

NORTHERN SEWARD PENINSULA IÑUPIAQ

Kiuḡiyaaq

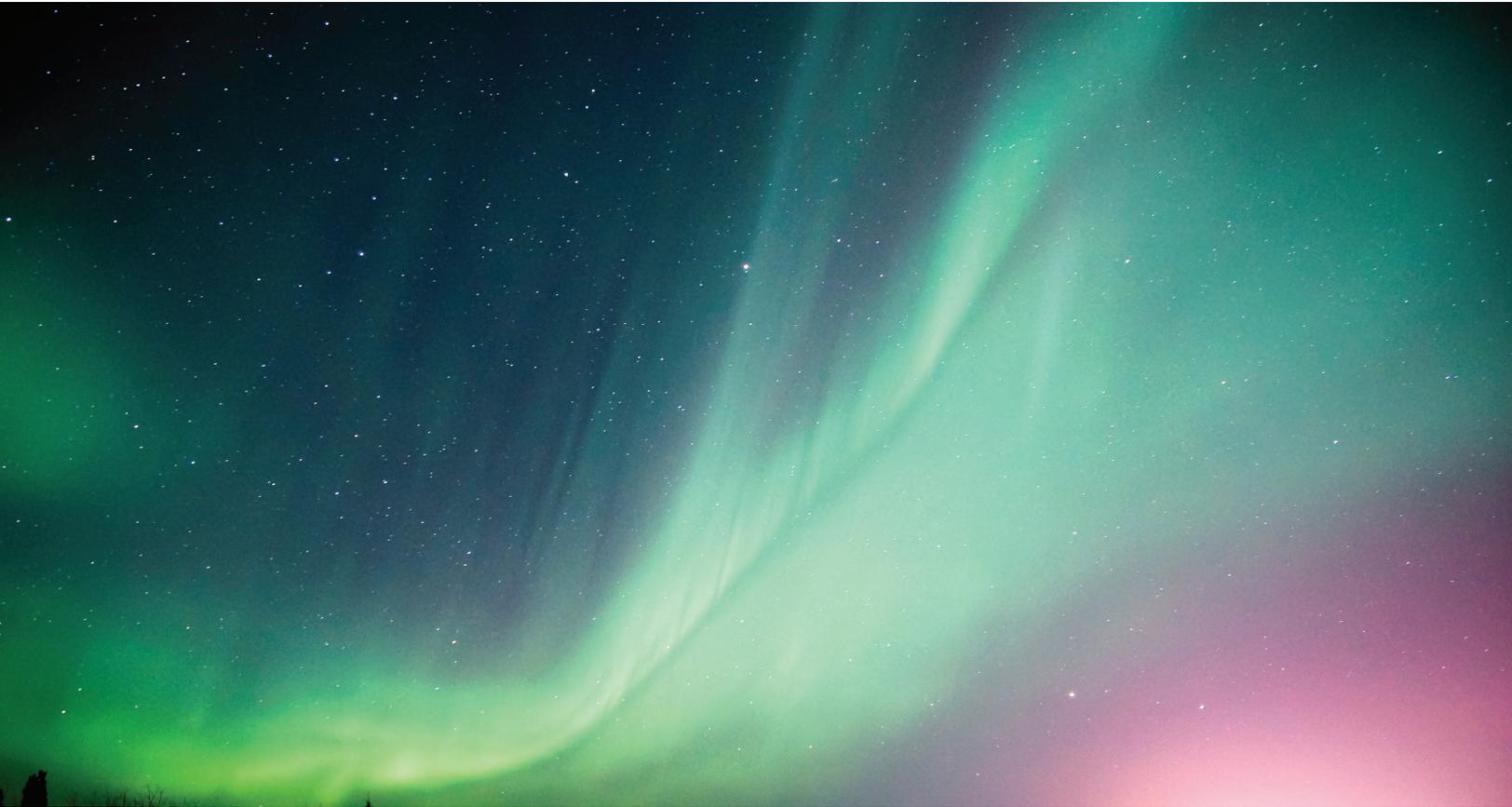
The Northern Lights Elementary Guide

LEARNING THROUGH
CULTURAL
CONNECTIONS

Kiuḡiyaaq

The Northern Lights

A&J Hughes Photography



Have you ever seen the northern lights?

These glowing lights appear in the night sky in the far north. The Iñupiat have observed the northern lights for centuries. The Iñupiaq word for northern lights is **kiuḡiyaaq**. According to the Iñupiaq oral tradition, **kiuḡiyaaq** are the spirits of ancestors. The spirits are playing a game of kickball in the sky. Some Iñupiaq stories about the **kiuḡiyaaq** help to teach important lessons for children. The stories also reveal information about the lights such as when they are visible, what shapes they take in the night sky and more.

cover photo courtesy Poul Jensen



Storytelling:

