

Trail-making

Making your own “fossil” animal trails

Trail-thinking

What do you have to do to make trails like those left by animals in the past? Find some damp sand (on a river-side, a beach or in a tray) and think about how you could make the trail of an animal on the sand which might later become fossilised. You'll need to ask yourself:

- Why would the animal have been on the sand (crossing the sand, looking for food, running away, resting, taking off, landing, etc.)?
- In which direction would the animal have been moving?
- How would the animal have been moving (on legs, sliding, digging, coming in to land)?
- How fast would the animal have been moving? Would the speed have changed?
- How deep would the trail be?
- Would the trail have been straight?
- Would the animal have rested?
- How could the trail become fossilised?

It's a good idea to think about these things and talk about the answers before you begin making the trail. Then have a go.

Dinosaur trail-thinking

If you decide to make a 'dinosaur trail', then these are the sorts of questions to ask yourself before you begin:

- Did the dinosaur walk on two feet or four feet?
- Were the front feet the same size as the back feet?
- How many toes did the dinosaur have on each foot?
- Was the dinosaur walking slowly, walking quickly or running? How will this affect the distance apart and the depth of the footprints?

Now put your thoughts into actions – and make your own dinosaur trail.



Muenchehagen Quarry near Hannover, Germany.
140 million year-old Iguanadontid and theropod dinosaur tracks on a shoreline.

With permission from Dr. Oliver Wings,
<http://dinosaurhunter.org>

Trilobite-trail thinking

This is a picture of a fossil trilobite; it lived on the sea bed around 500 million years ago. This trilobite could swim, but spent part of its time resting on and walking over the sea bed.



An *Isotelus brachycephalus* trilobite at the Museo di Storia Naturale di Milano.

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What sort of trail would this animal have left in the sand? Think about:

- the mark it might have made when it was resting;
- the marks it might have made as it walked away from its resting point;
- the marks it might have made as it 'took off' from the sand into the water above;
- the marks it might have made when it was feeding on the microscopic food particles buried in the sand.

Then try to make your own 'trilobite launch' trail and trilobite feeding trail.



Chris Bedford 'trail-making' on a sandy beach.

Photo – Nikki Edwards.

The back up

Title: Trail-making

Subtitle: Making your own “fossil” animal trails

Topic: Try thinking about how animals lived and moved before ‘recreating’ your own fossil trails on damp sand.

Age range of pupils: 5 – 19 years

Time needed to complete activity: 20 mins

Pupil learning outcomes: Pupils can:

- describe how animals of the past might have moved;
- use these descriptions to make appropriate trail marks in damp sand;
- explain how the trails they have made give information on how the animal moved in the past.

Context:

Pupils are asked to use their understanding of how animals move today and in the past to create realistic trails as they might have appeared in the past and been preserved in the fossil record.

Research on dinosaur trails has shown that the height of the hip of dinosaurs is about four times the length of the hind footprint. This allows us to interpret how the dinosaur was moving since if the stride length (distance apart of two prints from the same foot) divided by the hip height, is less than 2, the animal was walking; if between 2.0 and 2.9 it was trotting and if more than 2.9 it was running. So, in summary, if FL = hind foot length and SL = stride length, h (hip height) is 4 x FL. If SL/h is < 2 = walking; SL/h is 2.0 – 2.9 = trotting; SL/h is > 2.9 = running.

Research into trilobite trails has shown that there are three common types and that they are linked together as shown in the diagram below. It is thought that *Rusophycus* shows the resting mark of the trilobite, *Cruziana* is the walking phase and the animal makes *Diplichnites* traces as it ‘takes off’ from the sediment floor and swims into the water above. *Cruziana* trails are the most common and probably reflect the feeding action of the trilobite too.



A ‘trilobite trail’ combination of three trilobite trace fossils

The trilobite trail diagram has been redrawn by Dave King from the <http://www.trilobites.info/trace.htm> website where it was adapted from the Treatise of Invertebrate Paleontology, Part W. Trace Fossils (Revised) by S. M. Gon III.

Cruziana fossil (Late Ordovician) found in Helechosa del Monte (Badajoz), by the Faculty of Sciences of the University of Corunna. This is thought to be a trilobite feeding trail.



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Trails like the ones shown in the photos become fossilised if they are buried and the sand or mud becomes cemented and/or compressed into rock. Later, when the overlying layers of sediment are removed by erosion, the tracks can be exposed.

Following up the activity:

Ask your pupils to try to think about and ‘recreate’ the trace fossils of other animals in the sand, such as burrowing or feeding worms, burrowing or feeding shellfish or to try to ‘recreate’ a dinosaur environment, such as the footprints found around a nest of dinosaur eggs.

Underlying principles:

- Animals living on sand or mud leave tracks, trails and burrows, called trace fossils.
- Evidence from these traces can be used to help us to understand the lifestyles of these creatures and the environments in which they lived.

Thinking skill development:

The mental creation of the ways in which ancient creatures moved involves construction and cognitive conflict. Applying these ideas in producing simulations of the tracks and trails involves bridging.

Resource list:

- some damp sand (on a river-side, a beach or in a tray) in which to make tracks and trails

Useful links:

See: Loader, P. (2006) Jurassic lawn. *Teaching Earth Sciences*, 31.2, 12-13 and Clark, H. (2008) Making tracks. *Teaching Earth Sciences*, 33.2, 35-37. Also see the <http://www.trilobites.info/trace.htm> website and the ‘The meeting of the dinosaurs – 100 million years ago’ and ‘A dinosaur in the yard’ activities from Earthlearningidea www.earthlearningidea.com

Source:

Devised by Chris King of the Earthlearningidea team.

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