

Deep Earth

(1) 50 min class **likely shorter than 50 mins; suggested convection demo to fill it out.

Materials:

Silly Putty (several to share, appx. 1 per 3-4 students)

Lecture Slides

Context: This lesson will help students learn some fundamental concepts about the internal layers of the Earth. Included in the lecture is a review of the 3 types of heat flow. Then, the composition and heat flow occurring in each layer is discussed, especially in the context of what is driving the Plate Tectonics we see on the surface of the Earth. Although not included, a demo on Convection may be engaging and appropriate.

Lesson Plan:

1. Warm up with a pop quiz on the layer names. The rest of the lecture will expand their knowledge of the layers from just the names to more details about each distinct layer.
2. Begin Lecture with a review of the 3 types of heat flow, provided in Lecture slides. A demo or activity reviewing convection in greater detail is suggested depending on students background, but not included here.
3. Continue Lecture on Deep Earth (slide notes appear on slides).
4. When lecturing on the Mantle, take a short break to address the common misconception that the mantle is liquid. Demo with silly putty: Pull it apart quickly and observe that it breaks. Pull it apart slowly and observe that it stretches. Also, roll it into a ball and observe that it bounces (like a solid). It's behavior depends on timescale: when forces act quickly (like pulling apart quickly) it acts like a solid (it breaks), when forces happen over long timescales (like slowly pulling apart), it acts a little like a liquid and flows (stretches) without breaking. The mantle 'flows' in a similar way. Let students play with silly putty individually for a few minutes and then make a sculpture - encourage them to make tall but stable structures. Place all the small sculptures at the front of class for the rest of class. By the end of class they should look slightly 'melted' - another demo. of their plastic (not exactly solid) behavior.
5. After silly putty activity, continue with Lecture
6. Wrap up: let students observe silly putty and then put it away.