Engaging Context Data Integration

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Data Sources

The data sources on which I have chosen to focus this assignment are entitled *The Latest Earthquake Map and List* and *Weekly Volcanic Activity Report* and can be accessed at the following links: https://earthquake.usgs.gov/earthquakes/map/ and https://volcano.si.edu/reports_weekly.cfm.

Lesson Enhancement

This marking period, the discipline in which the fourth graders in Franklin Township are focusing on is Earth and Space Science. Students have already studied the Earth's internal structures and are going to be introduced to the tectonic plate model and the idea that the continents were once all clumped together into a single giant landmass. In the first session, *What is Pangaea?* students work in pairs to discuss ideas and predict what maps of the Permian, Jurassic and Present Day show and what they mean. Then, the students will read a passage about Pangaea and reflect back on their predictions and ideas (Baxter, McGinnis, Pashley, & Schwartz, *Grade 4 Earth and Space Science*, 2017, p. 34). The plate tectonics theory describes how the Earth's surface changed in the past, as well as how it continues to change today. When two adjoining tectonic plates interact along a common boundary, these interactions produce volcanic activities and earthquakes. Students can enhance their understanding of these natural processes by using real-time earthquake and volcano data from the above data source to explore the relationship between earthquakes, plate tectonics, and volcanoes. Students will access real-time earthquakes and plot the locations on a world map. Then, students will compare the map they've

created to one showing tectonic plates and look for a relationship. Students will then plot recent volcanic activity on a world map and look for relationships between volcanoes and plate boundaries (The Center for Innovation in Science and Engineering Stevens Institute of Technology, 2019).

Using Data

Using data in the classroom promotes problem based learning, collaboration, higher order thinking skills, and critical analysis (The Center for Innovation in Science and Engineering Stevens Institute of Technology, 2019). Using data on the Internet instead of information out of a textbook "not only engages students, but also brings a real world connection right into the classroom"(The Center for Innovation in Science and Engineering Stevens Institute of Technology, 2019).

Interdisciplinary STEM

Not only can the data from recent earthquakes and volcanic activity be used to, "analyze and interpret data from maps to describe patterns of Earth's features" which is Next Generation Science Standard (NGSS) 4-ESS2-2, using this data in the aforementioned lesson also connects to Common Core State Standards for English Language Arts (Baxter, McGinnis, Pashley, & Schwartz, *Grade 4 Earth and Space Science*, 2017, p. 111). One such standard correlation is CCSS.ELA-Literacy.RI.4.7, "Interpret information presented visually, orally and quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web Pages) and explain how the information contributes to an understanding of the text in which it appears"

(Baxter, McGinnis, Pashley, & Schwartz, *Grade 4 Earth and Space Science*, 2017, p. 38). The NGSS's Crosscutting Concepts addressed in the lesson are, "Patterns; Cause and Effect; Systems and System Models and the Scientific and Engineering Practices addressed are "Asking Questions; Developing and Using Models; Analyzing and Interpreting Data" (Baxter, McGinnis, Pashley, & Schwartz, *Grade 4 Earth and Space Science*, 2017, p. 111). Mathematical connections to this lesson include, Mathematical Practices 2, 4 and 5, "Reason abstractly and quantitatively; Model with Mathematics; Use appropriate tools strategically" (NGSS Lead States, 2013). Additionally, 4.MD.A.2, "Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale" is also addressed in using earthquake and volcanic data in the lesson (NGSS Lead States, 2013).

References

Baxter, J., McGinnis, S., Pashley, H., & Schwartz, J. S. (2017). *Grade 4 Earth and Space Science*. Armonk, NY: Knowing Science.

NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States (The Nature of Science in The Next Generation Science Standards). Retrieved from* http://www.nextgenscience.org/.

The Center for Innovation in Science and Engineering Stevens Institute of Technology. (2019). Retrieved from http://ciese.org/materials/k12/.