

Watch Out! It's an Earthquake!

University of Pennsylvania University: What Is The Earth Made of?

Monique Henry

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### Abstract

In the kindergarten grades, students are encouraged to take their education to another level in learning about their world all around them. Students at the Philadelphia School District of Philadelphia are engaged in learning to read on grade level, and students are encouraged to add in counting their numbers, but there are little curriculum units in the subject area of Earth Science, much less a curriculum unit on Earthquakes. Although learning about earthquakes may not have a direct effect on the improvement of the literacy goals and standards that are mandated for educators to follow, it can definitely breathe a love for learning about science topics in nature, which can create avid readers with a concentration and love for the Earth and their natural environment. This paper will present and discuss a curriculum unit on earthquakes, within the Earth Science course for Kindergarteners. By the end of this curriculum unit, students will be able to define what earthquakes are, how earthquakes occur, and where they mostly occur using everyday materials to explain earthquake occurrences.

Keyword(s): Earthquakes, occurrences, Earth disruptions, Earth Science, Philadelphia School District of Philadelphia

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## Overview

This curriculum unit, “Watch Out! It’s an Earthquake!” is intended to build a love for Earth Science by introducing kindergarten students to the topic of Earthquakes. The love for Earth Science can be built in students gathering information through various means. At this age, students are mostly interested in any activity that they can be a part of what will capture their attention and keep them engaged. This science unit is one where curious minds learn and be engaged, because it involves stories, drawing activities, writing activities, and hands-on experiments to solidify the learning.

First, the curriculum unit will provide background information in story to help students build a depth of knowledge about Earthquakes in general. Students will listen to stories about Earthquakes during read aloud and shared reading times. They will also be able to stop and think about what they are reading by turning and talking to answer reflective questions. Students will have a chance in engaging with the information by listening to the stories, while looking at pictures, and watching videos to see the massive destruction that occurs when Earthquakes rip through the states. All in all, students will get a chance to learn why Earthquakes occur.

Next, students will be able to test the depth of what they have learned by recreating pictures that depict the Earthquake scenes. Students will also be able to explain what is going on in their picture by connecting it to any personal encounters or experiences with the Earthquakes. Research has shown that writers that draw a picture of what they are intending to write will have the opportunity to extending their writing, because students will be reminded of any added detail. In addition to writing and responding to Earthquake prompts during journal time, students will

experience asking short answer questions as a way of building testing skills while learning about an interesting subject.

Lastly, the end of the unit will be an incorporation of all that we have read, heard, written, and seen. We will have a project where students will get a chance to experience the actual effect of being in Earthquakes. Students will be given an at home project that will start from the learning in the class. Students will be given material, and they will have to create their own imaginative Earthquake scene. I find this project will be most rewarding, because it will include children reasoning, as well as a chance for students to ask questions about what they are experimenting about.

This Earthquake curriculum unit will raise the interest of the students in a number of ways. Students will get to practice their developmental academic skills while learning about new and exciting content. Students will be writing and reading across the subject area, which will only enhance their ability to draw connections, and become better readers, writers, speakers, and thinkers. As the education system starts to move towards global thinking, it would be a great opportunity for students to engage in academic learning with rigor like how other students their age are learning in other parts of the world.

### **Watch Out! It's an Earthquake!**

#### **Rationale**

I seek to give students a good solid foundational knowledge of core subjects to enable them to begin developing their passion for their subjects of interest. The core subjects within kindergarten are Math, English Language Arts, Social Studies, and Science. Within these subjects, Math and English Language Arts seem to be the reigning subjects that we focused on most. However, incorporating this curriculum in the classroom will esteem the subject of Science

as important as the other reigning subjects. Students will have a focus within Earth Science that they can be engaged in while learning at the same time. The curriculum unit on Earthquake may be a Science content subject, but it can incorporate the skills across all the content to inform the students of how this natural phenomenon can affect our lives.

