Lesson Implementation and Reflection
Pinkelman.Lesson
March/April 2022

Lesson Implementation

The first part of our Earth and Space Science unit focuses on Earth's Systems and their interactions. We begin by exploring the hydrosphere following these focus areas:

- Anchor Phenomena: The Dust Bowl
- Investigate the amount of saltwater, freshwater and frozen fresh water on Earth
- Explore mixtures and solutions by investigating saltwater and how much salt is in Earth's oceans
- Learning about the important role groundwater plays in our lives
- STEM Challenge in which students construct a pipeline to transport water following certain criteria and constraints

After each activity, we look back at the anchor phenomena and add notes to a conceptual model about the interaction of Earth's Spheres before and during the Dust Bowl. The unit wraps with student-conducted research about Earth's Systems; students read through informational books and online resources to find examples of interactions in which the environment is both positively and negatively impacted.

Prior to the student research, I wanted to "Engage" students by sparking their interest in more current examples of interactions. Although they enjoy learning about the Dust Bowl, it can be difficult for them to relate to. As a result, I decided to implement a lesson based on a resource from the Earth Resources Observation and Science (EROS) Center. The resource includes satellite images of changes in the environment, including everything from agriculture to natural disasters.

One of the features included images of lakes and seas around the world and the changes they've gone through over the past few decades:

- https://eros.usgs.gov/remote-sensing-classroom/earthshots-classroom/

Since students were already familiar with the hydrosphere, I wanted to keep that system as a foundation before launching into their own research.

The lesson went as follows:

- Students partnered up and I created a simple graphic organizer on a chart.

Noticings	Wonderings
Outward Interactions	Inward Interactions

- We started with the Dead Sea, Israel, Jordan, West Bank photos from 1973 and 2013.
- Students talked with their partner about their “Noticings” as I recorded ideas on our class graphic organizer. Students discussed their “Wonderings” with their partner and we recorded these ideas as well.
- We then looked at the last two sections of the graphic organizer - “Outward Interactions” and “Inward Interactions.” I wanted students to think about how the change in water affected other spheres (outward), as well as what may have happened in other spheres to affect the water (inward).
- Students then followed these same steps with their partner and took their own notes as we looked at a few other images from the EROS site:
    - Lake Chad, West Africa
    - Aral Sea, Kazakhstan and Uzbekistan
    - Lake Turkana, Kenya and Ethiopia
- During our wrap-up class discussion, we noted how there can be both positive and negative consequences due to interactions, which served as a great segway into their own individual research activity.

Lesson Reflection

Overall, I was pretty happy with the lesson activity. When I was exploring our class resources, the EROS site really stood out to me as a resource I could use at the elementary level. The resources we’ve had in class have been amazing but I’ve struggled to filter some of them down to what would be appropriate for my grade level. To be honest, I think I just need some more time to sift through them. However, I immediately knew my students would be engaged by the satellite images on the EROS site.

Thinking about where to fit these images into my unit plan was a bit of a challenge. As a result, I adjusted the unit wrap-up to accommodate this lesson as an “engage” activity. I knew students would have the knowledge and experience to be able to see these before and after images and then make inferences about interactions that caused or resulted in the changes in water. Students loved the satellite images! They were amazed at some of the differences between the photos. We even went back, after the lesson, and looked at all the images since I had only included a few in my original lesson.

One element I would change next time is the graphic organizer. Instead of having sections for the type of interactions, I would change this to:

