Globalizing the Standards Assignment

**NEXT GENERATION SCIENCE STANDARDS**

Students who demonstrate understanding can:

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| **HS-ESS3-1.** | **Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.**[Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.] |
| **HS-ESS3-3.** | **Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.**[Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.] |

The first standard (ESS3-1) is easily adaptable to integrate global education, as the best examples of available natural resources (oil producing nations, rare earth metals, water, gold, etc.) and effects of climate change (sea level rise, increased incidence of disease, changes in weather patterns, water scarcity) would involve case studies from other countries/regions of the world. For science classes, an analysis of real data is always the preferred way to begin an analysis of complex problems.

To incorporate the global competencies of ‘investigating the world,’ one idea for this standard would be to do a comparative case study between the climate data (rainfall vs. water table levels, snowpack) over the past 20 years for California and then for the same data range for sub-Saharan Africa. Lake Chad is a great case study that I have used before, although I didn’t have students analyze actual data, but I’m sure it’s available with some searching. Students could then also assess the effects these shifting rainfall patterns have had on citizens’ lives and their economies, distribution/populations of cities/villages, effects on agriculture, etc. As has been mentioned in the discussion forums (week 1 and week 2), it is often a good strategy to discuss how a global problem looks in students’ own ‘backyards’ and then to extrapolate the same issue to a different country. This could be a good strategy for droughts, as the California mega-drought and associated fires/food prices are a common topic in the news. This strategy would work equally well for a suite of other global topics (food scarcity, energy, poverty). To incorporate “recognizing perspectives,” each student could be asked to write an op-ed style persuasive essay (posted to a Padlet) from the perspective of a denizen of the Lake Chad region that both describes how their daily lives have been affected by drought conditions and argues for the necessity of an international treaty to combat climate change.

I think the best assessment for the activity described above would be a checklist-style rubric for all the prompts of the assignment, covering data analysis of climate/water data for the regions, cultural investigations, research of the multitude of cascading effects caused by the drought conditions, and the structure of their essay/op ed, as well as their responses/feedback to their peers and their work. I like how this integration would start out from a very scientific research/data analysis perspective, and then shift into a more cultural/take action sort of framework.

The second standard (ESS3-3) also cries out for comparative international case studies of differential management regimes for natural resources. I’d need to further research the exact intent of ‘computational simulation,’ but I’m guessing that implies some modeling, or at the very least some data analysis of cause and effect.

An environmental science lesson that could be modified (or a physical science lesson if one is so bold), would be an analysis of energy. The effects of oil on the economies of oil-producing countries (U.S., Canada, Venezuela, Nigeria, Russia, Saudi Arabia, etc.) would be a really interesting analysis, especially in light of how the economies of some of these countries have responded to OPEC’s high production of oil during the past 12 months (driving down the price of oil/gasoline). It would also be worthwhile to examine issues of environmental justice for these different countries and compare how each country deals with fossil fuel related pollution, and to determine how much of the population benefits from oil development (or is it just the 1% and international corporations). International agriculture is another great subject that would be interesting to do some modeling with. Perhaps trying to project global food requirements as the human population on earth grows from 7 to 9 billion this century, and in light of drastic climate-induced changes to prime agricultural areas, as well as in increase in a demand for eating higher up the food chain (more protein). The analysis could also include ocean stocks of seafood and their status and projected declines at current or increasing levels of harvest.

This standard would largely be associated with globally ‘investigating our world,’ and I could envision a digital lab poster that their data analysis/models for their specific country or topic.