Infographics in the Classroom: Using Data Visualization to Engage in Scientific Practices

Activity 5: Fish Population Data Stories

1. Hand out the Fish Population Data Stories worksheet.
2. Give students them a chance to read through the explanatory piece in part 1 and answer the two questions. Discuss these answers together.
3. In partners have students answer questions 1 and 2 in Part 2.
4. Using "Pick a side", have students stand by the Sardine/Anchovy graph they would use (by month, year, or 5-year). Encourage them to disagree on this one – all could work.
5. Using the explanatory piece as a guide, what other information might they want to include on their graphic and how? How would they best tell the whole story? The rest of the questions in Part 2 of the worksheet can help to scaffold their ideas.
6. Have students sketch out what their graphic might look like. Remind them to consider the graphic principles and types of visuals. Demo what we mean by "sketch out" using the facebook one as a model, adding in explanations just like MacCandless does.
7. Have them share with a partner and critique each other's work by using Part 4 on the worksheet. This will take some practice and you may wish to repeat it many times, having them improve their sketch each time.

Activity 5
Fish Population Data Stories

CALIFORNIA ACADEMY OF SCIENCES

Name ______________________________

Date ______________________________

Part 1. Fish population information article

» Read the following article about sardine and anchovy populations.

» Underline the 1-3 main ideas. Circle words you don't know or ideas that confuse you.

From sardines to anchovies and back

In the late 1930s, California's sardines supported the biggest source of fish in the western hemisphere, with more than half a million tons of fish caught each year. By the mid-1950s, the sardines had virtually disappeared. Although fishing pressure may have played a part in this process, research shows that cycles in the Pacific Ocean have a big impact on which fish thrive and which do not.

Scientists have observed **fluctuations** in anchovy and sardine populations over time. These fluctuations are **correlated** with temperature of the ocean's surface. When ocean temperatures are cooler than normal, anchovies are more abundant. When ocean temperatures are warmer than normal, sardines are more abundant.

Changes in temperature of the ocean's surface can arise due to climate fluctuations or "oscillations". One of the most well-studied fluctuations is the El Niño and La Niña phases in the Pacific Ocean. These cycles last only 9-12 months, and occur every 3 to 5 years. El Niño results in warming of Pacific waters, while La Niña is a cooling of that same region. The Southern Oscillation Index gives an indication of the development and intensity of El Niño and La Niña events. Sustained negative values often indicate El Niño episodes, while sustained positive values are typical of a La Niña event. Recent major El Nino conditions occurred in 1997-98, 2003 and 2010.

"Upwelling," another climate phenomenon, can also affect fish populations. When there is an upwelling, warm surface water is replaced by cool, nutrient-rich water from below, which is capable of supporting lots of fish. Upwelling is largely a seasonal process in that it occurs most often in May-August, but it is also influenced by ocean temperature. When coastal waters become warmer than usual, less nutrient-rich deep water can be brought the surface.

Vocabulary

Correlated: when two sets of numbers are related to each other (e.g. brain mass and body mass)

Fluctuation: to shift continuously back and forth

In one or two sentences, summarize the main conclusions of the article *in your own words.*

How does this article connect to the fish catch data we have been graphing and interpreting?

Part 2. Fish population storytelling

Use the article about sardine and anchovy populations in part 1 and consider the following questions.

1. What explanations does the article give for the differences in how sardine and anchovy populations fluctuate over time? List at least two.

2. Which of the three ways of graphing (by month, by year, or by 5-year) would you want to use to go along with the article? Explain your thinking.

3. If you could add information (either other numbers or labels) to the graph chosen above to go along with the article, what would it be? Explain.

4. Referring back to *How to Visualize Numbers* document, consider if you could show the graph chosen in question 2 in another way that tells the same story.

5. What other ways might you alter the graph to make it a more successful graphic? Refer back to the *Graphic Principles of Visualizing Scientific Data*.

Part 3. Fish population graphic sketch

Use the space below to quickly sketch out how you might make a graphic to go with the article in part 1.

Part 4. Peer feedback

You will take turns with your partner(s) sharing your idea for a graphic. When it is your turn to listen to the ideas make sure to do what is listed in A. When it is your turn to share, record your partner's feedback in B.

A. Listen to your partner's graphic ideas.
1. Summarize back to them how their graphic supports the article you read.
2. Ask them what questions you have about a choice they made about how they visualized the numbers.
3. Give them at least one suggestion for how to incorporate a graphic principle better.

Use this space to take notes about your partners graphic:

B. List at least 2 constructive comments that you partner told you about your graphic.

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