ELDER INSIGHTS: CONNECTING THE DOTS

Overview:

Students will learn about changes in local weather patterns, changes in local freshwater sources, as well as changes in animal population and distribution by conducting interviews with local Elders and culture bearers.

Objectives:

The student will:
- ask Elders and local culture bearers a series of survey questions;
- summarize survey data and present in a graph; and
- make inferences about what might happen in the future, based on current trends.

NOTE: This activity must be divided into two sections to allow an opportunity for students to interview community members to collect data that will be used in class work.

Targeted Alaska Performance Measures Tested on the Alaska High School Qualifying Exam (HSQE):

Math

M6.3.1 Collect, analyze, and display data in a variety of visual displays including frequency distributions, circle graphs, histograms, and scatter plots.

M6.3.4 Make projections based on available and evaluate whether or not inferences can be made given the parameters of the data.

Targeted Alaska Grade Level Expectations:

Science

[11] SA1.1 The student develops an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalization, analyzing data, developing models, inferring and communicating.

[11] SD3.1 The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by describing causes, effects, preventions, and mitigations of human impact on climate.

Vocabulary:

break up – the breaking of ice on lakes and rivers in the spring

climate – the general or average weather conditions of a certain region over a 30-year period, including temperature, rainfall, and wind

climate change – a change in the statistical distribution of weather over periods of time that range from decades to millions of years

climatology – the scientific study of climates, including the causes and long-term effects of variation in regional and global climates

ecosystem – an ecological community made up of plants, animals, and microorganisms together with their environment; a pod or rain forest are each examples of complex ecosystems

freeze up – the time of year when rivers and lakes freeze over; the onset of winter

river – a large, natural stream of fresh water that flows into an ocean, a lake, or another body of water, usually fed by smaller streams that flow into it

ELDER INSIGHTS: CONNECTING THE DOTS

Whole Picture:

Alaska Native people have traditionally expected fluctuations in weather, hunting conditions, ice patterns and animal populations year to year, but many have noted major changes since the 1970s. Observations by Alaska's Native people not only corroborate scientific studies, but provide firsthand evidence that climate change is a reality. In the last 30 years, Alaska has warmed by about 4 degrees Fahrenheit. The change is profoundly affecting the lives and culture of the people who depend on traditional ways of acquiring and storing their food. For example:

- Thawing permafrost is changing the landscape and the ecology;
- Insect populations are changing, thriving in warmer temperatures;
- Coastal areas are eroding;
- Seasonal ice conditions are changing on both ocean and inland waters; and
- With a decrease in precipitation, the risk of wildfires has dramatically increased.

Earth's climate is dynamic and constantly changing. Geologic records show cycles of warming and cooling throughout Earth's history—from the hot, tropical climate that hosted dinosaurs to ice- age climates where Wooly Mammoths roamed. What modern-day scientists are paying close attention to is the speed at which the current climate is changing. Scientists want to determine what is driving the changes: natural or man-made influences?

Natural causes that factor into climate change include continental drift, volcanoes, the tilt of Earth, and ocean currents. Singular events, such at the Dust Bowl (a period of severe dust storms between 1930 and 1936 that caused major ecological damage areas in America and Canada), can also influence climate, both regionally and globally.

Modern reference to climate change often talks of anthropogenic (man-made) climate change, or global warming. This climate change factor is attributed to greenhouse gases produced by burning fossil fuels.

Materials:

- STUDENT WORKSHEET: "Connecting the Dots"
- STUDENT WORKSHEET: "Insights – Interview an Elder"
- STUDENT WORKSHEET: "Insights – Data Interpretation"

Activity Preparation:

1. In this activity students will be asked to interview Elders and culture bearers in the community. To ensure there is no duplication that would skew the data collected, choose one of the following:
   a. Organize a potluck and invite Elders and culture bearers. Assign students specific people to interview. (See Activity Procedure 1.)
   b. Have a class discussion about who will be interviewed. Divide the community members so there is no duplication.
2. Make extra copies of STUDENT WORKSHEET: "Insights – Interview an Elder" so students can use one per person interviewed. They will also need a blank copy for later class work. (See Activity Procedure 3.)