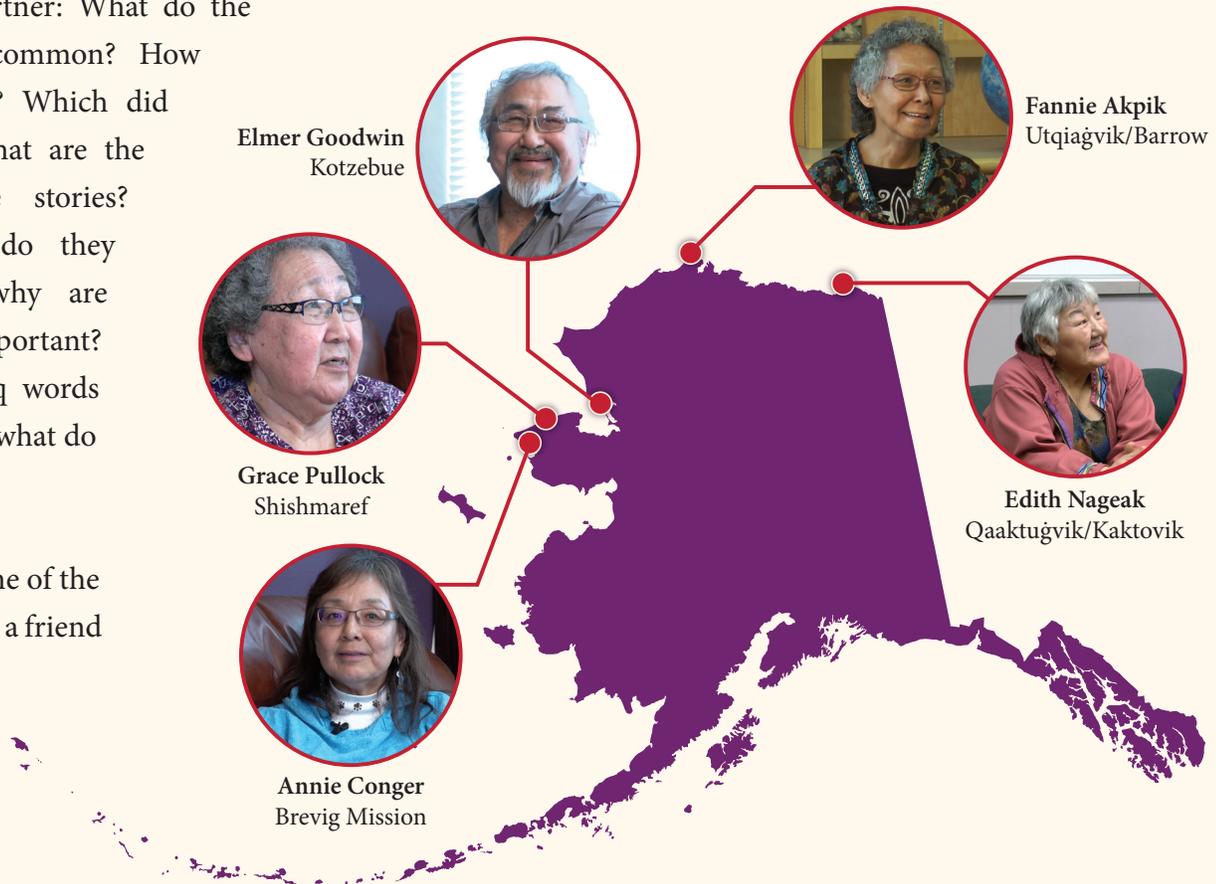
Iñupiaq values: Love for Children, Respect for Elders

Visit culturalconnections.gi.alaska.edu (Multimedia) to hear stories about the **kiuǵiyaaq** from elders.

Choose and listen to two of the stories and discuss with a partner: What do the stories have in common? How are they different? Which did you like best? What are the lessons in these stories? What behaviors do they encourage and why are those behaviors important? What new Iñupiaq words did you learn, and what do they mean?

What behaviors do they encourage and why are those behaviors important? What new Iñupiaq words did you learn, and what do they mean?

Pass it on: Retell one of the stories you heard to a friend or family member.



Iñupiaq Northern Lights Vocabulary

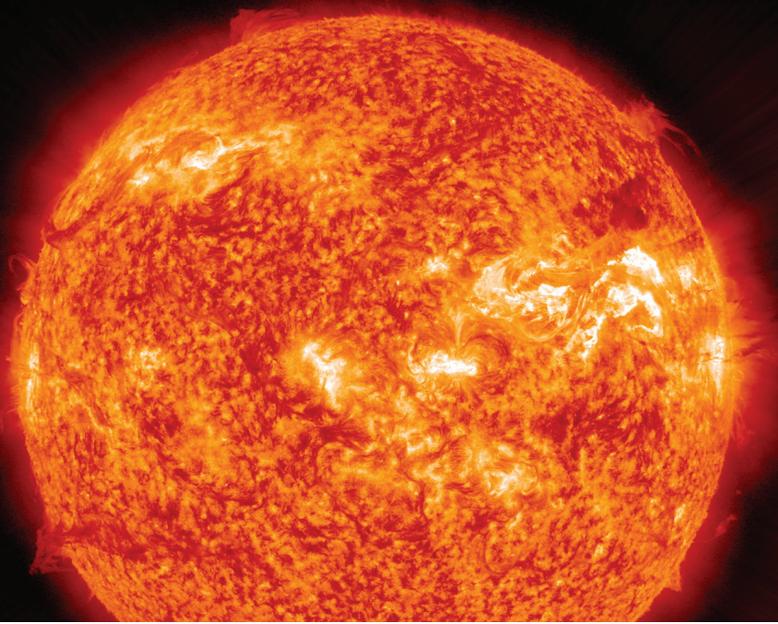
Iñupiaq values: Knowledge of Language, Cooperation

Would you like to learn more Iñupiaq words related to the northern lights? Work with a classmate or your teacher to practice the science and color terms using the vocabulary cards provided.

