Unit 4 Task 2 Plan

Task Directions - Link to the directions

Phenomena: Tsunamis

- You may want to frontload with the difference between climates and seasons before we begin the assessment. This discussion should help.
- Phenomena: What makes the season winter even when it is hot outside?

Part 1: What Causes Seasons

- **Task:** (Part 1) Student groups will look at cities at different latitude and collect data about their hours of daylight and height of the sun during the year, which will be added to a class sheet. (They will use these two links to collect their data http://aa.usno.navy.mil/data/docs/AltAz.php http://aa.usno.navy.mil/data/docs/Dur_OneYear.php) The groups will use the data and class discussions to write a description of what causes the seasons.
- **Task:** (Part 2) Students will then use these models (https://www.filamentlearning.com/sites/all/themes/bootstrap/filament/img/planet-mechanic/curriculum/PM-lesson-1-TG.png and http://astronomy.nmsu.edu/geas/lectures/lecture06/pics/seasons_4.gif) to improve their descriptions of what causes seasons.
- There are two other simulations about seasons (http://astro.unl.edu/naap/motion3/animations/sunmotions.html and http://astro.unl.edu/naap/motion1/animations/seasons_ecliptic.html) But they do not work on the iPad.

Part 2: Digital and Analog

- The focus on the digital standard is to understand why digital is better than analog. The next three parts work on that, while trying to connect it back to weather, climate, and climate change.
- **Task:** (Part 1) Students will use these links (https://learn.sparkfun.com/tutorials/analog-vs-digital and http://www.explainthatstuff.com/analog-and-digital.html) to create a thinking map comparing digital and analog looking at what they are, where they are used, and how they are different.
- **Task:** (Part 2) Students will then look at how signals transfer from digital to analog or back. They will be given an example of how visual information transfers for a picture and then will work on doing the same for sound waves for both a digital file and a record.

Part 3: Satellites, Weather, and Climate

- **Task:** (Part 1) Students will read an article and summarize how satellites transmit information using specific key terms in their summary.
- **Task:** (Part 2) Then students will look at a specific satellite and discuss how that satellite collects data/imagery. Then discuss the scientific or environmental impact of the data. To shift away from students looking at space telescopes you probably want to specify that these should be satellites collecting data about Earth.

Part 4: Statement on Digital and Analog

- As an introduction you may want to discuss the benefit of digital files in taking up less space. Wikipedia has some updating information on the size of wikipedia as printed (analog) encyclopedias and as a digital file. Basically, a huge wall of book shelves vs a flash drive.
- **Task:** Students will use teacher provided resources to write an argument in the CER (Claim, Evidence, Reasoning) format to support the statement that "*Digital signals are more reliable than analog*". (There are three things that they might focus on, reliability of recordings, storage for future recovery, and the ability to be transmitted over long distances without degradation.
- To make the task more accessible you might want them to list one or two benefits of digital over analog (or just a negative of analog) from each resource and then work on compiling that into evidence for their statement.
- The following were the resources I found that seemed the best, but they are by no means exhaustive. (Possibly more picture examples could be beneficial. (Though at this point they should have a basic idea of what analog is and what digital is.)

Articles:
- http://electronics.howstuffworks.com/question7.htm
- https://en.wikipedia.org/wiki/Generation_loss#Analog_generation_loss
- http://www.informit.com/articles/article.aspx?p=24687&seqNum=5
- http://www.planetoftunes.com/digital-audio/pros-and-cons-of-analogue-and-digital-audio.html#.WMdmTvnyu70
- https://www.cai.org.uk/information/cai-news/general-news/cai-blog/315-the-benefits-of-digital-tv
- https://www.techwalla.com/articles/the-advantages-of-digital-tv-over-analog
- http://www.onlinecomputertips.com/pc-hardware/analog_digital.html

Videos:
- https://www.youtube.com/watch?v=btgAUdbj85E
- https://www.youtube.com/watch?v=mES3CHEnVyI

Pictures:
http://www.yamahaproaudio.com/global/en/training_support/better_sound/part1/06/ (Focus on the picture showing how digital and analog signals respond to noise.)

Interactive Websites: http://cmc.music.columbia.edu/musicandcomputers/chapter2/02_06.php (You can read the whole thing (some links don't work on the iPad), but make sure to check out Soundfile 2.6(a) and Soundfile 2/6(b) at the end which show how an analog copy degrades over time.