

SHAKE IT UP (LEVEL 2)

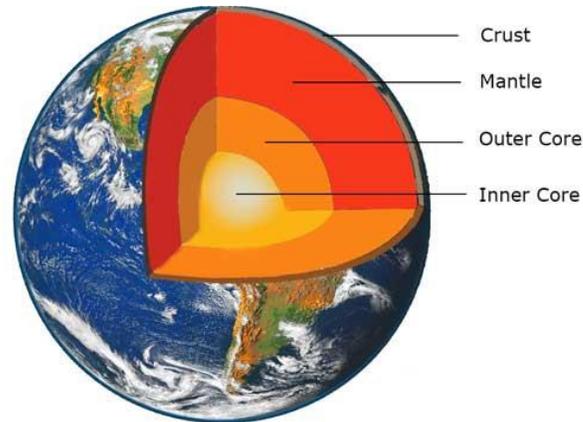
Description	Learners will begin to understand the way the Earth is designed as tectonic plates, how mountains form, what earthquakes are and how we respond to them!
Leading Question	Do you know how the land we are standing on keeps moving?
Total Time Required	5 hours total over 5 days
Supplies Required	Pens – Paper, Orange Biscuits / Clay, Tub Desks / Tables Cardboard, Scissors, Styrofoam, Glue Extension Materials: Vinegar, Baking Soda, Empty Plastic Bottle and a World Map
Learning Outcomes	<ul style="list-style-type: none"> • Tectonic plates and layers of the Earth • Movement of the tectonic plates • Formation of geographical features • Earthquake resistant structures
Required Previous Learning:	Basic knowledge on the world map

DAY 1

Today you will learn about the earth!

Suggested Duration	Activity and Description
10 minutes	<ul style="list-style-type: none"> • Learners will reflect on how they think the Earth's surface and continents are formed. - Learners will understand that our Earth's outer shell (also called the lithosphere) is made up of different layers of crust that are slowly moving as they are floating on the mantle (the hot liquid) under the crust

might be useful to illustrate <https://science4fun.info/composition-of-the-earth/>



There are 7 – 8 major plates and many minor plates that together make up our Earth's crust. To help visualize these plates, think of pieces of a broken eggshell!

All the continents in the world were together as one super continent called Pangea

10 minutes

- Learners will take an orange that represents the Earth, they will tear pieces of the peel – each of the peel pieces represent one plate and the orange below represents the hot liquid underneath

10 minutes

- Learners will take a few small plastic covers (or any material that floats) and float this on a tub of water. The way these plastic covers move like the Earth's plates move but much more slowly
- Learners will take pieces of biscuit, clay or any object that floats and create minor cracks on the surface without breaking them into pieces. Alternatively, they will take a few small plastic pieces (each representing a different tectonic plate)
- Learners will take a tub of water and float the biscuit, clay or other object on a tub of water.

10 minutes

- Learners will observe how the pieces keep moving just like the Earth's crust. The way these biscuit or clay pieces split, and move is just how the Earth's super continent Pangea split into the current different continents
- *Suggested extension activity - If learners have access to a map to cut or copy: Try and cut out each of the continents and put them together – as a super continent: Pangea. If they do not have access to a map, they can draw out the continents and try and see whether they fit together.*

30 minutes

- Learners will draw and design their own map of the Earth as a jigsaw puzzle with 8 pieces on Styrofoam or Cardboard (representing the 8 large tectonic plates). They will draw this based on the below or their own imagination of the various continents

10 minutes

- Learners will write down their reflection on their experience.



DAY 2

Today you will learn about how the earth can be like a puzzle.

Suggested Duration

Activity and Description

5 minutes

- Learners will begin to understand the different types of movement of the plates and the geographical features such as mountains, earthquakes and ridges
 - We will first learn about ridges that are caused by divergent plates that is plates that move away from each other.