Visit culturalconnections.gi.alaska.edu (Multimedia) to hear and practice the vocabulary words.

Mazaq

The Sun



Did you know that our sun is the source of energy for nearly all processes on Earth?

The Iñupiaq word for the sun is **mazaq**. In the far north, **mazaq** sinks below the horizon for weeks or months at a time. The traditional Iñupiaq Welcome the Sun dance welcomes and celebrates the annual return of **mazaq** and the end of the winter darkness. But even when the sun is out of sight, it provides energy for our planet's most beautiful night-lights—the northern lights.

The science story of the northern lights begins with the sun. The sun emits a constant stream of particles from its surface. This stream of particles is called the solar wind. The solar wind blows particles outward in all directions, all the time. Huge eruptions on the sun can send many more particles into space. Sometimes those particles are hurled toward Earth. The particles carried by the solar wind are charged with energy. It takes one to four days for the charged particles to reach Earth.

Welcome the Sun Dance

Iñupiaq value: Cooperation

Invite a local dance group to your classroom to perform the traditional Iñupiaq Welcome the Sun dance OR watch the Welcome the Sun dance video available at culturalconnections.gi.alaska.edu.

Practice the dance moves.

Discuss as a class: What does each dance motion mean? How does dancing make you feel?



Nunaqpak Earth

Mazaq (sun)



Nunaqpak (Earth)

Do you know the Iñupiaq name for our planet?

The Iñupiaq name for Earth is **Nunaqpak**. **Nunaqpak** is surrounded by a powerful magnetic field. The field is strongest near Earth's poles. The magnetic field acts as a shield and deflects most of the sun's charged particles around **Nunaqpak**. Some of the particles get caught in the magnetic field and move toward Earth's poles. The charged particles enter Earth's atmosphere near the poles. High in the atmosphere, charged particles crash into gas particles. This excites the gas particles, and they give off light. These lights are known as the northern lights.

Magnetic Fields

Iñupiaq value: Cooperation

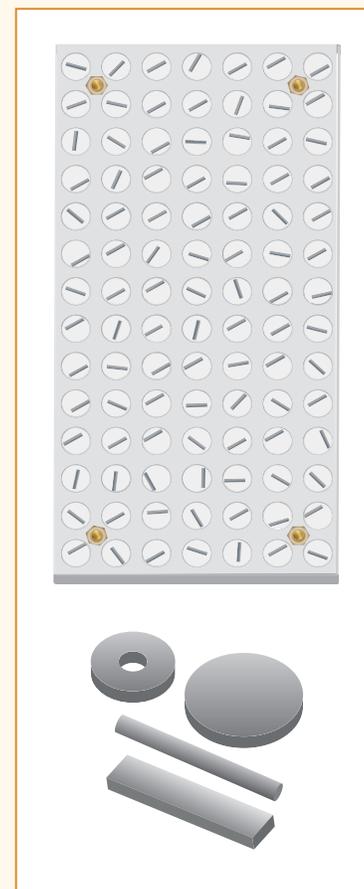
Did you know that every magnet has an invisible magnetic field around it? You can place magnets on a magnetic field viewer to see the shape of the field around different magnets.

Materials:

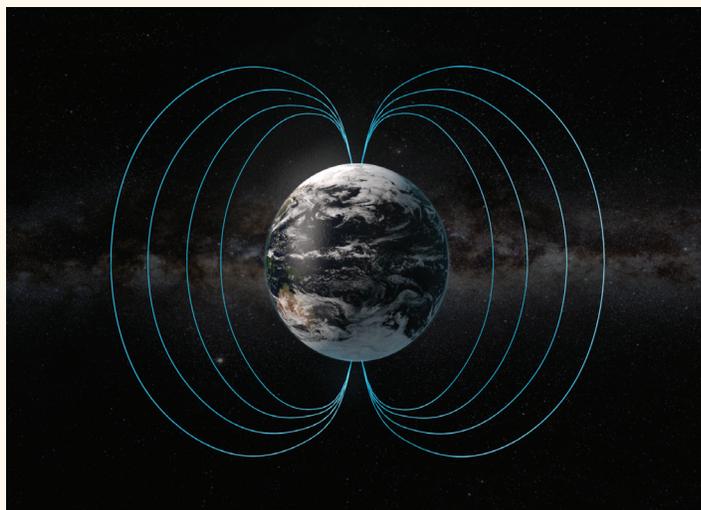
- Magnetic field viewer
- Magnets of different shapes

Procedure:

1. Working with a partner or small group, set the magnetic field viewer on a flat surface.
2. Place a magnet on top of the viewer. Do not move the magnet.
3. Watch the iron rods in the viewer align with the magnetic field.
4. Sketch what you see.
5. Repeat steps 2-4 with magnets of different shapes and sizes.

