Data Source:

This assignment uses GRACE Data Over the United States, 2003-2012 retrieved from https://youtu.be/nJVmBiAgVco.

Lesson Enhancement:

GRACE-FO and its predecessor GRACE (2018) track and monitor changes in the Earth's water resources and the water cycle which is essential to life on Earth. This data source and ideas from a project on JPL Education's website called Tracking Water Using NASA Satellite Data will enhance a Project Learning Tree (PLT) lesson on the water cycle for fourth through eighth-graders called Water Wonders. The data shows water mass change over the United States within a nine-year period using data collected from the GRACE satellite. The students will be able to see the changing data and make visual connections of the precipitation and evaporation process. Using this data source, I can add analyzing and interpreting data to my objectives.

Data integration is a benefit to students. When students see visual representations of what they are learning, they have a greater understanding of the subject matter and make deeper connections. Student-gathered data can make students connect with the subject matter in a personal way that makes it more important and worthwhile to the student.

Visual Presentation:

"Tracking changes in our water resources and the water cycle is important for everyone" ("Tracking Water," 2018, Background, para. 5). Teaching students about the importance of our water cycle and water resources convey the magnitude of these Earth processes in our lives. I selected the GRACE data because it shows how the United States' water mass changed over a broad span of time spectacularly. When thinking about the water cycle, one tends to imagine a bedrock-to-cloud picture. The GRACE data is an amazing above-the-Earth representation of the water cycle. Seeing the water cycle as an active phenomenon will engage the student in more critically inspired thought processes.

Interdisciplinary Context for Data:

Ideas for the science and mathematics teacher and student exchanges come from Tracking Water Using NASA Satellite Data in the Procedures section on JPL Education's website referenced below. After showing the data animation, the students will complete science, mathematics, technology, writing, and social studies activities.

Science: The teacher will ask: what is the animation showing? The student will answer, "the highs and lows of the combined land-water storage…" ("Tracking Water," 2018, Procedures, #6). The student will be asked to read the data as presented on the map. The student will answer mm-H2O which is millimeter of equivalent water with high land-water represented as red and low land-water represented as blue.

Mathematics: The teacher will ask what are the numerical values on the data map. The student will answer that the values range from -200 to 200. Given two dates (March 2007 and March 2009) and a specific area of the map (Alabama), the student will find differences in the data. The student will answer that March 2007 and March 2009 have the same land-water storage in mm-H2O in Alabama.

Technology: Gathering data to complete mathematics assignment.

Other content areas:

Writing: Write a report focusing on the on the science and mathematics components: In complete sentences, describe the data on the map. In complete sentences, write if there were the differences in the data of the specific area given in the math assignment, or were there any differences?

Social Studies: State recognition. Which state to the east of Texas had high land-water storage during June 2007? The student will answer Louisiana.

Resources

Tracking Water Using NASA Satellite Data. (2018, May). Retrieved June 22, 2018, from

https://www.jpl.nasa.gov/edu/teach/activity/tracking-water-using-nasa-satellite-data/

National Aeronautics and Space Administration. (2018). [Animation illustrates the highs and lows of the Earth's gravity field as water in the basins of the U.S. changes over time]. GRACE Data Over the United States, 2003-2012. Retrieved from https://www.youtube.com/watch?v=nJVmBiAgVco&feature=youtu.be