Lessons 8 & 9: Data Jam

Materials
- Computers with internet access (1 per pair of students)
- Method of data with student computers
- Copies of Data Jam handout
- Assortment of drawing materials for student creative projects

Overview
By identifying trends in averaged Adelie and Gentoo Penguin foraging data and other data sets from Antarctica, students will design creative projects (infographics or poems) to communicate the data trends to non-scientists, and students will see evidences of the relationship between the biological and physical systems in the Palmer Deep.

Motivating Question: How can you identify and communicate the presence of hotspots in Palmer Deep?

Take Home Message

- Students will access and use several data sets to determine the relationship between biological and physical systems in the Palmer Deep.
- Students will use these observations to see if they can identify any unique or special regions that stand out (biological hotspots).
- Students will devise a creative solution to communicate the data to non-expert audiences.

Engage: Introduction to Data Jam activity ● Familiarize students with the concept of a Data Jam by stepping through the PowerPoint presentation opening slides	20 minutes
Explore: Project Development ● Continue through the slides to familiarize students with the "DataJam_Level3_data.xlsx" file (averaged Adelie and Gentoo Penguin foraging depths) ● "DataJam_Level2_data.xlsx" which has the un-averaged version of the data for deeper inspection/correlations ● Codar data ● Sea ice cover, chlorophyll, sea surface temperature and air temperature at Palmer Station ● Distribute copies of the Data Jam worksheet ● Form student groups and challenge them to develop a creative solution for data communication	40 minutes
Make Sense: Gallery Walk ● As a class, display their work in the classroom and conduct a Gallery Walk ○ Debrief and be sure to highlight key areas of Palmer Deep data	20 minutes
Total:	**80 minutes**

Audience

- Middle and high school students

Preparation

- Teachers should familiarize themselves with the data files
- Teachers should go through the provided slides, paying close attention to the teacher questions at the bottom of each slide
- Teachers should be familiar with example creative communication solutions

Engage (20 minutes)

- Introduce the concept of a Data Jam (format and purpose) by stepping through the opening PPT slides and setting the challenge for the students to use the data found in the Data_Jam files to create a creative project which expresses the meaning of the data to non-experts.

Explore (40 minutes)

- The "DataJam_Level3_data.xlsx" file in this folder are averaged Adelie and Gentoo Penguin foraging depths for several days in January and February of 2015, and the average mixed layer depth for the corresponding days. A biological and physical variables were chosen so that students can investigate the relationship between the biological and physical world.
- To add another (optional) layer of difficulty, the "DataJam_Level2_data.xlsx" has the un-averaged version of the data. Students can investigate this data to better understand the pros and cons of different levels of data processing. For example, on January 20th, it looks like the Adelie penguins were foraging a little deeper than previous days. However, if students look at the level2 doc, they will find that only three penguins were tracked on that day. Ask students how that may alter their interpretation of the data. (level 1 of these data are the excel sheets in the shared SWARM drive of "2015_Palmer_Glider_0-10m" and "2015_Palmer_Penguins".)
- Codar data to depict in which direction and how intense the currents were.
- Year data set of water temperature, air temperature, sea ice cover and chlorophyll.
- Create small student working groups and challenge them to generate a creative project.

Make Sense (20 minutes)

- Conduct a Gallery Walk to share out the student work
- Review and debrief to ensure students fully understand the connections between the data sets presented and the importance of "hotspots" in the Palmer Deep region.

Additional Information

NGSS Standards Addressed:

HS-ETS1-4 Engineering Design

Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. Performance Expectation Grade: High School (9-12)

Polar Literacy Principles Addressed
Polar Literacy Principle #4: The Polar Regions have productive food webs.
Polar Literacy Principle #7: New technologies, sensors and tools — as well as new applications of existing technologies — are expanding scientists' abilities to study the land, ice, ocean, atmosphere and living creatures of the Polar Regions.

Ocean Literacy Principles Addressed
Ocean Literacy Principle 5: The ocean supports a great diversity of life and ecosystems.

Climate Literacy Principles Addressed
Climate Literacy Principle #3: Life on Earth depends on, is shaped by, and affects climate.