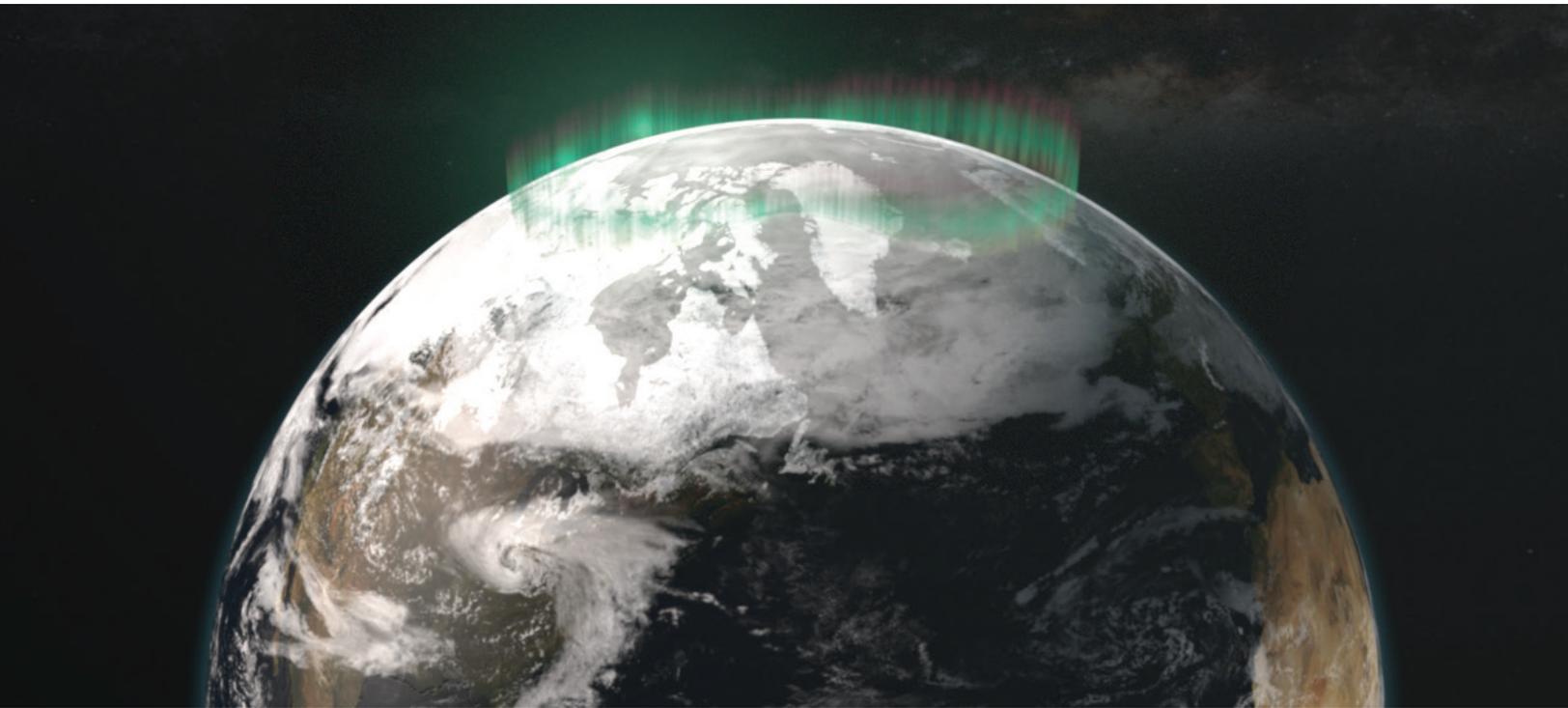


Discuss: Where was the magnetic field strongest around each magnet? How were the fields different around different magnets? How were the fields similar? Which magnet's field most closely resembled the shape of Earth's magnetic field?



Kiuġvaa

Aurora Oval



What do the northern lights look like from space?

The **kiuġiyaaq** (northern lights) form an oval above Earth's north pole. This is known as the aurora oval, or **kiuġvaa** in Iñupiaq. The aurora is the scientific name for the **kiuġiyaaq**. Earth has two aurora ovals, one centered on each magnetic pole. The ribbons of light that people see when they look up at the **kiuġiyaaq** are one small segment of the **kiuġvaa**.

ACTIVITY 5

Ask an Elder

Iñupiaq value: Respect for Elders

Visit an elder in your community.

Ask in Iñupiaq: **Sumik kulaiqfiupina kiġiuqzraqmik?** (Can you tell me about the northern lights?)

Record the interview if possible.

Ask the elder if they have any stories, songs or dances about the northern lights. When are the northern lights visible? What colors has the elder seen in the northern lights? Which colors are most common? Which are most unusual?

