i3 STC Kit Extension Activities

North Carolina

Grade: 6th

Kit Name: Exploring Planetary Systems

Essential Standard(s):

6.E.1.1 Explain how the relative motion and relative position of the sun, Earth and moon the affect the seasons, tides, phases of the moon, and eclipses

6. E.2.1 Summarize the structure of the earth, including the layers, the mantle, and the core based on the relative position, composition and density.

6. E.2.2 Explain how crustal plates and ocean basin are formed, move and interact using earthquakes heat flow and volcanoes to reflect forces within the earth.

Big Ideas:

6.E.1.1

The number of hours of daylight and the intensity of the sunlight both vary in a predictable pattern that depends on how far north or south of the equator the place is. This variation explains why temperatures vary over the course of the year and at different locations. The Earth's moon revolves around the Earth as both go through space and revolve around the Sun. From Earth, our moon appears in a series of phases that repeat in a regular cycle. Since the rotational period of the moon is the same as its period of revolution around the Earth, the same side of the moon is always viewed from Earth. The moon and the Sun each exert a gravitational pull on the Earth. These gravitational forces can be aligned or in opposition to one another. These forces as well as the Earth rotation have a major impact on the Earth's ocean tides. Ocean tides follow a predictable pattern. The alignment of the Sun, Earth and Moon can produce shadows on the Earth or Moon resulting in Lunar or Solar Eclipses. Eclipses are also predictable. The Earth's north-south axis is tilted at an angle, as compared with the plane of its revolution around the Sun. The rotation of the Earth causes all parts of the Earth to experience periods of daylight and darkness. The revolution of the Earth around the Sun on its tilted axis along with its daily rotation causes varying lengths of daylight on the Earth's surface as well as changes in the directness and intensity of sunlight. This results in a yearly cycle of seasons for much of the Earth's surface. The tilt of the Earth's axis also results in the seasons being 'reversed' in the Northern and Southern hemispheres. (e.g.: winter in North America corresponds to summer in South America.)

6.E.2.1

The earth is composed – primarily- of rock. Three-fourths of the earth's surface is covered by a relatively thin layer of water (some of it frozen), and the entire planet is surrounded by a relatively thin layer of gas we call the atmosphere. The Earth has a solid inner core that is surrounded by a liquid outer core. The inner core is a solid section of the Earth and is unattached to the mantle, being suspended by the molten outer core. The inner core is predominantly iron metal with significant amounts of the element nickel. This inner layer in mutual combination with the rotational motion of the Earth creates a dynamo effect where a force field is generated. This field is also known as Earth's magnetic field. In terms of the physical aspects of the outer core, the layer is dense but not as dense as pure molten iron. Surrounding the entire dense, metallic core is a thick, hot, convective layer called the mantle. The crust consists of many continental and oceanic plates that have slowly moved and changed positions on the globe throughout geologic time.

6.E.2.2

The earth's plates sit on a dense, hot, somewhat melted layer of the earth. The plates move very slowly, pressing against one another in some places and pulling apart in other places, sometimes scraping alongside each other as they do. Mountains form as two continental plates, or an ocean plate and a continental plate, press together. There are worldwide patterns to major geological events (such as earthquakes, volcanic eruptions, and mountain building) that coincide with plate boundaries. Lithospheric plates on the scale of continents and oceans constantly move at rates of centimeters per year as a result of movements in the mantle coupled with characteristics of the plates themselves. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions. The crustal plates range in thickness from a few to more than 100 kilometers. Ocean floors are the tops of thin oceanic plates that spread outward from mid-ocean rift zones; land surfaces are the tops of thicker, less-dense continental plates. Earth is made up of 4 different layers: inner core, outer core, mantle, crust. Seismologists have studied how wave energy travels through the different layers of Earth. Waves have characteristics: frequency, wavelength, amplitude and speed. During an earthquake, energy is released into the Earth as: Primary waves, Secondary waves and Surface waves

Essential Question, The HOOK!
6. E.1.1Our Class has won a trip to Sydney, Australia during winter break. What type of clothes should we pack?

6. E.1.2.1 and 2.2 If our trip changed and we were to go to the center earth, would we pack different items?

Which activities in the kit touch on the Standard(s) and how can they be adjusted to better affect or address the Standard(s)?
Lesson 7 for 6E.1.1
Lesson 4, 5, 6 for 6E.2.1 and 2.2

Kit Activity	**Extension Suggestions**
Lesson 4: Literature connection: Earth Activity create a brochure	Use an Egg to demonstrate the layers of the earth Writing Prompt: You are the pilot of a special vehicle that is made to travel to the earth's interior. Summarize the structure of the earth including the layers, the mantle and core. Be sure to address relative position and density. 3-D model lesson: http://web.ics.purdue.edu/~braile/edumod/threedearth/threedearth.htm Pie slice Model lesson: http://web.ics.purdue.edu/~braile/edumod/earthint/earthint.htm www.thelayersoftheearth.com
Lesson 5; Making Craters Lesson 6: Other surface features	Boiling rice: convection… looking at the flow of heat Plate tectonics activity: http://web.ics.purdue.edu/~braile/edumod/foammod/foammod.htm Lava Layering: http://lunar.arc.nasa.gov/education/activities/active7.htm
Lesson 7 gravity and orbital motion	Faces of the Moon Lesson pdf: http://bobcrelin.com/FOTM-TG.pdf Seasons on Earth Lesson: Sign up… free site http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.lp_seasons/

Additional Suggestions (Literature connections; online resources):

Extension selections from kit;
P66-67 Mission Earth
P73-77 Climate's Link to Life
P136-P139 Heavy Thoughts

www.ck.12.org

http://web.ics.purdue.edu/~braile/indexlinks/educ.htm

http://lunar.arc.nasa.gov/education/index.htm