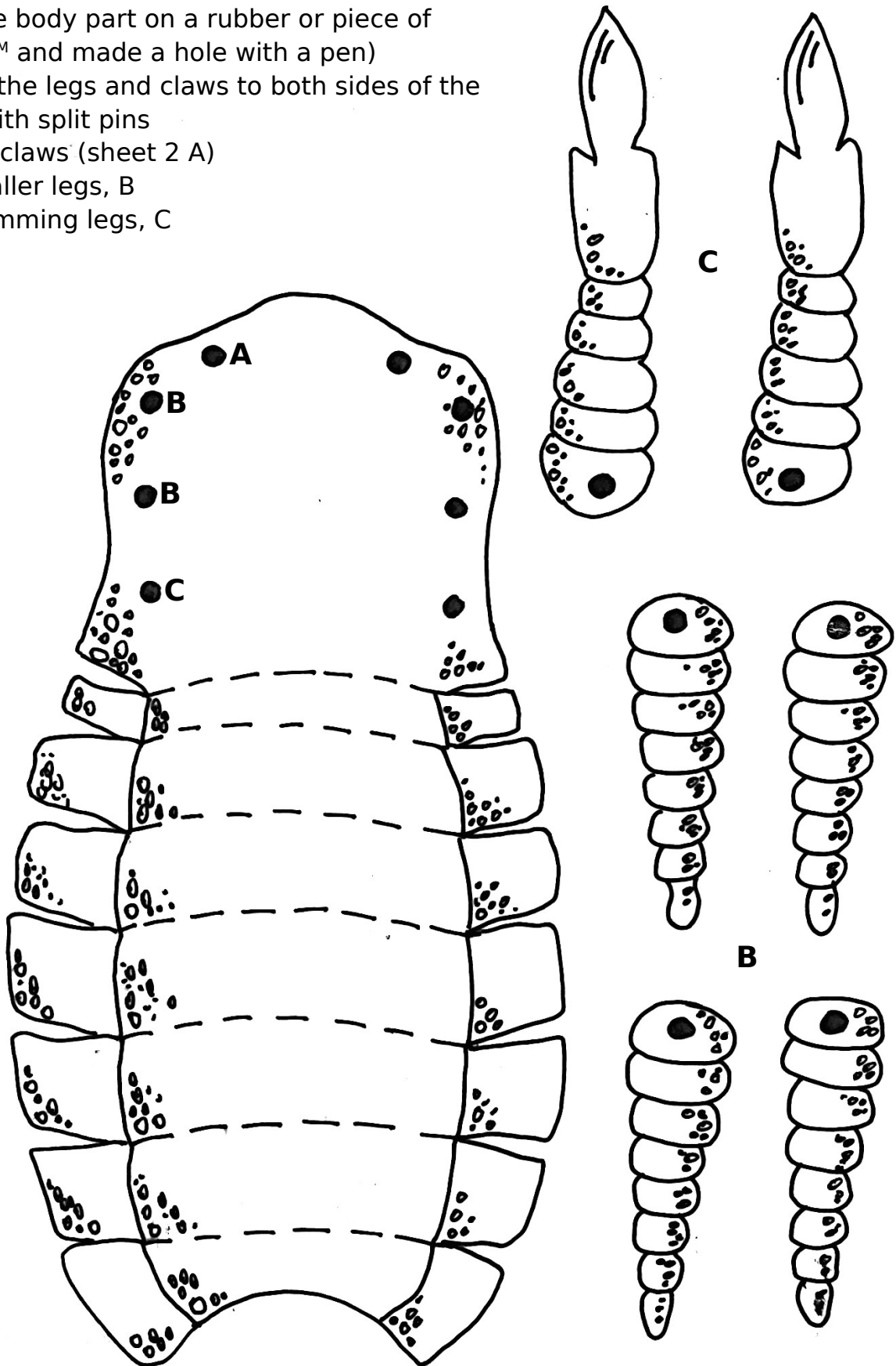
Make holes through the large black circles
(put the body part on a rubber or piece of
BluTac™ and made a hole with a pen)

Fasten the legs and claws to both sides of the
body with split pins

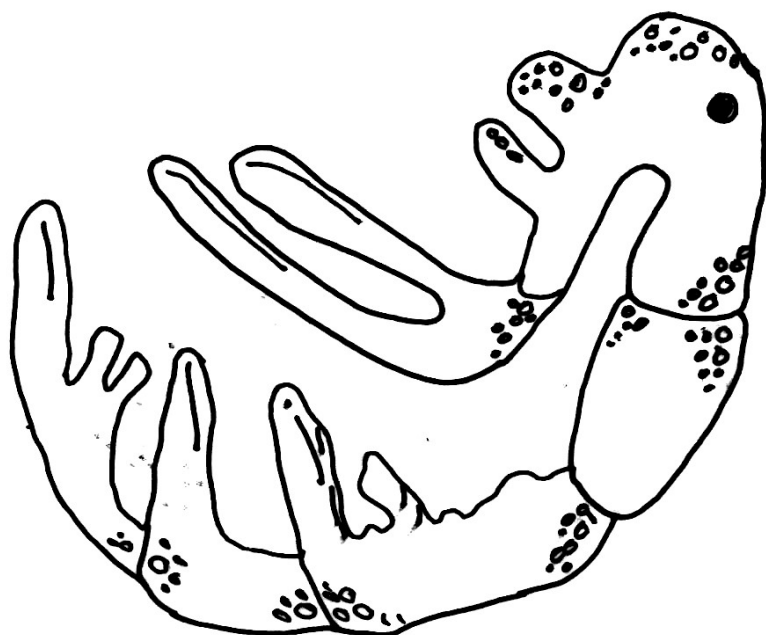
the claws (*sheet 2 A*)

smaller legs, B

swimming legs, C



SEA SCORPION sheet 2
Claws and tail



A