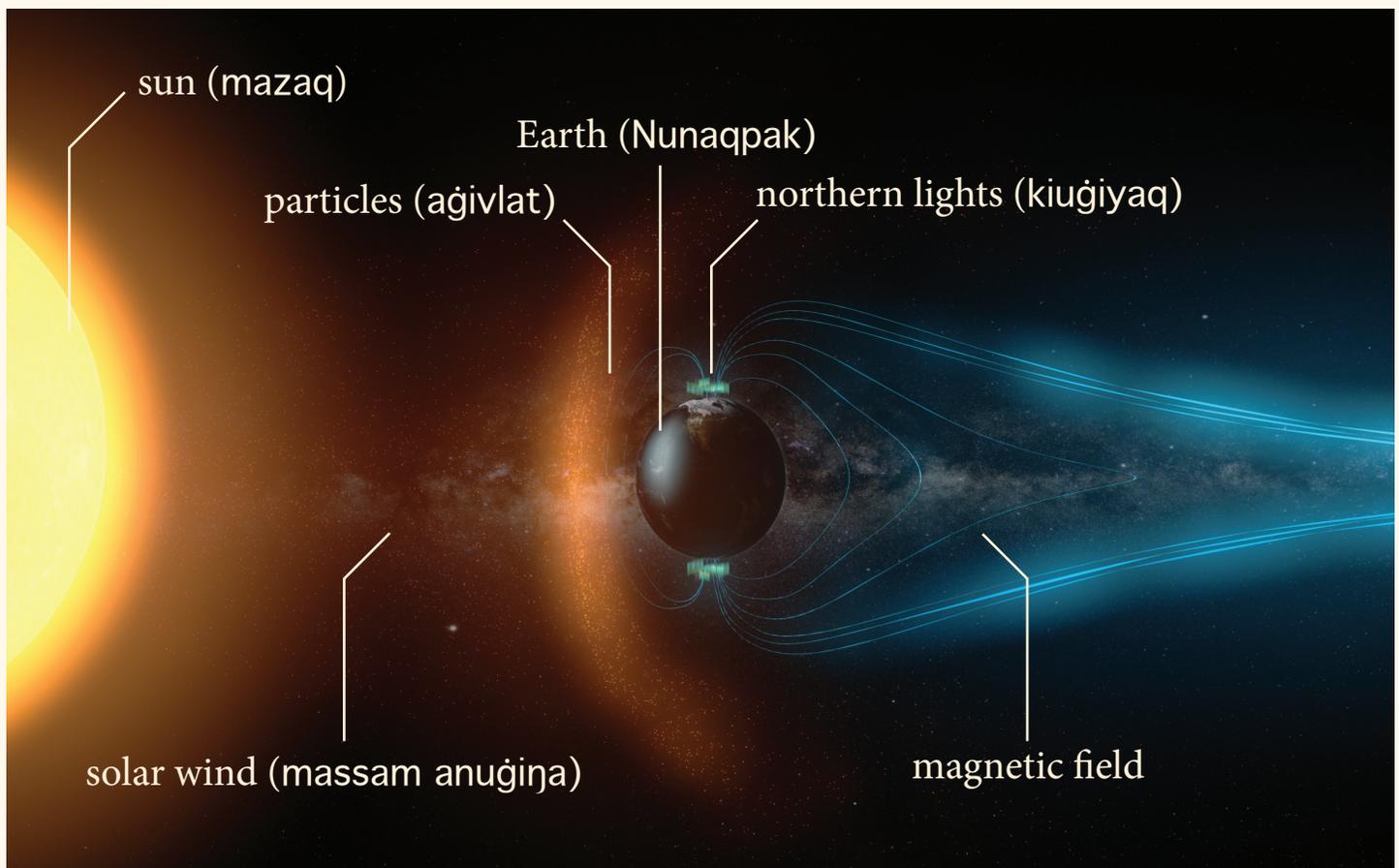
Diagramming the Northern Lights

Iñupiaq value: Knowledge of Language

Watch the video *Kiuḡuyat: The Northern Lights*.

Create a drawing of how the northern lights are formed. Include and label the following in English and Iñupiaq:

- Northern lights/**kiuḡiyaaq**
- sun/**mazaq**
- Earth/**Nunaqpak**
- solar wind/**massam anuḡiṇa**
- particles/**aḡivlat**
- Earth's magnetic field



Kalait Colors

Jan Curtis photo



What causes the different colors in the northern lights?

The **kiugiyaq** come in many different colors. Different gases in Earth's atmosphere cause the different colors of the northern lights. The most common color is green, or **sunagtuag**. Green light occurs when charged particles collide with and energize oxygen particles. Very high in the atmosphere, the **kiugiyaq** are sometimes red, or **kawiaqtuaq**. Red light is caused by energized oxygen high in the atmosphere. Lights that are purple, or **tigluuraq** are caused by energized nitrogen. Often people see purple lights as white or pale blue, because the color is sometimes too faint for human eyes to detect.

Colors	Kalait
green	sunagtuag
red	kawiaqtuaq
purple	tigluuraq

ACTIVITY 7

Like a Neon Sign:

Visit culturalconnections.gi.alaska.edu.

Try the Glowing Gases multimedia activity.

Discuss: How are the northern lights like a neon sign?



