Unit 6 Lesson: Indigenous Observations
Alaska Eyewitnesses to Change

Overview

In this lesson, students will download a KML file to open in (free) Google Earth™ software to access a geo-referenced database of indigenous observations of climate change in Alaska.

Objectives

The learner will:

- download a KML file and open it in Google Earth; and
- access indigenous observation and weather station data in Google Earth; and
- compare indigenous observations with climate data from nearby communities.

Materials

- Computer with Internet access
- Google Earth program installed on computer

Background Information

Indigenous Knowledge:

Indigenous knowledge is also known as Traditional Knowledge (TK), Traditional Environmental Knowledge (TEK), or local knowledge. It is a body of knowledge built up by a group of people over many generations, sometimes thousands of years, of close contact with nature. This knowledge is refined and expanded with the daily experience of observing land, water, weather, and living things. It favors qualitative data and intuition, and is passed down through practice and oral tradition.

Indigenous Observations:

In the past, Western scientists thought the traditional knowledge of indigenous peoples was anecdotal and unscientific. Today, researchers working in areas inhabited by indigenous peoples recognize the scientific importance of traditional knowledge.

Indigenous peoples have long been keen observers of weather. Their weather knowledge is passed from one generation to the next. Elders and hunters, who are experienced weather forecasters, find that Alaska's climate is changing. Persistent changes in weather, over time, result in climate changes that affect life in the far north.

Snow and ice are key features of the Arctic landscape that shape the ecosystem in direct and indirect ways. Alaska Natives have interpreted and adapted to life in the far north, and are able to utilize snow and ice for survival.

Adaptation:

Indigenous peoples have lived in the Arctic for thousands of years. Traditions and daily life are closely connected to the environment and the climate. Because areas at high latitudes are sensitive to changes in climate, Alaska Natives are among the first people to feel the effects of climate change. Climate is always changing, and Alaska Natives have always been able to interpret and adapt to the changes. In recent years, however, climate change has been more extreme and happening at a faster pace. Traditional knowledge no longer fits the natural world in certain situations, and it becomes more difficult to interpret and adapt to the new environment. These rapid changes can have a great impact on Alaska Native cultures and traditions.
Subsistence:
In Alaska, a subsistence way of life is characterized by living off the land. It refers to the harvest of fish, wildlife or other wild resources for food, shelter, and other personal or family needs. Subsistence has been central to Alaska Native people and cultures for thousands of years. To this day, subsistence hunting and fishing provide a large share of the food supply in rural Alaska.

Infrastructure:

Infrastructure is the basic underlying framework or features of a system. In this lesson, infrastructure refers to the structures needed to operate a community. It includes buildings such as schools and airports. It also includes roads, power supplies and water systems.

A community's social infrastructure is the range of activities and organizations that support social relationships in the community. These include community Elders, local groups, community partners and events.

Travel:

Travel is a necessary part of life in the far north. Travel is required to gather or hunt for food, or to get medical attention. People also travel for recreation, shopping and social visits or events. Many villages in Alaska are not on the road system, which means the community can only be reached by alternative means of transportation, such as airplane, boat, snowmachine or dog sled. The portion of the state that is not connected by a system of roadways is often referred to as "the Bush." Some communities have a limited, local road system, but it rarely extends beyond the downtown area of a village.

Vocabulary

adaptation:	The process by which a population adjusts to changes in the environment to avoid undesirable consequences.
climate:	The average weather conditions in a certain place.
indigenous:	Having existed in a particular region or environment for an extremely long time, often beyond memory.
indigenous knowledge:	A cumulative body of knowledge and beliefs, handed down through generations by cultural transmission.
infrastructure:	The basic underlying framework or features of a system. In this lesson, infrastructure refers to the physical structures needed for the operation of a community or society. These may include buildings, roads, power supplies and water systems.
subsistence:	A means of support or livelihood. In Alaska, it describes an economic, cultural, and social way of life characterized by living off the land.

Getting Started

STEP 1. Download Google Earth if it is not already installed on your computer.

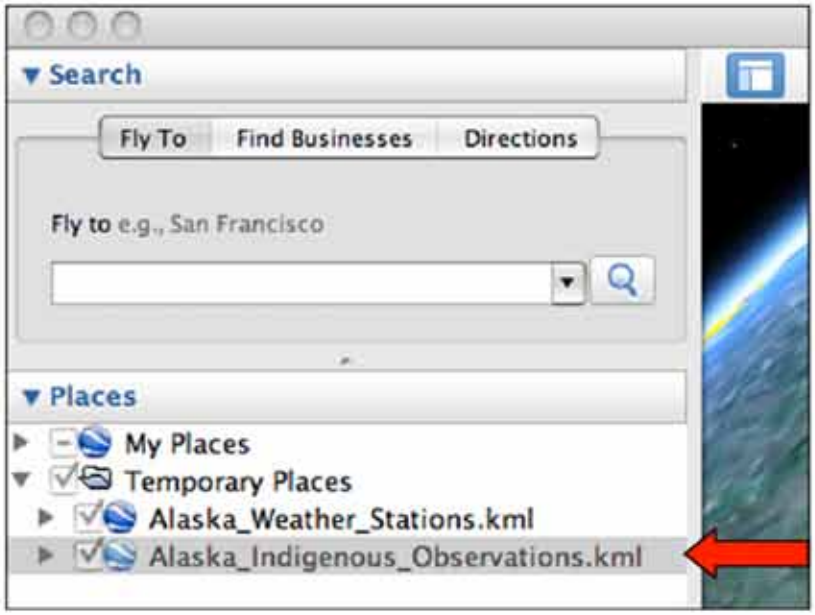
- Go to: http://www.google.com/earth/index.html.
- Available for free on PC, Mac, and Linux.
- Download Google Earth to your computer.
- Drag Google Earth to your desktop.

