Tackle box of Tools and Technologies

*Katie Lodes (links to lessons by Joanna Chierici, Nancy Fitzgerald and Jackie Gallela)*

Summary

This lesson allows students to access personal narratives of marine scientists talking about the equipment that they use to study the ocean and the data that they collected. Students will use a VoiceThread with short scientist videos and pictures of their data to deepen their understanding of the process of science.

*[TAGS: marine technology, process of science, VoiceThread*

Key Concepts

* New technologies, sensors and tools are expanding our ability to explore the ocean.
* Ocean scientists are relying more and more on satellites, drifters, buoys, subsea observatories and unmanned submersibles.

Objectives

* Students will be able to discuss the tools and technologies needed to conduct scientific investigations of the ocean.
* Students will understand the difficulties in answering questions about our planet (everything cannot just be googled)

Materials

* Include any additional resources that educators would need to teach the lesson
  + Voicethread (internet access)
  + Instructions on registering for VoiceThread (including links on how to use it)
  + Lesson Plan for Teachers
  + Process log for understanding the tools and technologies used in marine science. Student worksheet (for those that will be showing the VoiceThread as a class activity there is a Student Log)
  + Summative assessment quiz

Procedure for teachers

Science research is pushing the boundaries of many of our everyday lives (driving from a climate controlled house in a climate controlled car to a climate-controlled school or workplace). If we want to know what the weather might be like (as we move from a car to building), it requires no more than turning on a radio or TV or accessing an app on our phone. The science behind solving questions from what the weather will be like, to climate change to where is the best spot to spot wildlife to what is that star in the sky to how do we stay healthy involves lots of tools.

This lesson will allow students to hear personal narratives from scientists who study the ocean and the tools and technologies that they need to work on answering their research questions.

**Pre-lesson work:**

Lead a short brainstorm discussion with students about exploring the ocean. Teacher discretion on how to record the session (for instance, this could be part of a student logbook). Possible questions to focus on could be:

* *What would you want to know about the ocean?*
* *Where geographically in the world would you want to collect data (a globe or map of the world would be an important visual to refer to)?*
* *What tools would you need to explore the marine world?*

Most of the researchers in this lesson have focused their work in the Antarctic polar environment. A good video to show before or after the brainstorm in #1 would be *Antarctic Edge; 70o South* (it runs about 75 minutes which may be too long for a classroom viewing)

**Once the brainstorming session is completed**

1. Go to the VoiceThread found at <https://voicethread.com/myvoice/thread/9351980> . Copy the VoiceThread for your own file (directions on how to do this can be found under Resources below).
2. Use the Voicethread with either the directions for commenting on the VoiceThread (if technology is available) OR the student log (for viewing the VoiceThead as an entire class).

The VoiceThread has personal narratives from:

* Josh Kohut (Rutgers University) and gliders
* Dr. Ken Johnson of MBARI and argo floats
* Dan De Leon (MBARI 2017 summer intern) and bioacoustics in the Monterey Bay
* Dr. Ari Frielaender (U of Santa Cruz) and studying whales
* Dr. Alma Parada (Stanford University) and studying microbes in the ocean
* Dr. Ellyn Enderlin (University of Maine) and understanding rapid glacier change

1. Students will either comment on the copied VoiceThread using their avatar identities OR hand in their logbook for review.
2. After students have completed the VoiceThread/logbook, hand out the quiz on what tools would be used to answer specific research questions (handout under Materials).

Assessment

* **Formative assessments**—Brainstorming on studying the ocean
* **Summative assessments**—
* Student log (either comments on VoiceThread or Paper Log handout), under Pre-Lesson work
* Quiz (*again work in progress)*, under materials

Additional Resources

VOICETHREAD

Background in the software program VoiceThread <http://voicethread.com/products/k12/> It is available to use on Ipads, laptops (multiple platforms including chromebooks), cell phones (multiple platforms).

<https://ed.voicethread.com/myvoice/browse/threadbox/890> (you have to have registered for VoiceThread to access this link)

Instructions for copying the template Voicethread <https://wp.voicethread.com/howto/copying-a-voicethread/>

Articles about using VoiceThread in the classroom

<https://www.facultyfocus.com/articles/teaching-with-technology-articles/using-voicethread-to-build-student-engagement/>

## Mentioned in the NSTA e-book Tech Trek: Skeins of Student Contribution: A New Web 2.0 Tool for Science

<http://www.nsta.org/store/product_detail.aspx?id=10.2505/4/ss12_035_09_80>

EARTH activities

Many EARTH activities have been developed on the tools and technologies addressed in this lesson:

* A kinesthetic activity designed to educate students on keeping a glider on course <http://www.mbari.org/how-deviant-are-you/>
* An in depth activity where students study the structure, function and purpose of drifters; based on knowledge they will design and build drifter prototypes; based on near-real-time data students will also draw conclusions about ocean currents: <http://www.mbari.org/drift-away-with-me/>
* An engineering challenge lesson to develop a tool to collect data in the arctic <http://www.mbari.org/arctic-warming-engineering-challenge/>
* *I know there is at least one past EARTH lesson on technology, but right now I can’t find it…….*

Rutgers University

Wonderful, short (five minute) videos on the process of science available at <http://toolsofscience.org/lessons.html>

Video to show difficulties of research in the Antarctic

*Antarctic Edge; 70o South* video (available on Netflix and also DVD), runs about 75 minutes. Information available at <https://beyondtheice.rutgers.edu/>

**E**xtensions or adaptations

List any adaptations to the lesson that will make it more accessible to a wider audience,

* There isn’t a no internet access option for this lesson

Any extensions that will move the lesson beyond initial understanding or experience.

* Not available right now (July 2017), but a quick lesson on using Float Viz (Ken Johnson) and whale hormone data (Ari Frielaender) are in the brainstorm stage (also multiple EARTH lessons on these topics were developed at EARTH 2017).
* Design a tool or technology that would help you answer a question that you have about the marine environment