Northern Lights in a Tube:

What happens when electrical energy is transferred to different types of gas particles? You can use tubes of gas and a power supply to find out. We've learned that the bright lights we see in northern lights are mostly caused by energized oxygen and energized nitrogen. In this experiment, we will see how nitrogen glows, and we will also test two other gases: neon and carbon dioxide. Perform this experiment with the gas tubes and power supply that has been included in your northern lights learning kit.

Materials:

- Tubes filled with different gases (neon, nitrogen, carbon dioxide)
- Power supply to transfer electrical energy to gas tubes
- Northern Lights in a Tube worksheet
- Spectrum slides (optional)
- Colored pencils

Procedure:

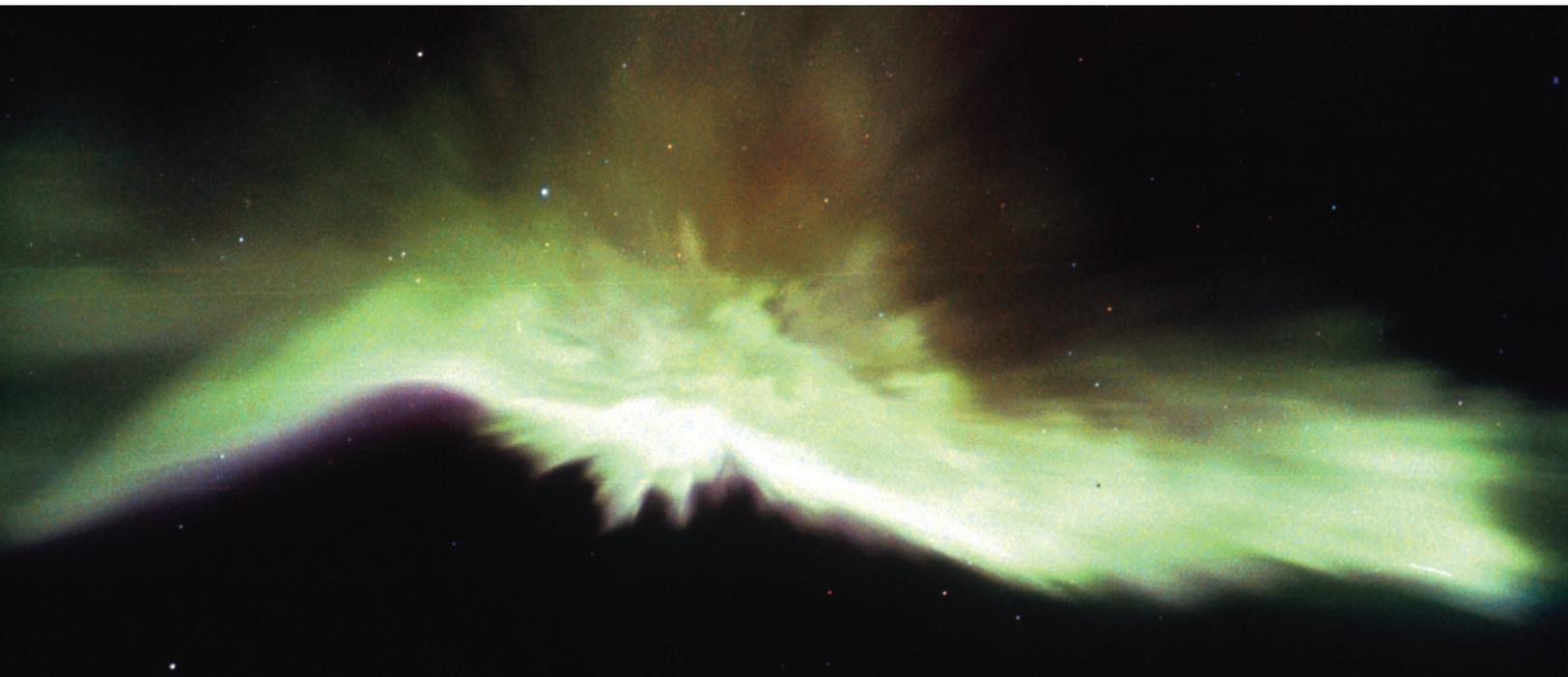
1. Make a hypothesis (educated guess)—what do you think will happen when different gas tubes are plugged into the power supply so that electrical energy is transferred to the gas particles in the tube?
2. Test your hypothesis by asking your teacher to insert each tube into the power supply. It will help to turn off the classroom lights.
3. What happened with each tube? Record your observations by sketching and writing about what you see. Look at the tube through a spectrum slide to add more detail to your observations.
4. Form a conclusion: What did you find out? What evidence supports this conclusion? Was your hypothesis proved or disproved?

Connect it: How does this relate to the northern lights?