STEP 2. Open the KML File in Google Earth

- Download the Alaska_Weather_Stations.kml file to your computer.
- Download the Alaska_Indigenous_Observations.kml file to your computer.
- Double-click Google Earth to start the program.
- Go to the **File** dropdown menu, and select **Open...**

- Navigate to the Alaska_Weather_Stations.kml file and click **Open**.
- Go back to the **File** dropdown menu, and select **Open**.
- Navigate to the Alaska_Indigenous_Observations.kml and click **Open**.
- Double-click either of these files under **Places** in the left-hand menu in Google Earth.

(NOTE: This should zoom to the extent of the KML file - in this case, the state of Alaska.)



STEP 3. Access Indigenous Observation Data

- Click on  (the subsistence icon) at Barrow.

This will open a balloon with indigenous observations from Barrow.

Answer questions 1-6 on the worksheet.

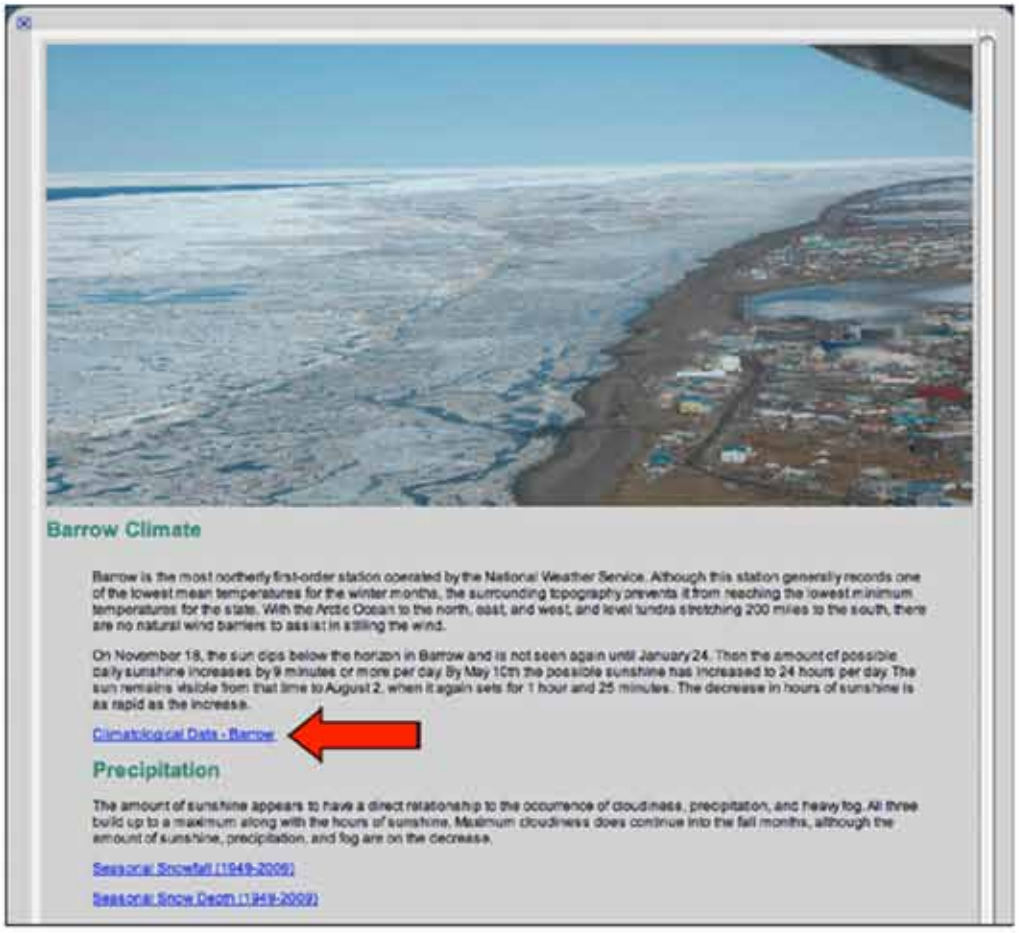
STEP 4. Compare Climate Data

- Click **Back to Google Earth** button.

- Click on  (the weather station icon) at Barrow.

This will open a balloon with climate data for Barrow.

- Click on the **Climatological Data - Barrow** link.



On the Alaska Climate Research Center's climate page for Barrow, Alaska, study the time series plot for "Barrow Mean Annual Temperature (°F)" and answer the following questions.

(NOTE: The grey dots represent the mean annual temperature of each year. The grey line is the trend line, which shows how temperatures have changed over time.

Answer questions 7-8 on the worksheet.

STEP 5.

- Go to this site: http://climate.gi.alaska.edu/ClimTrends/Change/TempChange.html
- Scroll down to the graph titled "Total Change in Mean Seasonal and Annual Temperature (°F), 1949 - 2009.

Answer questions 9-10 on the worksheet.