Activity Procedure:

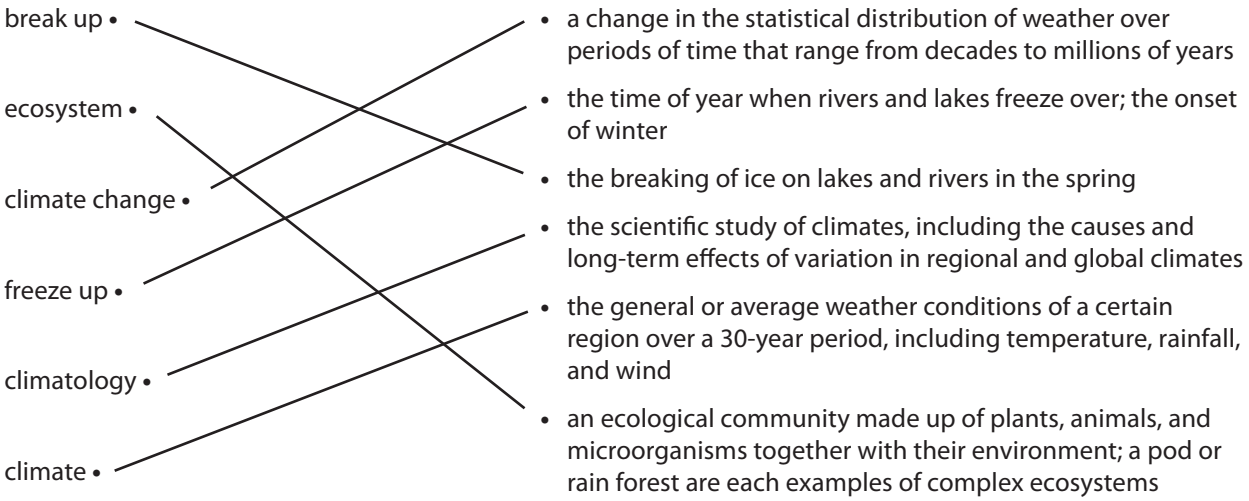
1. Hand out STUDENT WORKSHEET: "Connecting the Dots" and allow students a few minutes to complete on their own.
2. Explain understanding changes in a community is a complex process. Learning about past and present in the community is an important piece of the puzzle. In the current lesson, Elder Insights: Connecting the Dots, students will talk to community members about perceived changes, then compile the information to analyze trends and "connect the dots."

3. Hand out STUDENT WORKSHEET: "Insights – Interview an Elder." Explain the method students are going to use to interview and collect the data. (See Activity Preparation 1.) Explain it is important for scientists to collect measurable data, as well as perceptions and insights from those who live in an area and have seen changes over time. The interviews students will conduct measure peoples' perception, which is important information when studying climate change. If students are conducting interviews in the community (apart from a group potluck) assign a date of completion for the interviews.
4. After students have had the opportunity to collect individual data and information, hand out STUDENT WORKSHEET: "Insights - Data Interpretation." Students will refer to their own notes on personal interview sheets for page one of the worksheet. Allow adequate time for students to complete page one. As a class, compile the information needed for page two of STUDENT WORKSHEET: "Insights - Data Interpretation." Students will need a blank set of Chart 1 and Chart 2 from "Insights – Interview an Elder" to complete this assignment. (Refer to the directions associated with questions 4-7 on the worksheet.)
5. Assign each question from both Chart 1 and Chart 2 of STUDENT WORKSHEET: "Interview an Elder" to a student to graph on page 3 of STUDENT WORKSHEET: "Insights - Data Interpretation." For example, assign the first question from Chart 1, "Compared to the past, bird migration in the spring now occurs…" to one student. The student will use page three to graph the class results for that question.
6. When all graphs are complete, ask students to share with the class. Display in the classroom, if appropriate.
7. Ask the following critical thinking questions:
   a. Did you see any trends that surprised you? What were they?
   b. Do you think changes in the ecosystem are directly related to climate change? Why or why not?
   c. What kinds of changes are directly linked to man's influence on the land rather than climate? Explain.
   d. What kinds of change would directly affect your lifestyle? For the better? For the worse?

Answers:

STUDENT LAB SHEET: "Connecting the Dots"

Part 1



Part 2

Answers will vary.

NAME: _____

CONNECTING THE DOTS

Part 1

Directions: Draw a line to match the word with the definition.

break up •	• a change in the statistical distribution of weather over periods of time that range from decades to millions of years
ecosystem •	• the time of year when rivers and lakes freeze over; the onset of winter
climate change •	• the breaking of ice on lakes and rivers in the spring
freeze up •	• the scientific study of climates, including the causes and long-term effects of variation in regional and global climates
climatology •	• the general or average weather conditions of a certain region over a 30-year period, including temperature, rainfall, and wind
climate •	• an ecological community made up of plants, animals, and microorganisms together with their environment; a pod or rain forest are each examples of complex ecosystems

Part 2

Directions: Answer the following questions in complete sentences.

1. In your community, what is the significance of break up each spring? Are there any celebrations that mark the event? What does it mean to you, personally?

_____

_____

_____

_____

2. In your community, are there rivers or lakes that freeze over? (Yes or No) If you circled "Yes," are there activities that happen on the rives and lakes once the ice is thick? Please explain.

_____

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3. The plants and animals that live in Interior Alaska thrive in its continental climate. What are some of the important plants and animals in your community? What would happen if they disappeared?

