CURRICULUM SUPPLEMENT

For use with the **Results** section of Watching Walrus

ACTIVITY ONE: CONDUCTING A CENSUS

Materials Needed:
-Walrus haulout image (see below) for each student
-Pencils and pens
-Scratch paper for calculations
-Hand lenses (optional)
-Software or materials to create chart displaying student data

Time: 30 minutes

Background:

Over the course of a summer season, still cameras at each haulout could snap more than 100,000 pictures. With only a small staff to analyze the data, the scientists must develop fast and accurate ways to count walrus. In this activity students will develop and utilize strategies to estimate walrus without simply counting them.

Directions:

1. Distribute printed image of walrus at land haulout (see below) to each student.

2. Ask students to brainstorm techniques scientists they could you use to estimate the number of animals present without counting every individual? Record student ideas on the board.

3. Have students carry out their method, using it to estimate the number of animals on land at the haulout pictured.

4. Have students write their count on the board. Using all number generated, have students find the mean, median and mode. Add these to the board.

Discussion:

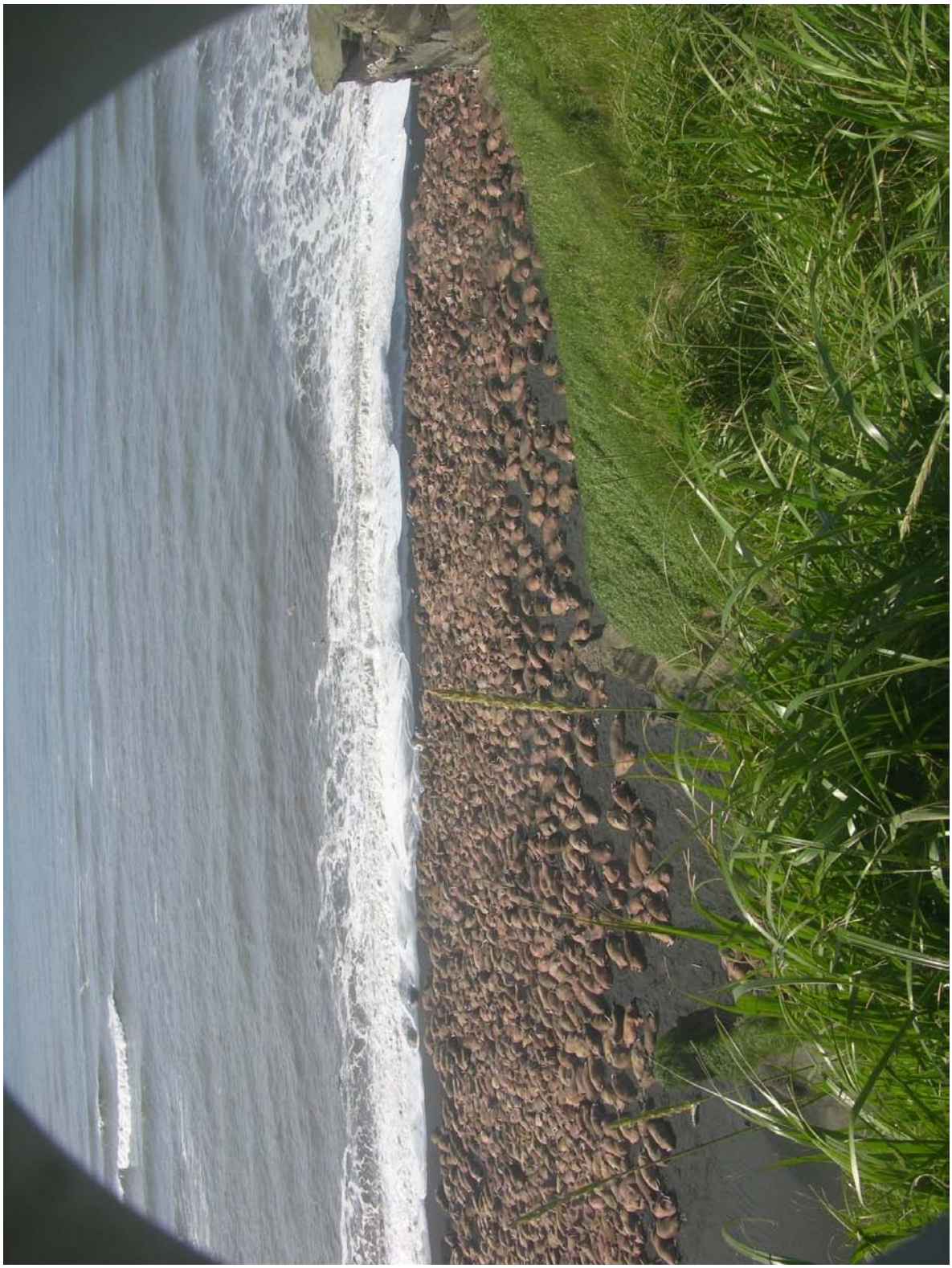
Using student data, discuss the effectiveness of different estimation methods:

