

Topic/Theme: Plate Tectonics

NYS ILS Standards:

Essential Questions:

1. How does a geologist determine the internal structure of the Earth?
2. What is the Earth composed of?
3. How can heat energy be transferred in the Earth?
4. How has Alfred Wegener's theory of continental drift and scientists' knowledge of sea-floor spreading helped us learn more about plate tectonics?
5. What is the theory of Plate Tectonics?

Performance Indicators:

- The rock at Earth's surface forms a nearly continuous shell around Earth called the lithosphere.
- Heat can be transferred through matter by the collisions of atoms and/or molecules (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).
- Continents fitting together like puzzle parts and fossil correlations provided initial evidence that continents were once together.
- The Theory of Plate Tectonics explains how the "solid" lithosphere consists of a series of plates that "float" on the partially molten section of the mantle. Convection cells within the mantle may be the driving force for the movement of the plates.
- Plates may collide, move apart, or slide past one another. Most volcanic activity and mountain building occur at the boundaries of these plates, often resulting in earthquakes.
- Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser.

Essential Knowledge and Skills:

- Geologists study the processes of Earth.
- The Earth has 4 main layers: crust, mantle, outer core and inner core.
- Heat can be transferred in three ways: conduction, convection and radiation.
- Alfred Wegener developed the theory of Drifting Continents.
- Pangaea was a supercontinent that "broke apart" 200 million years ago.
- In sea-floor spreading, molten material erupts along the mid-ocean ridge and hardens to form rock.
- In subduction, the ocean floor sinks back into the mantle beneath deep ocean trenches.

- The theory of plate tectonics explains how Earth's plates move and interact with each other.
- There are three types of plate boundaries: convergent, divergent and transform.

Classroom/Assessment Ideas:

- Black Can Lab (CCR 3,7 CCW 3)
- 3-D model of the interior of the Earth
- Movie: Journey to the Center of the Earth (how the Jules Verne novel had a base in science) (CCR 1,2,4 CCW 5,6,7,8,9)
- Heat transfer demonstrations
- Recreating Pangaea posters
- Plate Tectonics Lab (drawing and labeling plate boundaries) (CCR 1,3 CCW 3)

Vocabulary:

geologist crust basalt granite mantle lithosphere
 outer core inner core radiation conduction convection
 radiation convection current Pangaea continental drift
 mid-ocean ridge trench subduction sea-floor spreading
 plate transform convergent divergent plate tectonics
 fault rift valley