Noticings	Wonderings
Positive Impacts	Negative Impacts

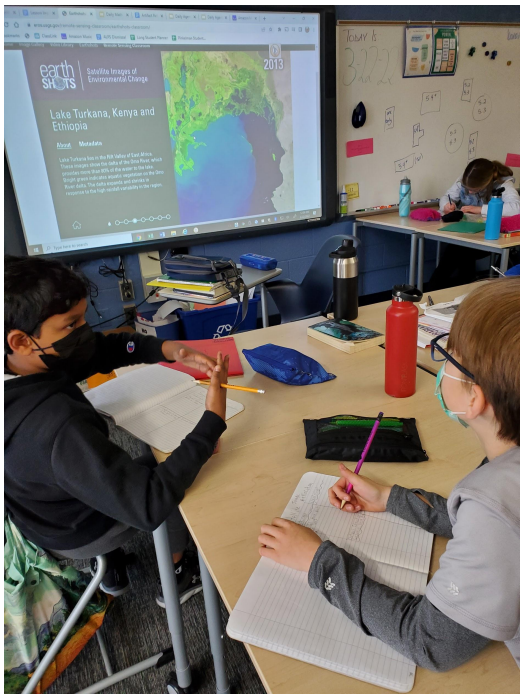
As we discussed our graphic organizers, the conversation naturally fell into the pros and cons of the interactions. I expected students to comment on the negative impacts and was surprised when they explored the positives, including:

- The growth of wetlands in Africa is good for animals that live in wetland biomes
- The change in the water level of the Aral Sea is good for farmers and maybe helps feed hungry people
- More rainfall not only helps the lake levels but also increases/improves groundwater for humans

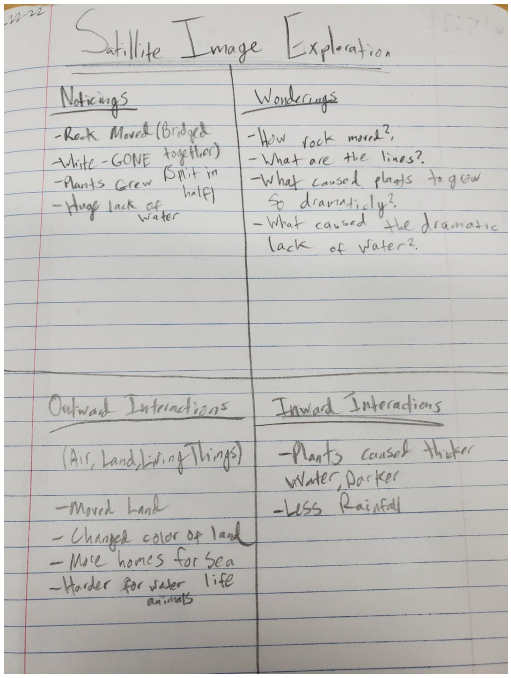
Another simple change I would make is to have the students section off their graphic organizer so they could easily see their notes for each different image. They might do this with a key or even just use different color ink for each different image. Since students just completed their notes in one graphic organizer, it was difficult for them to refer back to their notes to determine which comments were about which images.

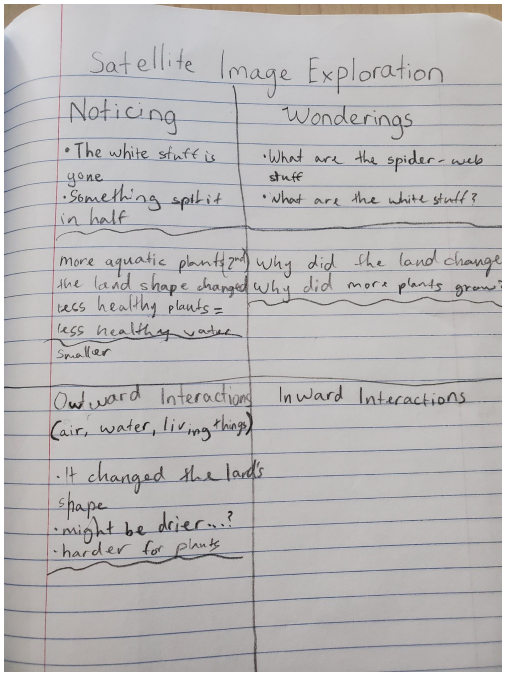
Again, overall, the students enjoyed the lesson and it was a perfect launch to their own independent research.

Lesson Artifacts



Students talking with partners and taking notes in their Science Journals.





Two Science Journals with "Satellite Image Exploration" graphic organizer.

Works Cited

USGS. *Earth Resources Observation and Science (EROS) Center*, eros.usgs.gov/remote-sensing-classroom/earthshots-classroom/.