



Hands – On Science with NOAA

TITLE: Plate Tectonics and Lava Lamps

OVERVIEW:

Participants use discovery and inquiry to investigate a lava lamp and relate it to Earth's internal processes that cause geological phenomena such as earthquakes, mountain building and sea-floor trenches.

MATERIALS:

Lava Lamp
Popsicle sticks

INSTRUCTIONS:

- Plug in lava-lamp; allow ample time for heat to build and convective currents to begin.
- Allow viewers to hypothesize about possible correlations between Earth's Plate motions and the lava lamp.
- Leading question: "What is the "engine" that drives Earth's internal processes and geological events?" Answer = heat from radioactive decay
- Compare the light bulb in lava to Earth's internal heat source.
- The heavier liquid absorbs the heat, and as it heats up, it expands. As it expands it becomes less dense. Because the liquids have very similar densities, the formerly heavier liquid is suddenly lighter than the other liquid, so it rises. As it rises, it cools, making it denser and therefore heavier, so it sinks.
- Have students hypothesize and discuss how objects floating on the surface would move.

SCIENCE BACKGROUND:

Tectonic plates are portions of the Earth's outer crust (the lithosphere) about 5 km thick, as well as the upper 60 - 75 km of the underlying mantle. The plates move on a hot flowing mantle layer called the asthenosphere, which is several hundred kilometers thick. Heat within the asthenosphere creates convection currents (similar to the currents that can be seen in the lava lamp). These convection currents cause the tectonic plates to move several centimeters per year relative to each other.

EXTENSION IDEAS:

- Have students design and build their own lava lamp.
- Investigate hot spots, hydrothermal vents and sea floor spreading.
- Have students investigate how they can affect the convection currents in the lava lamp.
- Plot recent earthquakes and volcanic activity on a world map and compare to the location of plate boundaries.

EXPLORE FURTHER:

NOAA hydrothermal vents website - <http://www.pmel.noaa.gov/vents/>

NOAA tsunamis website - <http://www.tsunami.noaa.gov/> -

Sea Floor Education resources -

http://www.education.noaa.gov/Ocean_and_Coasts/Ocean_Floor_Features.html

USGS Earthquake Hazards - <http://earthquake.usgs.gov/>



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