-Which methods worked well? Which proved less effective?
-How certain are you about the reliability of your estimate?
-What are the limitations of your method?
-What other factors might impact the accuracy of student estimates?
-Why would it be important for researchers to be able to estimate accurately instead guessing?

Conclusions:

Students should observe that while there are some differences in individual findings, most numbers are relatively similar. Students should be able to identify outliers in the data and challenge the validity of such estimates.

Having accurate census records helps researchers identify how walrus are using a site day-to-day as well as annually. If a disturbance is recorded, census data helps scientists know what percentage of the animals abandoned the site and what percentage returned. At sites with recurring disturbances, repeat census data can help researchers observe changes in how a haulout is used, including duration, number of animals and reaction to future disturbance. All of this data will help researchers as they work to expand their study, comparing walrus behavior in Bristol Bay and the Chukchi Sea.



ACTIVITY TWO: LOCAL RESEARCH PROPOSALS

Materials:

-Print resources: newspapers, local history texts, local plant and wildlife guides etc.

-Online resources: local extension office website, state fish and game website, local conservation groups' website, and online search tools.

Time: 90 minutes or longer if desired

Background:

In this wrap-up activity students will apply the research skills they used in Watching Walrus to develop their own research proposal. Research proposals will focus on a locally relevant issue, giving background on the issue, outlining scientific questions students wish to answer and what resources each group would use to answer these questions.

Directions:

1. The day before starting this project ask students to begin brainstorming examples of local ecosystem issues they could study. For the purpose of this project students should focus on one specific animal or plant species. Each student should arrive on proposal day with a project idea in mind.

2. On proposal writing day, break students into groups of four. Ask each group to spend a few minutes sharing what local ecosystem issues they came up with.

3. After each group member has had the chance to share their ideas, instruct each group to select one idea to write up in their research proposal.

4. Distribute proposal writing directions to each group (included with this lesson).

5. Make local print, news and online resources available to students. Explain that they may use these to support their proposal.

5. Give students time to work together with their group to construct their proposal.

Discussion:

When proposals are complete groups will discuss how best to present their proposal to the class. Each group's presentation should be 3-5 minutes, highlighting the issue they selected, what questions they had and how they would work to answer these questions.

Conclusions:

Scientific skills including asking questions, making predictions, observing, describing and classifying can be applied to a variety of problems.

After participating in this virtual field trip students will recognize that although the issues in their community may be different than those presented in Watching Walrus that these similar strategies may be used to study each problem.

Just as walrus, their food sources and sea ice are all interconnected as part of the arctic ecosystem, plants and animals in student community are connected and reliant on one another.

Research Proposal Format

BACKGROUND

Describe the reasoning behind your project. Start from the very beginning: what are you interested in monitoring, why is it important to study, and what is the problem or question you are hoping to address?

OBJECTIVES

List exactly what you are setting out to study. Include at least three objectives. For example:

> Objective 1. We will record what date blueberries ripen in different parts of our county.
>
> Objective 2. We will compare the date blueberries ripen this year with historic data available through our county extension office.

METHODS

Clearly describe the methods that you will use to carry out your research. What tools & technologies will you use? How do they work? What data do you hope to collect with each technique? How does each monitoring method relate to your objectives?

SUMMARY

This is a brief summary of the problem, what your question is and how you are going to get answers. It should be about one paragraph long.

QUALIFICATIONS/TEAM MEMBERS

Here you get to use a little creativity. List each member of your team and his/her qualifications (schooling, research experience, etc.). Use your real names, but make up whatever qualifications you want for each team member. As a bonus, you can choose one final team member, living or dead, that you would pick to complete your dream team!