The background content needed for this lesson will come from an elementary textbook, *Inside the Restless Earth*, where students will learn the bulk of background information about Earthquakes (Holt, Rineheart, & Winston, 2005). The first essential question that will be answered is: What are Earthquakes? Earthquakes are events during which the ground moves and dismantles buildings, ground surfaces, and deforms cities. Earthquakes occur when there are shifting plates over rocks beneath the surface of the Earth. Earthquakes occur because of Plate tectonics, and if one lives at the edge of the plates, one will be at a higher risk of experiencing Earthquakes (Holt, Rineheart, & Winston, 2005). The Plates are huge rock layers, called lithospheric plates (the top layer of the Earth), which move on/above the Asthenosphere. These plates move in different directions, in pushing towards, passing, or away from each other, causing friction, which generates Earthquakes (Holt, Rineheart, & Winston, 2005). The crumbled rock that is created as a result of the plate movement or the separating lines are called faults, and it is along these faults that Earthquakes occur (Holt, Rineheart, & Winston, 2005).

As a result of the movement of the plates, the rocks will deform, and upon deformation, the shape of the rock will change. The rock will change due to the stress or pressure that the rock may be under when it collides or shifts past another plate (Holt, Rineheart, & Winston, 2005). The word deformation means to bend, tilt, or break. When plates move past each other, it is called a transform motion. When plates push together, that process is called convergent motion.

When plates pull away from each other, it is called a divergent motion. The movement of these plates will create different types of faults (Holt, Rineheart, & Winston, 2005).

There have been many noted occurrences of Earthquakes throughout the world. In 1906, for example, there was a terrible earthquake in San Francisco. The level of this earthquake had an intensity of XI (magnitude 7.8). This earthquake caused widespread damage in the city leaving many buildings shattered. However, the most powerful earthquake happened in San Francisco, during the winter of 1811-1812 (Holt, Rineheart, & Winston, 2005). Another earthquake is mentioned that occurred in San Francisco in October 1989. Scientist used the Richter scale to measure the earthquake's power, which is known as magnitude. It was noted that the level of the Earthquake was 7.1.

In order for students to grasp the concept of how Earthquakes occur, students will have to be able to comprehend while using their critical thinking ability to imagine the actual event by various means. For example, students will have to be able to depict what an Earthquake looks like in order to be able to recognize that an Earthquake is taking place in the picture (Woodford, 2016). According to the Kindergarten standards, students should be able to ask and answer questions upon prompting pertaining to the stories that they read. In addition to that, students will be able to point with one to one correspondence which will allow practice time for identifying letters and noting key term or vocabulary words seen once sighted.

In bringing it all together, this newly created curriculum will be a nice fit into the existing curriculum prescribed by the school district, because this curriculum will give students the ability to apply their learned knowledge of Earthquakes to real occurrences and experiences that students may experience in the natural environment on a daily basis (Woodford, 2016). Currently, the school district has limited content information for science. In addition to this

observation, many of the lessons are topical and broad, which is a positive thing, because it will give teachers the flexibility needed to incorporate learning about Earthquakes in the science topic of the five senses. Teachers can create small group activities where students can note the picture that depicts the earthquake versus a picture that is not depicting an Earthquake.

### **Objectives**

This unit on earthquakes seeks to achieve motivation and excitement for learning to read and analyze information across the subject areas. Therefore, by the end of the lesson, students will be able to fill or identify the hotspots on the world map that signify earthquakes, in order to explain where earthquakes take place with 80% accuracy. Students will be able to explain what causes earthquakes, after watching an informative video about earthquakes. Students will be given a fact sheet to fill out while watching the video. By noting the different findings from the video on paper, students will be able to recall 3 to 4 reasons why earthquakes occur.

Lastly, students will be able to use drawing, writing, and a combination of food and play dough to create an earthquake display, which depicts how plate boundaries function. Students will be able to identify the different types of plate boundaries that exist.

The standards for student achievement will incorporate English Language Arts, Math, and Science standards. The kindergarten standards will be used as a guide to keep the lesson unit in line with what kindergarten students should be learning in order to demonstrate their mastery in the standard. The standard will be posted on the board at the time when the lesson will be carried out. Students will recite or listen to the standard as it is spoken in order to get an understanding of the skills that are to be worked on while learning about an interesting topic.

