

TO Tour – for 6th graders from American Martyrs Catholic School

Lesson on Plate Tectonics – James Hollingsworth (January 6th 2011)



I gave a 30 minute lesson on Plate Tectonics six times over the course of the morning. Here are my thoughts on what happened...

Firstly, the children were 6th graders and went to a private school in Redondo Beach. So they were fairly well behaved, and were also pretty knowledgeable. They had been taught an introduction to plate tectonics a few weeks before.

So I began by introducing myself, and asking what they thought a scientist was. I didn't try to explain what a postdoc was, rather I focused on why one might do research to find out things we don't fully understand. I showed a picture of people pouring chemicals into test tubes, and then said this is not the sort of laboratory I work in. I showed them a picture of the Himalayas and said this was my laboratory. They liked that! I then showed a few pictures of me working in the field, and tried to give them a different perspective of a scientist, and how they are not all boring geeks!

I followed this up by asking if anyone knew what an earthquake was. They did. I then showed them the earthquake machine, and also some videos of the different types of faults (using USGS gifs). I asked them for about different types of faults... they all knew the San Andreas was a strike-slip fault.

We then looked at an earthquake map of the world and I talked them through the pattern of eqs... i.e how they happen along narrow lines in the oceans. Then we discussed how the surface of the earth is like a crispy shell and the eqs happen on the edge. We used graham crackers and pushed them around the table to simulate plates moving. Eqs happen where crackers rub up against each other. I also used a candy bar which I snapped in two, to show how cold things snap (in earthquakes). I left a candy bar in some warm water and showed how this wouldn't break, as it has become floppy. This is why eqs don't happen in the middle of the Earth.

I showed a short (2 minute) video from YouTube summarizing plate tectonics, and how plates subduct and melt and form volcanoes. Using GoogleEarth we looked at a map of volcanoes along the west coast of S America (Chile).

Ok, so everyone was happy with Plate Tectonics. However, then I showed them a map of earthquakes and zoomed into Central Asia. Earthquakes were everywhere, and the continents don't look like plates anymore. Rather than go into the complexities of why Plate Tectonics doesn't work so well on land, I simply said that the continents are much more complicated because they are made of up lots of different types of rock with different material properties. I shows some examples of things with unusual material properties... we looked at corn starch mixed with water (~1:1). If we move a spoon slowly through the water, it goes through. If we do it quickly, the corn starch mixture becomes hard (strain hardening) and the spoon drags the corn starch. I showed the opposite using ketchup. They could all relate to this! Then I explained how some people think Tibet behaves like honey, and cragged a spoon through some honey to make the 'Tibetan Plateau' which collapse when we move the spoon away.

So this part was really an excuse to show them some fun food experiments, which didn't really explain why continents deform in a diffuse was, but certainly made them think differently about the behavior of the Earth's surface. They were all pretty focused.

We finished off by looking at faults in the LA area. I said this is what I do for my research... fault finder! We looked at the Raymond fault in San Marino, and how it has made a topographic step. Then we went further to the north to look at the range front of the San Gabriel mnts. I asked them to try and find some active faults on their way home!

So it all went very well. The kids were pretty well behaved, although the two groups at the end were a bit restless as they had already been shown around the seismolab for 2 hours already. Also, they were split into boys and girls... I'm not sure this is a good thing to do.

Some points which will shape future lessons:

1. Maybe spread the responsibility of controlling the kids to the teachers as well?
2. Do not let the kids get their hands dirty with corn starch. It's super messy and gets everywhere.
3. Ask as many questions as possible. If there's an opportunity to ask a question rather than just tell them something, do it. It keeps them engaged and makes them feel like they are being successful. Also, it helps you know what level they are at.
4. Try not to do 6 lessons in one go. I was completely exhausted at the end!
5. Try to end on something specific rather than fizzling out.
6. Small class sizes are DEFINITELY the way forward!

As I say, I had well behaved kids who were interested and knowledgeable. I'm not sure how kids from a more typical school would have found the lesson. I might have had to control them a bit more, or relied on the teachers to do so.

References:

YouTube video: <http://www.youtube.com/watch?v=ryrXAGY1dmE>

USGS animations: <http://earthquake.usgs.gov/learn/animations/>

Also, I used USGS GoogleEarth earthquake and LA fault map layers:

<http://earthquake.usgs.gov/learn/kml.php>

<http://earthquake.usgs.gov/earthquakes/catalogs/>