IMHOTEP'S
LEGACY ACADEMY

Wonders of the World

Grade 7.12 Activity Plan

Reviews and Updates

REVIEWER	ACTIONS/COMMENTS	DATE
Esther Bonitto	First draft of activity	24/07/19

Wonders of the World

Objectives:

1. To identify the layers of the planet Earth
2. To understand how tectonic plates cause earthquakes and tsunamis

Keywords/concepts: crust, earth layers, earthquakes, inner core, lava, magma, mantle, outer core, rock, soil, tsunamis, water

Take-home product: Labelled plasticine Earth model with crust, mantle, outer & inner layers

Curriculum Outcomes:

Grade 7: (210-6, 311-1, 311-4, 311-5, 109-7, 111-2, 310-1)

Segment	Details
African Proverb & Cultural Relevance (5 min)	"If you think you're too small to make a difference, you haven't spent a night with a mosquito." **~Ghanaian Proverb**
Demo 1: Fault Lines (10 min)	Using wooden planks, a motor, some string and springs, earthquakes and tremors can be demonstrated and explained.
Activity 1: Jell-quake (30 min)	Allow students to build/design building models that they think will be able to withstand a Jell-O earthquake.
Activity 2: Earth's Layers (30 min)	Use plasticine to form a model of the Earth, revealing its four main layers.
Post-test (5 min)	Aid students in the completion of the Fill-in-the-Blank activity, encouraging them to finish it quickly, as the first student to finish will get to pick out a prize from the *Earth Mine*

Suggested Interpretation of the Proverb: Whenever you think that you are too small to make a difference in this world, think about a mosquito. Mosquitos are tiny little creatures that can wreck significant havoc on humans, which are thousands of times bigger. In the same way, you can make a major impact on this world, by improving healthcare or architecture, etc. Never underestimate your abilities – you can do anything! https://books.google.ca/books?id=-LgrDwAAQBAJ&pg=PT84&lpg=PT84&dq=If+you+think+you+are+too+small+to+make+a+difference,+you+haven%E2%80%99t+spent+a+night+with+a+mosquito+nigerian+proverb&source=bl&ots=6xE4U80ZWn&sig=ACfU3U1In2yxjyv0CKNFot1eOm_pruxHNQ&hl=en&sa=X&ved=2ahUKEwjD77yFmNXiAhVuvlkKHZa2D3wQ6AEwDXoECAkQAQ#v=onepage&q=If%20you%20think%20you%20are%20too%20small%20to%20make%20a%20difference%2C%20you%20haven%E2%80%99t%20spent%20a%20night%20with%20a%20mosquito%20nigerian%20proverb&f=false

Cultural Relevance: Mae Jemison, born in 1956, is the first African-American woman that travelled to outer space. She spent 156 days in space on a mission with NASA, and had the awesome privilege of viewing our beautiful world from above. Interestingly, Jemison is also a physician and an engineer. Why stop at one career when you can have 3 or 4?

BACKGROUND INFORMATION

The planet Earth on which we live is a beautiful place. We observe things like the ocean, trees, and animals that live on the Earth's surface everyday, but have you ever thought about what might exist underneath our feet? In this activity, we are going to explore the separate, unique layers of the Earth and learn about tectonic plates, which are what cause earthquakes and tsunamis.

Crust: The outermost layer of the Earth. The crust is made of igneous, sedimentary, and metamorphic rocks, and is 8 – 32 km thick.

Mantle: The mantle is the next layer that sits right underneath the crust, and is composed of rocks and magma. The mantle is approximately 2900 km thick.

Outer core: The outer core is mostly composed of iron and nickel, and is approximately 2400 km thick.

Inner core: The inner core is approximately 1220 km thick, and is a solid iron-nickel alloy ball, which may also contain some other elements.

Fault lines: Crack or fracture in the ground that occurs due to the movement of tectonic plates. Fault lines are common places for earthquakes to occur.

