The Impact and Importance of Current Events in Earth Science Education

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In the last twenty years of education in my school, earth science education has largely been ignored….pushed to the side for those subjects and courses which require exit exams and school test data. Unfortunately this is a common occurrence in many schools statewide. Schools are assessed on their ability to perform on certain tests, so those subjects are the focus of attention. This has led to a disservice to students. They are not getting the holistic instruction that would benefit them in all their science courses. The Next Generation Science Standards now address that holistic approach to teaching and learning science and we as teachers must integrate Earth Science concepts back into our instruction. One such way to spark excitement and give students authentic engagement is by using current events. Students and teachers both should realize that "we are unavoidably participative beings in Earth's systems - that our behavior is constantly affecting and being affected by everything natural and human, in a dynamic relationship" (Orion, 2019.)

Engaging students must be the first step of planning an instructive sequence. For many students, this may be a short, exciting video about the topic, a brainstorming session, or even an article about a current event. Current events always seem to pique the curiosity of students in my classroom and are a way that I often get their attention when we begin a new unit of instruction. Current events are real world, authentic, and most students find some way to personally relate to the event. We will look at three such current events that could easily be integrated into Earth Science curriculum and allow students to learn about the four spheres of the earth.

One such current event that was widely publicized in 2020 was the Australian wildfires. So many people watched as the outback burned, resulting in the loss of habitats and 1.5 billion animals (Gramling, 2020.) Students even were organizing events where they knitted or sewed pouches for baby kangaroos whose mothers perished in the fires. The evening news pulled on the heartstrings of so many students and teachers alike. Many wondered how this could happen? According to Carolyn Gramling in her article published by ScienceNews.org, a warming climate increased the wildfire risk in Australia by thirty percent in the 2019-2020 year.

From an Earth Science perspective, students can correlate the occurrence of this devastating wildfire to climate change. The heat wave that baked the southeastern half of Australia in 2019 was due to global warming. The Royal Meteorological Society of the Netherlands had monitored the heat wave and stated that a heatwave of such proportions is ten times more likely now than it would have been in 1900 (Gramling, 2020.) According to records kept in Australia, the 2019-2020 season was the hottest on record since recordkeeping had started in 1910. Scientists blame this heatwave on a weather pattern similar to El Nino, which they call the Indian Ocean Dipole (Gramling, 2020.) This pattern increased the effects of the dry hot weather and created the perfect firestorm for the wildfires to occur. This event allows students to look at Earth Science through the lens of both the atmosphere and the hydrosphere. The connection between the two spheres of earth would be an easy one to make. Ocean currents, temperatures and even pH (hydrosphere) can affect the weather patterns of an area which may lead to droughts or flooding rains (atmosphere.) These changes in weather patterns can then cause a domino effect that can in turn change the biodiversity (biosphere) of the planet.

Another phenomenon that students can easily relate to right now is the hurricane season that has plagued the Atlantic Ocean in 2020. This year alone has been a monstrosity of named

hurricanes.....twenty-nine to be exact. An article by Curtis Segarra from Science News.org states that hurricanes this year arrived earlier than ever since hurricanes began being named in 1953. A weather pattern including La Nina and warmer than usual waters of the Atlantic caused this unbelievable storm season (Segarra, 2020.) Are hurricanes becoming more numerous and destructive due to global warming? Is this the "new normal", having five hurricanes swirling in the Atlantic at once? (Segarra, 2020.) Scientists are hesitant to say that this is due to global warming, however, one can see that the intensity and occurrence of hurricanes has been increasing in the last couple of decades. Students would be able to use this article to spark the brainstorming session that allows them to delve into the history of hurricanes in the United States and discover how global climate could have an impact on strengthening storms. This could easily be correlated into units containing the spheres of hydrosphere and atmosphere. Students could then again compare how the interaction of the hydrosphere and atmosphere lead to biodiversity issues which represent the biosphere. Do these storms cause disruption of living organisms? Does the encroachment of the ocean onto the land during a dangerous hurricane displace marine life? Because the spheres encompass all other areas of science, the possibilities are endless!

