Pre-Assessments

Pre-Assessment Overview

Pre-assessment tasks help you to find out what knowledge, experiences, skills and attitudes your students have before you begin any science instruction. In some instances, you might find it useful to have students write their responses to a short set of simple questions on the topic. Examples might be: What is air? Where do clouds come from? What are rocks made out of? What is a fossil?

At the upper elementary grades, concept maps and webs are good ways of seeing what your students know and how they connect their ideas.

Younger students can make drawings or diagrams showing what they know about concepts. For example, a student drawing our Solar System might put stars next to planets or show all the planets the same size. By looking over what your students produce, you can design lessons that address naïve or erroneous understandings, as well as any lack of skills. It is important that you or your students keep pre-assessment tasks safely, so that you can compare what they knew before starting a topic to what they learn by the end.

While this part of the web site contains pre-assessments that have been developed for the investigations on K-5 GeoSource, you may find them useful for other lessons as well.

Fossil Pre- Assessments

What are children's ideas about fossils?

Most of your children will have seen fossils in museums, classrooms, or on television, yet many will not have developed a formal scientific conception of what a fossil is or how it forms. For example, some children do not think of trace fossils or impressions as fossils. They are more likely to equate fossils with bones (vertebrates) than with impressions or spores (plants) or with burrows, tracks, molds, and casts of invertebrates. Many children understand that fossils reveal evidence of earlier life (children commonly refer to this as "prehistoric life") and of extinct animals and plants, yet do not understand that fossils can be studied to understand how life has changed through time. Children also have a variety of nonscientific ideas about how fossils form. They generally know that decay is involved, yet some children equate fossilization with "hardening" of the organism, yet many do not understand how deposition (burial) and sediment size affect fossilization.

What do children think about the age of fossils?

The passage of time is a relative concept. For example, if you ask your children to keep their eyes closed for one minute, many will open them much earlier, and some much later. Adults, also, often have difficulty estimating the passage of time. This difficulty is sharply magnified when children, and adults, try to envision the vast scale of geologic time. In addition, your children may have been seriously misled by fictional movies and other media which distort life through time for entertainment. For example, the spectacle of humans fighting off dinosaurs may have led some children to think that dinosaurs and humans coexisted. In fact, nothing could be further from the truth. Children may also have little idea of how fossils provide evidence not only of past animal life (the fossil record) but also of the age of rocks (geological record). It is very important to use every opportunity to help children grasp the accepted scientific explanations and concepts as accurately as possible. They need to achieve this through an understanding of how scientists gather, analyze, interpret, and reconstruct the past.

Here are some examples of what children think about fossils.

- A fossil is an old object that was buried under the earth a long time ago and rocks have formed around it, so it is preserved.
- A fossil can be a footprint that was preserved by rock forming around it.
- Fossils are the remains or imprint of an object.
- Fossils might have formed in muddy places where an animal got trapped in the mud and hardened.

- Fossils might be formed when oceans or lakes dry up and fish or shells get left on or in the ground.
- When fossils start out to become fossils, they form mud around them and it keeps building up and starts drying out to form rock.
- Fossils can show different extinct organisms.
- Fossils can tell us something about why they are gone [extinct].
- Fossils can tell us that Earth contained life long ago and that it is very old.

Here are questions about fossils or changes in life through time that you can use as pre-assessment questions with your children.

- What is a fossil?
- What kinds of things can become fossils?
- How do you tell how old a fossil is?
- Where is the best place for a fossil to form?
- How long does it take for a fossil to form?

It is important that you find out what informal ideas your students already have about fossils before you begin instruction. You can ask them to respond to the questions above, either in writing or orally. Keep their responses for later, so that you can compare what they think at the beginning of your instruction on fossils to what they know at the end.