NGSS Unit Planning with UbD

Teacher Name: 2nd grade team-Ordinario **Date: April 2016**

School Site: E. Hale Curran Elementary **Unit: Slow Changes to Land: The History of Planet Earth, Module 1**

NGSS Covered: Earth's Systems: Processes that Shape the Earth

ESS 1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

ESS 2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

ESS 2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.

ESS 2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.

CCSS ELA Covered: R.I. 2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

R.I.2.9 Compare and contrast the most important points presented by two texts on the same topic.

W.2.8 Recall information from experiences or gather information from provided sources to answer a question.

CCSS Mathematics Covered: 2.OA.A.1 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units.

2.MD.A.1 Measure and estimate lengths in standard units.

Note: This module should take 2-4 days.

Understanding by Design NGSS Unit Plan

Stage 1: Desired Results

Understand	**Essential Question(s)**
Students will understand that the Earth can be change slowly, as evidenced by key factors such as wind and rain.	**1. Why does the Earth change over time?** **2. What factors/events can cause the Earth to change slowly?** **3. What causes changes to the Earth?**

Stage 2: Evidence/Assess

Know	**Do**
Students will already know that our Earth consists of many different landforms, such as plains, mountains, rivers, lakes, etc. As we do the following experiments, they will begin to understand how these landforms are created in Earth's slow changes. Vocabulary: erosion, soil, surface, elements	Students will rub sidewalk chalk together over varying amounts of time in order to see the effects on wind erosion over a short vs. longer time period. Students will make mountains out of sugar cubes and then add a water element to determine how these "mountains" erode from the effects of rain, rivers, and other forms of precipitation.

Stage 3: Learning Plan

How

<u>Engage:</u> (Hook-Day 1) Begin by showing a timelapse video that displays changes to the Earth (such as Grand Canyon) over time. You can find these videos/pictures on Youtube or online. By observing these pictures/videos, students can then make inferences about how it was formed and how long it took to form. On chart paper or the white board, write the following: What might have caused these landforms to form? Do a think pair share and jot down the answers for the class to see. Follow this by the students writing their preferred answer in sentence form in their journals.

<u>Explore:</u> (Day 1) *Students use chalk as a model of how the land changes.*
Provide students with two pieces of chalk, a sheet of black construction paper, and a hand lens. Students place paper in front of them, then draw the chalk in their science journal. After rubbing them together for 10 seconds, they draw the chalk again. Repeat this rubbing again for 30 seconds and 1 minute…each time drawing how the chalk has changed. Students will use their hand lens to view that amount of chalk that has eroded. They can also examine the chalk itself to see the physical change that the chalk went through from the rubbing. This rubbing is meant to signify the toll that wind takes over time on a solid surface such as a cliff or mountain range. As a mathematics extension, you can have them measure their chalk before rubbing, and then after each time lapse to see how it differs. You may even want to compare these results with the class and discuss how adding more pressure (more forceful wind) while rubbing can change each student's results.

<u>Explain:</u> In their science journals, have them write down these questions:
***How did the chalk change after 10 seconds? 30 seconds? One minute? Why do you think it looked that way? What happened to the chalk after each rubbing?**

<u>Elaborate:</u> (Day 2)*Students explore how water can change a mountain.* **As a whole group, discuss how we can make observations to learn more about the Earth each day. Earth looks different now than it did 50 years ago. We can observe changes to different landforms by carefully recording data over time.**
For this activity, form groups of 3-4 and pass out materials for each. <u>Students will need to wear safety goggles for this experiment.</u>
Inside the bowl, students will make a mountain using 5 sugar cubes for the base, 3 on top of those, and one at the pinnacle. On the provided paper *Student Journal: Slow Changes*, they will draw what the mountain looks like. They then take turns pouring water down their sugar mountains. Explain that this simulates the effects of rain and river flow on a mountain. After everyone has had two turns, they draw the mountain again.
Discuss: How did the water affect your mountain?

(Day 3) *Students explore how wind can change a mountain.* **Give one sugar cube to each group (of 3-4 students). They draw the cube on the same paper as yesterday. Then each student takes a turn rubbing their cube with sandpaper. Explain that rubbing simulates the effect of wind on the rock. After everyone has had two turns, they draw the cube again.**
Discuss: How did the wind affect your mountain?
Do you think wind and water could change a real mountain that much in two minutes? Why or why not?

<u>Evaluate:</u> Students will use an exit ticket to answer the Essential Questions (above). Working with a partner, do a Give One, Get One activity where each student must give one answer to the questions, and get one answer from a partner. Have them share their partners answers out loud.

Stage 4: Transfer

Knowledge Transfer:

Cross-cutting Concepts:
Patterns: Patterns in a natural world can be observed.
Cause and Effect: Events have causes that generate observable patterns
Stability and Change: Things may change slowly or rapidly.

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Stage 3: Learning Plan

How

<u>Engage:</u> (Day 4) Do an Internet search for a video showing soil erosion due to runoff from a rainfall. You may also want to show a video of landslides occurring. Brainstorm what cause these things to happen to our Earth.
<u>Explore:</u> Teacher makes a pile of soil in the pan/pie plate. Put some seed mix on top of the pile (you may choose to put a small layer of soil over the top of seeds, or not). Have students gather around the pan (or display using Elmo). Slowly pour water over the soil pile and let students observe what they see.
<u>Explain:</u> Using their science journals, have them write a few sentences explaining what happened and why. Share a few as a class out loud.
Next, introduce the handout and explain the challenge.

Elaborate: **The challenge is to design a model of what you could create for your home so that the rain will not wash the seeds away. Criteria and constraints include:**
***The design must show the house and the flowerbed.**
***It also must clearly show how the flowerbed will be protected from the rain coming off the roof.**
***The seeds may also not be buried in the soil.**
Once everyone has completed their design, students may have each other look at their designs to see if they followed all criteria and if they would be successful.

Evaluate: **Allow time for each group to share and discuss their design. They must be able to answer the questions on their Student Journal handout. Other questions to ask:**
***How does your design keep the water off the flowerbed?**
***What would happen to the land where the flowerbed is if there was not anything put up to keep the water from coming down right there?**
You may use the rubric attached to grade the project if you'd like to.