15 minutes

- Learners will place two desks or tables with their ends touching each other - these represent two tectonic plates that are moving

	<p>away from each other and the papers represent the magma underneath that will form new crust in the gap that is made by the separation of the plates</p> <ul style="list-style-type: none"> - Place two pieces of paper vertically into the gap between the desks. Leave just enough of the papers sticking out so that there is something to pull out - Learners should slowly pull the papers out from the gap, spreading the papers apart onto the desks as they go. Make sure that both papers are pulled at the same speed
15 minutes	<ul style="list-style-type: none"> • Learners will place their hands on top of each other, palms facing down. The palm of their upper hand should be touching the back of their other hand. They will now rub their hands in this position and notice how their left hand moves to the right and right hand moves to the left. This heat created when the hands rub represents the friction created when the transformative plates slide over each other. In most cases this creates an earthquake as the crust shakes • TIP: one of the reasons that earthquakes often happen in the same places is because these places are on the fault lines that mark the boundaries between plates
10 minutes	<ul style="list-style-type: none"> • Learners will try and draw the two types of movements and the geographical features that are created.

DAY 3

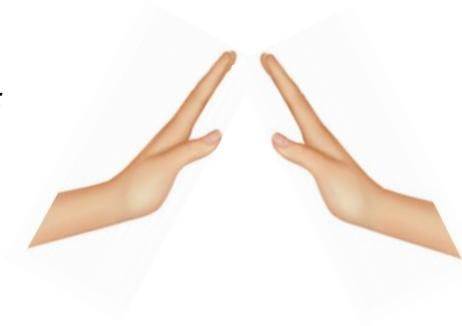
Today you will understand how earthquakes and mountains are formed.

Suggested Duration	Activity and Description
15 minutes	<ul style="list-style-type: none"> • Learners will hold up both their hands touching at the fingertips as shown in step 1. Each of their hands represents a different tectonic plate. Learners will then push their hands together from their wrists as shown in step 2 and observe how their fingers move upward to form a mountain as shown in step 3 (see images below for clarification). This is representative of two plates colliding with each other – this is how the Himalayas and other mountains were formed when plates crashed against each other

Step 1:



Step 2:



Step 3:



Suggested Extension Activity: If the resources are available: Learners will now create their own volcanoes that are mountains with open holes on the top. Since under the plates of the Earth there is molten magma, this comes out in the form of lava.

- *Learners will combine 400 ml of vinegar, 100 ml of cold water and 10 ml of dish soap in an empty bottle. In a separate cup they will fill it halfway with baking soda and halfway with water and stir it to a liquid consistency.*
- *Learners will need to be careful of the explosion and now add the baking soda liquid to the bottle. This will cause an explosion this is what an explosion is. this represents the lava that comes out of volcanoes when they erupt*

15 minutes

- Learners will write down and represent this in diagrams.

DAY 4

Today you will create structures that are Earthquake resistant.

Suggested Duration	Activity and Description
40 minutes	<ul style="list-style-type: none"> Learners will try and create structures that are Earthquake resistant - Learners will use styrofoam (thermocool) as a base and construct a tower of any materials available at home such as paper or plastic cups <ul style="list-style-type: none"> Learners will design two towers: <ul style="list-style-type: none"> The first tower will be deeply embedded into the base and have a broader base. Learners can use toothpicks, pins etc. to secure the tower into the base. The second tower will not be as embedded into the base and has a narrower base
10 minutes	<ul style="list-style-type: none"> Learners will try and shake the Styrofoam base to test which of the towers will not fall during an Earthquake. Learners will shake the base with different levels of intensity to represent different magnitude or strength of Earthquake
10minutes	<ul style="list-style-type: none"> Learners will reflect on what makes towers more resistant and write this down

DAY 5

Today you will think of ways to react in an earthquake, and you will present your jigsaw puzzle to your family.

Suggested Duration	Activity and Description
20 minutes	<ul style="list-style-type: none"> Learners will begin to think about how they would react in their home if there is an Earthquake. What emergency response plan would they put into place. <ul style="list-style-type: none"> Prompts: how would you ensure all the family members leave the home or stay safe? How can we ensure everyone leaves in an orderly fashion? Etc.
40 minutes	<ul style="list-style-type: none"> Learners will put together all their understanding in the form of basic diagrams and text as a chapter of a schoolbook to explain this to their younger siblings

ASSESSMENT CRITERIA

- Understanding of plates and movement
- Representation of how geographical features are.
- Designing maps and jigsaw puzzles.