Night Lights

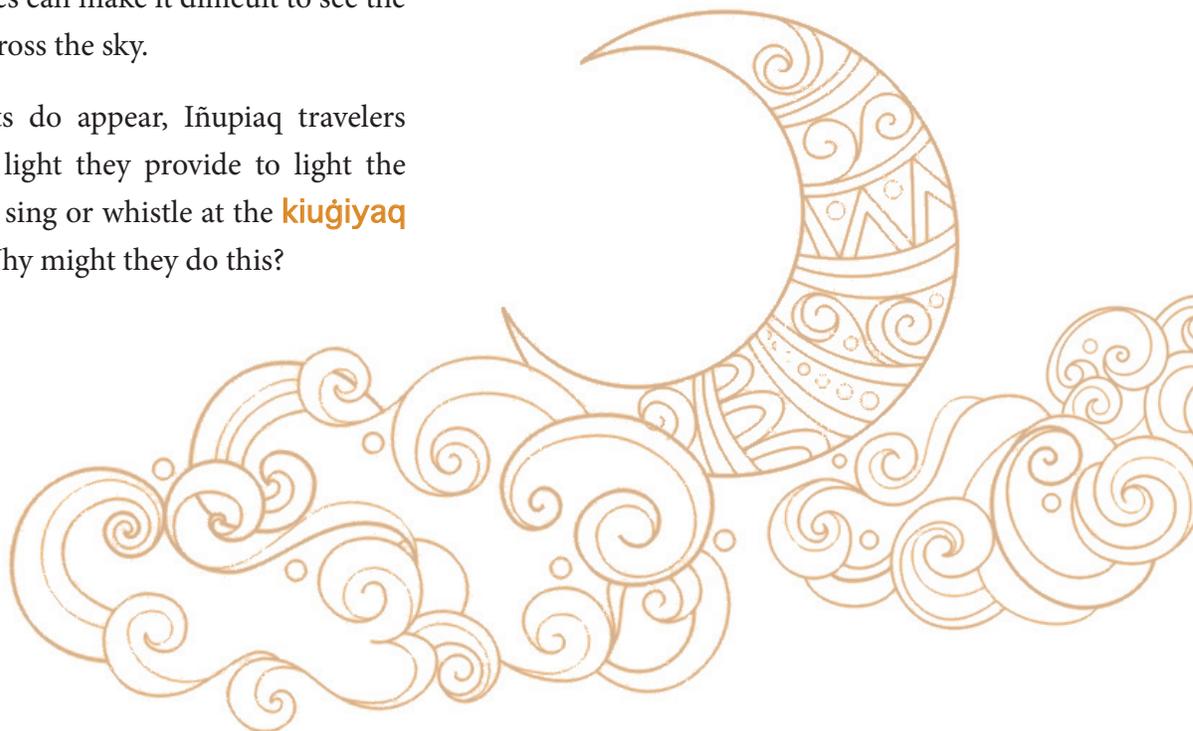
Jan Curtis photo



When do we see the lights?

The **kiuġiyaq** can occur during all seasons, and during both daylight and night, but the lights are only visible when skies are clear and dark. Clouds block the northern lights from view. Sunlight, bright moonlight, and even man-made lights in communities can make it difficult to see the **kiuġiyaq** as they move across the sky.

When the northern lights do appear, Iñupiaq travelers appreciate the additional light they provide to light the trail. Many Iñupiaq elders sing or whistle at the **kiuġiyaq** as they move in the sky. Why might they do this?



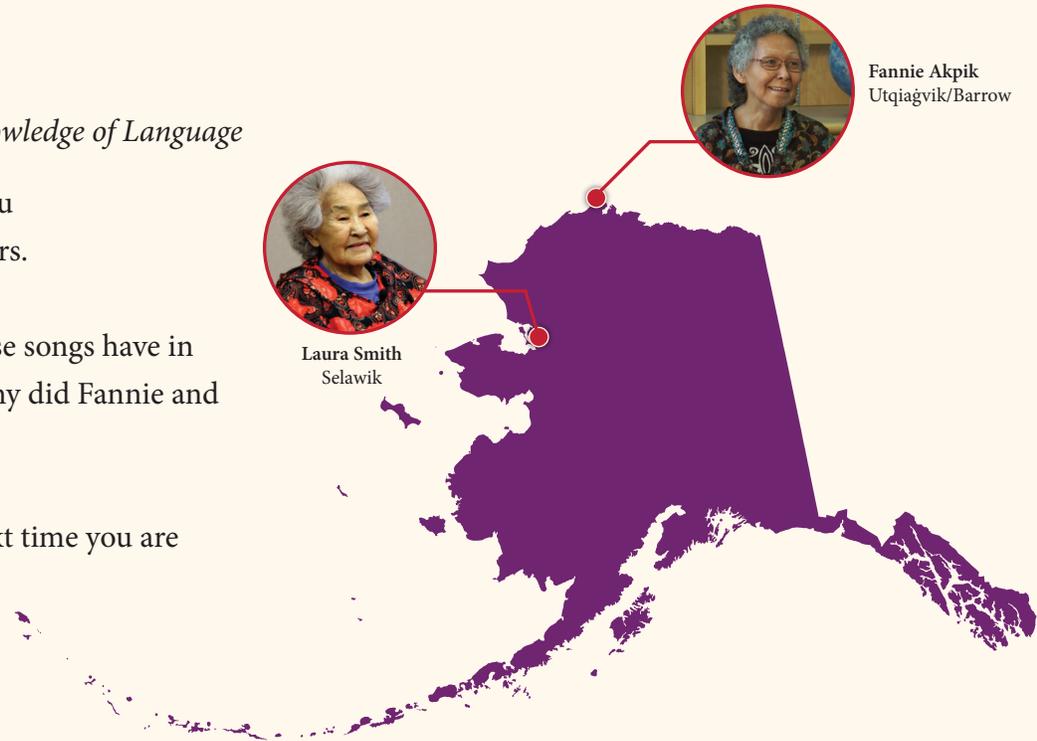
Kiugiyaq Karaoke

Iñupiaq values: Respect for Elders, Knowledge of Language

Visit culturalconnections.gi.alaska.edu (Multimedia) to hear songs from elders.