One very current event that the entire world population is still experiencing is the outbreak of Covid-19. One may ask how does this relate to earth science? Surely many have seen the satellite images of NASA's air quality monitoring studies. The images show polluted air of heavily populated countries around the world pre-pandemic and during the lockdowns. According to graphics in a study written by Arora, Bhaukhandi, and Mishra, Mother Earth was able to relax during the Covid-19 lockdown and "nature pressed the reset button" (2020.) Many

people around the world were able to see a clear blue sky for the first time in years and it renewed their hope of a clean environment.

One of the most interesting results of the lockdown is a reduction of particulate matter in the atmosphere of developed countries. Nitrogen, sulfur dioxide, carbon dioxide and ozone levels decreased dramatically (Arora, Bhaukhandi, and Mishra, 2020.) Studies were even conducted on the Ganga River in India. Dissolved oxygen levels increased during the lockdown while Biological Oxygen Demand (BOD) increased, as well as pH (Arora, Bhaukhandi, and Mishra, 2020.) Students could correlate these levels of dissolved oxygen and increased demand of oxygen to increased biological activity of the river and conditions more susceptible to life of fishes, invertebrates, plants, etc. This current event would integrate well with a unit that deals with the atmosphere and hydrosphere. NASA data could be integrated. Students could see the images of satellites and how they have captured the clearing of the atmosphere. In fact, that is where I would start with this idea…. show the students the two satellite images of the atmosphere pre-pandemic and the one during the lockdown. Students could do a data talk and discuss such questions as: What do you notice? What do you wonder? (youcubed.org.)

This article is one that every single person on earth could relate to. Everyone has been affected by the pandemic in one way or the other. Students could use this article as a springboard to investigate pollution in developed and undeveloped countries. Why do we see such polluted air over India and China? This phenomenon would be an excellent way to look through the earth science lens and then diversify and move into NGSS standards that deal with making proposed solutions to an environmental impact. Data from NASA shows that the pandemic shutdown did allow nature to return to a healthier state. I could see students proposing

that shutdowns of factories, industry, public transportation, and other activities that produce immense pollution could be used to lower our pollution rates.

The Australian fire event and the hurricane season event are both phenomena that affect the hydrosphere and atmosphere. As students are learning about global warming and its effects on the massive fire in the outback, they could delve into the aspects of warm waters causing a surge in named storms and storm intensity. As students learn how humans impact the global warming crisis, they may then propose solutions for these shifts in global temperatures. The last article which shows how the COVID-19 lockdown has given earth a chance to "breathe" is a reminder that the planet can heal itself if given a chance. This incorporates the biosphere, atmosphere and hydrosphere into one bundled unit of instruction. Students can make connections to their actions and the planet's health.

As we teach students in the 21st century, we must make changes to the way we address the curriculum. Earth science is not a "stand alone" course. It is easily integrated into every single science course that my school offers. Teaching students about the four spheres of the earth and then integrating those spheres into all our lessons allows them to see the holistic interactions among living things and the planet. One of the best ways to hook students and show them the importance of recognizing how our planet works is by using current events. They are engaging, easily accessible, and authentic.

Works Cited

Arora, S., Bhaukhandi, K., & Mishra, P. (2020, November 10). Coronavirus lockdown helped the environment to bounce back. Retrieved December 06, 2020, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7323667/

Gramling, C. (2020, March 04). Australia's wildfires have now been linked to climate change. Retrieved December 06, 2020, from https://www.sciencenews.org/article/australia-wildfires-climate-change

Orion, N. (2019, November 28). *The future challenge of Earth science education research*. Retrieved December 06, 2020. doi:https://doi.org/10.1186/s43031-019-0003-z

Segarra, C. (2020, November 10). With Theta, 2020 sets the record for most named Atlantic storms. Retrieved December 06, 2020, from https://www.sciencenews.org/article/2020-storm-theta-record-atlantic-hurricane-climate

What do you notice? What do you wonder? (n.d.). Retrieved December 06, 2020, from https://www.youcubed.org/resources/what-do-you-notice-what-do-you-wonder/