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NAME: _____

INSIGHTS – INTERVIEW AN ELDER

Directions (Part 1): Interview one or more Native Elders or local culture bearers in the village to learn about changes and patterns in local weather and ecosystems, including rivers, lakes, animal populations, plants and forests. Record answers carefully. Ask for clarification, if needed. Use one questionnaire for each interview.

Elder or community member's full name: _____

1. How long have you lived in the area? _____

2. How much time do you spend outside now? Did you spend more or less time outside in the past? Explain.

   _____

   _____

3. How much would you say your life today is affected by weather and climate? A lot Somewhat Not at all

4. In the past how much was your life affected by weather and climate? A lot Somewhat Not at all

5. Can you tell me a story that illustrates the difference between earlier times and now?

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NAME: _____

INSIGHTS – INTERVIEW AN ELDER

Changes in Seasonal Transitions	much earlier	somewhat earlier	same time	somewhat later	much later	not sure
1. Compared to the past, spring bird migration now occurs:						
2. Compared to the past, lakes and rivers freeze:						
3. Compared to the past, the frost comes:						
4. Compared to the past, spring breakup comes:						

Thinking about the questions from the chart, what are some examples you can give or stories you can tell?

First frost	Spring break up
Freeze-up of lakes and rivers	Bird migration
Other	
If there have been changes, what do those changes mean to your lifestyle?	

NAME: _____

INSIGHTS – INTERVIEW AN ELDER

Quantitative Changes	much more	somewhat more	same	somewhat less	less	not sure
5. Compared to the past, the number of animals around now is:						
6. Compared to the past, the number of fish now is:						
7. Compared to the past, the amount of rainfall now is:						
8. Compared to the past, the amount of snowfall now is:						
9. Compared to the past, the amount of wind now is:						
10. Compared to the past, the number of unusually hot days now is:						
11. Compared to the past, the number of unusually cold days now is:						
12. Compared to the past, the number of forest fires now is:						

Thinking about the questions from the chart, what are some examples you can give or stories you can tell?

Animal population	Wind
Fish population	Hot days
Amount of rain	Cold days
Amount of snow	Forest fires

NAME: _____

INSIGHTS – DATA INTERPRETATION

Now that you have collected some data, it is time to look at the information and see what can be learned from it.

Background: It is important to note that while your data may tell you that something is happening, it doesn't tell you ***why*** it's happening. For example, if your data tells you there are fewer fish in the river now, it may be that the river has been over fished, it may be that a company is dumping toxic waste in the river and killing the fish, or it may be in the natural cycle of a certain kind of fish. It may be related to climate change. It may not.

Part 1 – Individual Work

Directions: Using your data collection sheet, "Insights – Interview an Elder," pages one through three, answer the following questions. Use complete sentences.

1. Refer to your notes on page one of your interview sheets. Why is important to know how long someone has lived in the area when examining their input into perceived climate changes?

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2. Refer to your notes on page one of your interview sheets. Oftentimes Elders don't spend as much time outside as they did in their youth. Could this influence the way they perceive the climate, past and present?

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3. Refer to your notes on page three of your interview sheets. If there has been a perceived change in the population of animals and/or fish in the area around your village, what human-caused reasons could have contributed?

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_____

NAME: _____
INSIGHTS – DATA INTERPRETATION

Part 2 – Using Class Data

Individually, data cannot examine trends, so it is important to share your data with classmates. Once the class data has been collected from each student's Chart 1 and Chart 2, use the data to complete the worksheet.

Gathering Data

4. How many people, in total, were interviewed by class members? _____ The people interviewed will be called "respondents" in future questions.
5. Gather the data from Page 2, Chart 1. Using a blank chart, write the class total in each section and circle it. Your chart may look like this:

Question	⑤	⑧	②	②	②	①

(This shows the distribution of 18 respondents.)

6. Gather the data from Page 3, Chart 2. Using a blank chart, write the class total in each section and circle it. Again, your chart may look like the example above.
7. You can now calculate the percentage for each question on both Chart 1 and Chart 2.

Use the following formula: (amount / total) x 100 = percentage

Write the percentage in each box. Each row will equal 100%. Your chart may look like this:

Question	28% ⑤	44% ⑧	11% ②	11% ②	0% ②	6% ①

(This now shows the percentage of respondents in each category.)

Using the Data

8. Refer to Chart 1 – Changes in Seasonal Transitions. Are there any trends that stand out? Answer in complete sentences.

_____

_____

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9. Refer to Chart 2 – Quantitative Changes. Are there any trends that stand out? Answer in complete sentences.

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NAME: _____

INSIGHTS – DATA INTERPRETATION

10. Complete the graph below for the chart reference assigned by your teacher. Choose a bar graph or a pie chart. Label the X and Y axes (if appropriate), give the chart a title and provide a key, if needed.

Write the question addressed:

_____.

Title: _____

Y axis: _____

X axis: _____