Discuss with your class: What do these songs have in common? How are they different? Why did Fannie and Laura sing to the northern lights?

Learn one of the songs and sing it next time you are watching the lights dance.



When are the kiugiyaq visible in your area?

Iñupiaq Values: Cooperation

Collect data from your parents, school staff or other community members about when they see the northern lights. Ask:

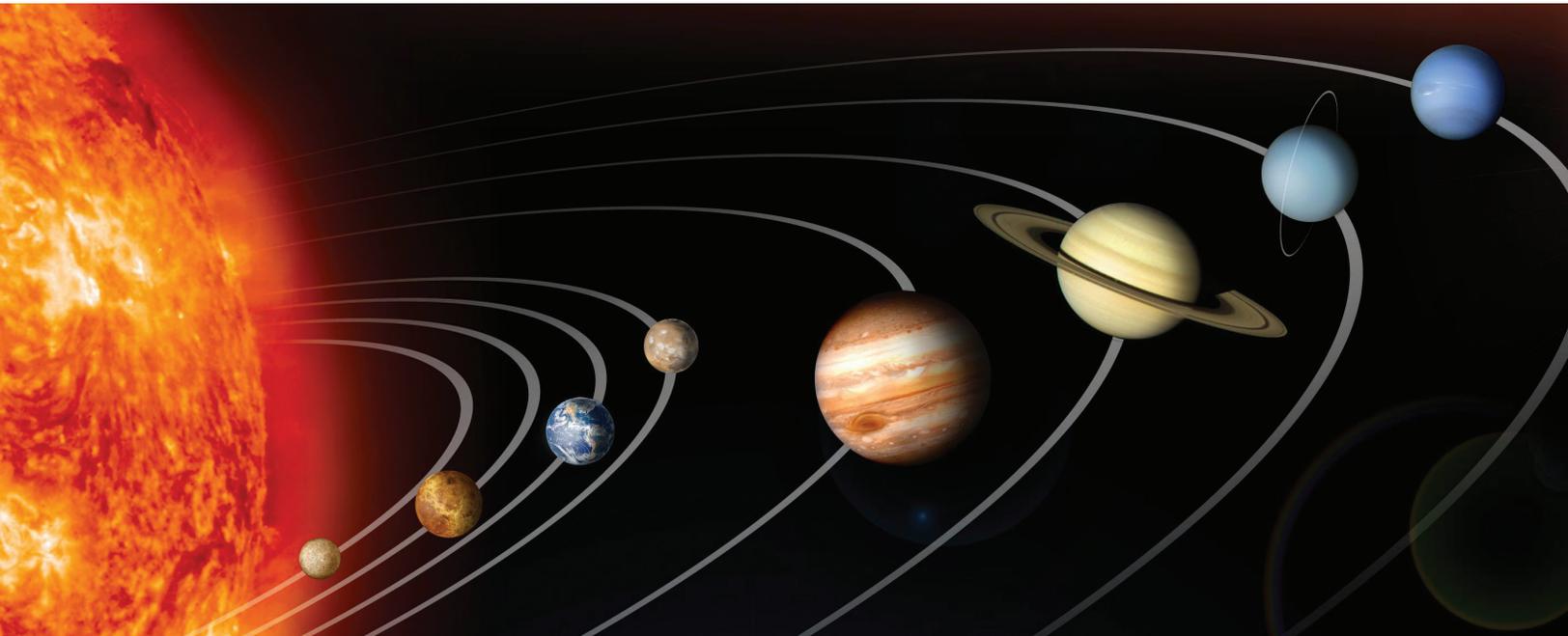
1. During which months are the northern lights visible?
2. What colors have you observed in the northern lights?
3. Where is a good place nearby to go to view the northern lights?

Create a class graph of all of the data. When is the aurora visible in your community? What colors were reported? Where can you go for the best views? What do the areas with the best views have in common?



Solar System Patterns

NASA/JPL



When will the skies be dark in your area?

Earth (**Nunaqpak**) is always rotating. This rotation causes day and night. The side of **Nunaqpak** facing the sun (**mazaq**) experiences day. The side of **Nunaqpak** facing away from **mazaq** experiences night. During winter, the far northern regions of Earth are tilted away from the sun. Days grow shorter, and nights longer, until in some areas, **mazaq** sinks below the horizon and does not appear again for weeks at a time. Times of darkness are good times to look for the northern lights.

Illustrating the Northern Lights

Materials:

- Black construction paper
- Oil or chalk pastels

Illustrate the northern lights using pastels on black paper. Include something new that you learned about the northern lights in your illustration.

Caption the illustration with a sentence that begins: *I learned that...*

Aurora Borealis, oil painting by Frederic Edwin Church, 1865





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