### **Strategies**

Students will achieve the expressed objectives mentioned in the earlier sections in order to enhance their learning of Earthquakes by completing a number of class assignments. First, students will complete a KWL chart as a whole group in gathering information about what students already know about Earthquakes. Students will ask questions to establish what they want to learn about Earthquakes. Next, students will watch a video about Earthquakes, while jotting down some key details of the information that they gathered while watching and listening to the video. At the end of the video, students will turn and talk and share the information that they have jotted down. Then, students will discuss what they learned about Earthquakes. This activity will be completed over a span of 1-2 days.

Students will learn more about earthquakes and what causes earthquakes by listening to a read aloud story, and by engaging in shared reading to understand more about earthquakes. Students will complete a three-tier box on the information that they have gathered from the readings. Students will have the opportunity to circle information, look at Earthquakes pictures, and exchange their thoughts about earthquakes with their neighbor, in small of groups of 3 people, and in whole group settings. In addition to that, students will be able to identify the area where earthquakes are most likely to occur on the world map. Students will gain experience with learning how to look at the world map.

Getting students up and moving is the last strategy of how students will achieve the expressed objective. Students will change objects in a box position to see how earthquakes can move things from one place to another or even shatter them. Students will engage in movement with music to get a full experience of how earthquakes can affect one's life. The goal is to have students become a part of the learning process where they can get a true experience of how earthquakes affect buildings, homes, families, and the entire world.

### **Classroom Activities**

The earthquake curriculum unit is looking to incorporate activities that will cover the learning styles of all students. Students will be able to engage in learning from the aspect of physical touch, listening, kinesthetic, and using their ability to observe objects with their senses. Each lesson will be about 25 minutes long on a daily basis. Day one will consist of completing a KWL chart on what students know about Earthquakes. Students will sit on the rug in a circle to complete a whole group activity. Students will answer the questions: 1) What do you know about earthquakes? and 2) What do you want to know about earthquakes? I will roll the ball to the students that will speak or give their response. After that, students will be given a fact sheet, with empty boxes where they can jot down key details from the video they will watch after the class answers the two questions as a whole group. After the video, students will pair with two partners to talk about the pictures they saw, and the information they gathered from the video.

The next lesson will incorporate a read aloud story and a shared reading story (Wald, 2016). Students will meet as a whole group on the carpet. The classroom will be decorated with earthquake pictures, and as I am telling the story, I will point to the pictures in order to allow students to capture the visual scene of what I am reading. In between the reading, I will stop and pause modeling how I would think about the text as I am reading. During reading, I will ask students to think about the text with me while reading. Next, I will have students think about what they are thinking about on their own, and I will have them share out. This will be the gradual release model that I put in effect in order to help students get the experience of thinking while reading. At the end of the reading, students will have one response question to write a

sentence or draw a picture in order to respond to the question. The question is: 1) What was the story about? or 2) How did the earthquake affect the city?

Continuing on with the next lesson, students will get a chance to place cookies on a cookie tray. The cookies would represent the homes and buildings before an earthquake would hit. Then, the students would break the cookies up into small pieces to create the scene of the after effect of how the earthquake would change the design or arrangement of the buildings and home. This point would show that when earthquakes occur it then move things out of place. They also disrupt the orientation of people's ability to carry out their daily routines. Students will take pictures of their city scenes. Next, students will guess what type of plate movement would cause their city to look the way their cookies looked on their cookie sheet.

Lastly, students will work in centers creating buildings and entire cities using a variety of materials on a tray, construction paper, or table. Next, we will shake the surface that the city or building was built on to get the experience of seeing what would happen if an earthquake occurred. Students will see that the buildings would fall or bend or move. Students will use this experience to connect it back to the information that was read earlier in the curriculum unit to explain their reasoning for why the cities were shifted or dismantled. Students will have the ability to share in the experience of learning about how earthquakes occur, how they change the arrangement of buildings, and why earthquakes occur.