Tectonic plates: Separate pieces of the Earth's crust that move, shift and sometimes overlap, according to the movement of the underlying mantle. Significant movements of the tectonic plates can be felt in earthquakes.

Earthquake: Violent shaking of the ground, caused by volcanic eruptions or movement of tectonic plates.

Tsunami: a high, wide sea wave caused by a nearby earthquake.

Demo 1: Fault Lines

Source:

- https://www.youtube.com/watch?v=WmU_2cYWB1rQ

Purpose: *to demonstrate how the shifting of fault lines cause earthquakes and tremors*

Item	**Quantity (10 students)**
Wooden planks	2
Wooden blocks	2
Motor	1
Clear plastic string	1 piece
Metal springs	2

Procedure:

1. Assemble the fault line model as demonstrated in the YouTube video in the link above.
2. Adjust the model as necessary to demonstrate and explain earthquakes, and the tremors that can follow.

Activity 1: Jell-quake

Source:

- https://www.youtube.com/watch?v=mMnEXukSmdg

Purpose: *to learn that structures must be engineered to withstand violent earthquakes, especially in areas of the world that are prone to earthquakes*

Item	**Quantity (10 students)**
Packages of Jell-O (any flavor)	10
Baking pans	10
Toothpicks	300
Mini marshmallows	3 bags

Procedure:

1. **To be prepped by MENTOR day before activity:** Prepare Jell-O as directed on packaging and pour a single pack of Jell-O liquid into each baking pan. Place pans in the fridge to cool overnight.
2. Allow students to design/build structures using the toothpicks and marshmallows that they think will be able to withstand an earthquake.
3. Carefully place the structure on top of the pan of Jell-O. Shake the pan to demonstrate an earthquake. If the building falls over or breaks, make necessary adjustments to the building and try again. Shake the pan more vigorously to demonstrate earthquakes of a higher magnitude.

Activity 2: Model of the Earth

Source:

- http://www.elizabeth-elle.com/learning-about-the-earths-layers/

Purpose: *to understand and visualize the layers of the Earth*

Item	**Quantity (10 students)**
Plasticine (modelling clay)	5 boxes
Toothpicks	40
Paper	5 sheets
Tape	5 rolls
Plastic knives	10

Procedure:

1. Take a yellow piece of clay and roll it into a ball.
2. Take an orange piece of clay and use it to completely cover the yellow ball.
3. Take a red piece of clay and use it to completely cover the orange layer. Make the red layer a bit thicker than the orange layer.
4. Take a brown piece of clay and use it to completely cover the red layer. Make sure that the brown layer is thinner than the red layer.
5. Take a piece of blue clay and use it to completely cover the brown layer, roughly matching the same thickness as the brown layer.
6. Add green pieces of clay around this blue layer, mimicking pieces of land on the watery globe.
7. Take a plastic knife and gently slice a wedge through the globe to reveal its layers. (Like a cake slice!)
8. Stick toothpicks into each layer, and label from the center to the outside as inner core, outer core, mantel, and crust.

Name: _____

Fill-in-the-Blanks

Complete the crossword puzzle below! Whoever finishes first will get to pick out a prize from the *Earth Mine* :) If you complete the bonus question first, you can also get a prize! (Therefore, there's a chance to win 2 prizes!)

Outermost layer of the Earth	
	Solid iron-nickel alloy ball
Giant wave caused by an earthquake	
	"Plates" that sit underneath the Earth
What is the mantle made of?	

Bonus Question: What do we call magma that has flowed out onto the Earth's surface after a volcanic eruption?

Item	Price	Source (in-store)
Wooden planks	$	
Wooden block	$	
Motor	$	
Plastic string	$	
Metal springs	$	
Jell-O packages	$	
Baking pans	$	
Toothpicks	$	
Mini marshmallows	$	
Plasticine (modelling clay)	$	
Printer paper	$	
Tape	$	
Plastic knives	$	