

**Blair Middle School LEARNS after-school program; 6th, 7th, and 8th graders
March 26, 2013**

20 students, divided into two groups

From 10 AM until noon

Kirsten Siebach, Renata Cummins

Kirsten Siebach – "Why Earth is Special"

Gave 50-minute presentation twice, to groups of ~10 middle schoolers

The outline of my talk was centered around the theme of what makes Earth special, and I used Mars as a point of comparison for finding things that were special about Earth. The three key points were that Earth has (1) 3 phases of water (2) plate tectonics (3) an atmosphere that supports life. I used video clips and diagrams to explain how we study different planets, how they are formed and what is similar about them, and then what is different.

Some things that went well:

- I had the kids repeat the three reasons the planets were different several times, so hopefully they learned the key points from the talk and maybe some more interesting facts.
- One of the groups was really small and I asked them their names. I think that was a good idea and made them feel more comfortable asking questions, and I'd recommend that in the future with small enough groups. Unfortunately I am not particularly good at names so I didn't remember them later when I called on them but I think the idea helped anyway.
- Short movie clips are useful for showing ideas that are easier to see in movies than on slides (e.g. formation of Earth, plate recycling), but I find they are best understood when I ask a specific question before the movie clip and then quiz the students on what the answer was afterward.

Some things I plan to improve:

- Still working on finding a balance between explaining one thing really well and explaining a lot of different concepts. I think repeating three key points helps ensure there is a take-away message even from an overview presentation, but I also think I need to simplify my slides to more directly correspond to the three points.

Based on the slides I spent longer amounts of time on in this presentation, I will make a few more simple diagrams to split difficult concept

Renata Cummins -

I gave a presentation called Fossils! What they tell us about the Earth. First we talked about which types of rocks have fossils in them. I showed them a youtube video of a fish turning into a fossil

(<http://www.youtube.com/watch?v=SEdfRy6DQns>).

Then I showed them a few different sedimentary and igneous rocks, and asked them which one was which.

Next I talked about Darwin's dilemma. Darwin was worried that complex animal fossils seemed to appear suddenly out of nowhere in the Cambrian. I showed some pictures from fossils in the Precambrian, and explained that fossils are hard to find in the Precambrian because most of them were made by either very small microbes or soft-bodied animals that are unlikely to be preserved.

Next I asked the students what they think we can use fossils for. They had a few good ideas. I told them that fossils can be used to date rocks, but only if you can identify the fossils first. I put up pictures of a few different types of animals and plants (trilobite, fish, snail, horn coral, ammonite, fern, and flowering plant), and then gave each group a box of seven different fossils. They had a sheet of paper with a picture of each of the organisms, and I asked them to identify which fossil went with which organism, and write down the fossil's name.

Once everyone finished, I had six students volunteer to hold a "rock", which was a piece of paper with two pictures of fossils on it. The other students helped them stand in order from oldest to youngest in the front of the classroom. There were multiple orders that were all possible, because many of the age ranges of the fossils overlapped. There was also one "rock" that had a trilobite and a flower, which never lived at the same time.

Next I explained that fossils can also be used as evidence for plate tectonics. I gave each student a baggie with five cut-out continents in it: South America, Africa, Australia, Antarctica and India. They helped me identify each of the continents. Then they colored in the areas where different fossils were found on each of the continents, and tried to fit them together into Pangaea. After they found the correct answer they glued the colored continents down onto tagboard.

Finally, I talked about other uses for fossils. I said that John Eiler's group used dinosaur fossils to measure the body temperature of dinosaurs, to see whether they were more similar to reptiles or birds. I also explained how paleontologists used the extinction frequency of different types of animals during the end-Permian extinction to guess that the extinction was caused by ocean acidification. This gives us a warning of what might happen if we put too much CO₂ into the atmosphere today!

What worked well:

The students liked the beach rock with the wave ripples and the pahoehoe I showed them as examples of sedimentary and igneous rocks. They all had heard of Darwin and the theory of evolution before, and I didn't get any questions like "my pastor says this isn't true". They liked getting to look at and touch fossils. They also really liked seeing the modern nautilus and gastropod to compare to the fossil gastropods and ammonites. Most of them liked coloring the continents and trying to figure out how they fit together.

Suggestions for next time:

Next time, I won't spend so much time asking the students to identify sedimentary rocks. They were already pretty good at this. I will also try to explain the background reasoning behind Darwin's dilemma - that evolution needs to happen slowly through time - better. I think that giving the students pictures of the fossils made it too easy to identify them, so next time I will just give them a sheet of paper with numbers corresponding to each of the fossils. I will also bring more modern examples of the organisms in the fossils. The students really seemed to like the comparative biology part of fossil identification. I will start with only two students at the front of the classroom when they are putting the "rocks" in order of age, and then add one student at a time, because having all six of them up there at once was too confusing. I might also make the age ranges of the fossils a little more specific, because the students were frustrated with the ambiguity and "multiple answers" that were possible when several types of fossils overlapped in age ranges. Maybe I will have only one ambiguous placement. I will also try to figure out an activity students can do quietly if they finishing their coloring early.