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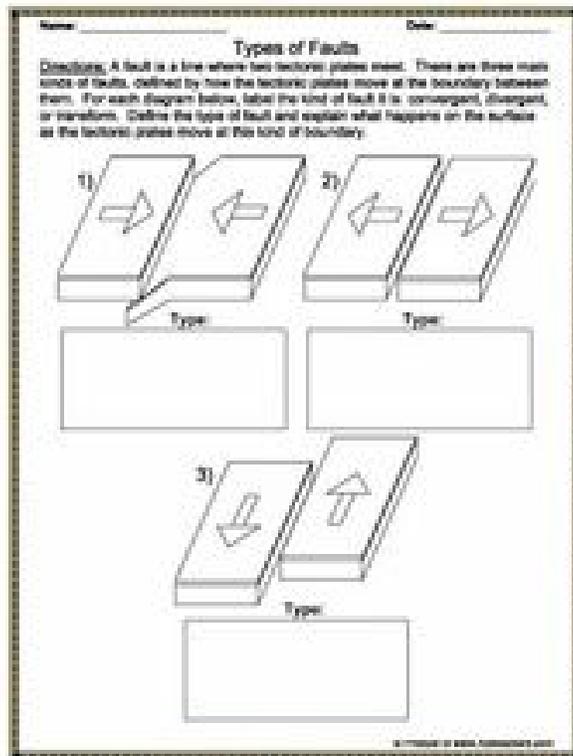
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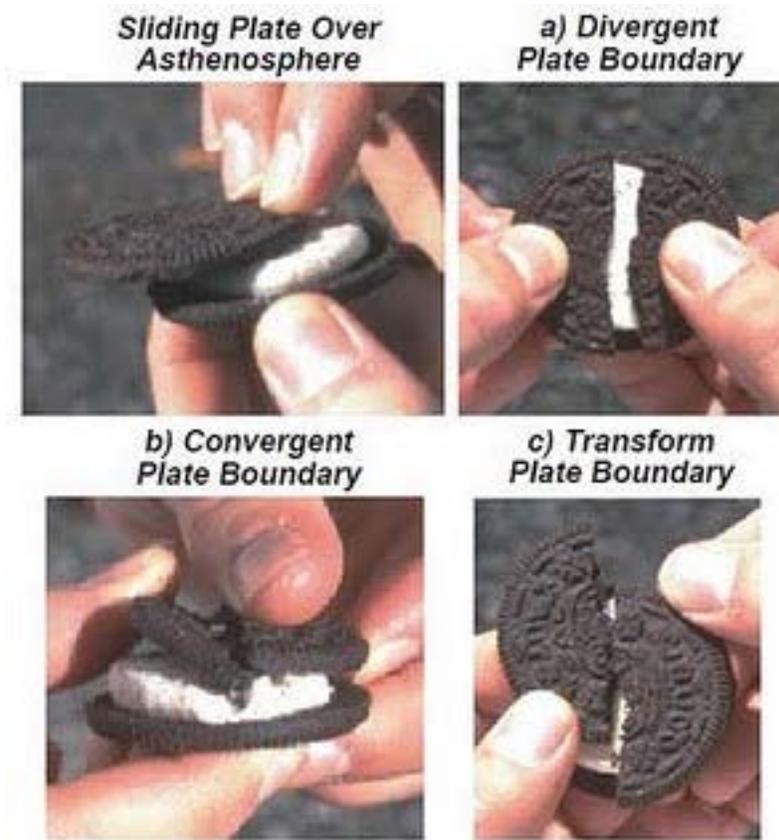
Appendix

Type of earthquakes worksheet:



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Japan earthquakes: Dozens killed; 'race against the clock' to find survivors

By Junko Ogura, Madison Park, Yoko Wakatsuki and Ray Sanchez, CNN  
Updated 9:21 PM ET, Sat April 16, 2016

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Pa Common Core Standards:

CC.1.2.K.F- With prompting and support, ask and answer questions about unknown words in a text.

CC.1.1.K.B- Demonstrate understanding of the organization and basic features of print

- Follow words left to right, top to bottom, and page-by-page.
- Recognize and name all uppercase and lowercase letters of the alphabet
- Recognize that spoken words are represented in written language by specific sequences of letters.

CC.1.4.K.M- Use a combination of drawing, dictating, and writing to compose narratives that describe real or imagined experiences or events.

S.K-2.A.1.1.1. Identify a scientific fact as something that can be observed using the five senses.

