

Smithsonian

Saving the Arctic



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At the Top of the World

Imagine you are looking at Earth from space. As you watch it rotate on its axis, you look north. It is covered in ice. You can see Greenland and the North Pole. That area at the top of the world is called the Arctic.

The Arctic is very important to our planet. It's like an air conditioning system for all of Earth!

Because Earth's **climate** is warming, ice in the Arctic is melting. As ice melts and seawater rises, more Arctic land disappears. People who live there have to **adapt** to new changes. So do animals that live there.



village in Greenland

Scientists go to the Arctic to study these changes. They may not be able to stop ice from melting, but they want to understand why it is melting so quickly.

They are also working closely with people from the Arctic. Together, they help write **policies** to reduce the harmful effects of climate change.

SCIENCE

Warming Up

Scientists keep track of Earth's temperatures. They compare them to the past. They have found that the average temperature has risen about 2° Celsius (36° Fahrenheit) in the last 150 years. Most of that change happened in the last 35 years. The Arctic is warming twice as much as the rest of the world.

Who Lives in the Arctic?

Even though it is one of the coldest places on Earth, the Arctic is home to many different animals. And there are about four million people who live there, too!

Arctic Animals

Polar bears, fish, seals, sharks, and whales all share this icy home. Some species can only be found in the Arctic. These species include polar bears and narwhals. Each narwhal has a long tooth called a tusk. A narwhal's tusk can grow to almost 2.7 meters (9 feet) long!

On land, **tundra** wolves stalk caribou. Arctic foxes hunt for food. Musk oxen feed on small tundra plants, and polar bears hunt for fish and seals in the water.

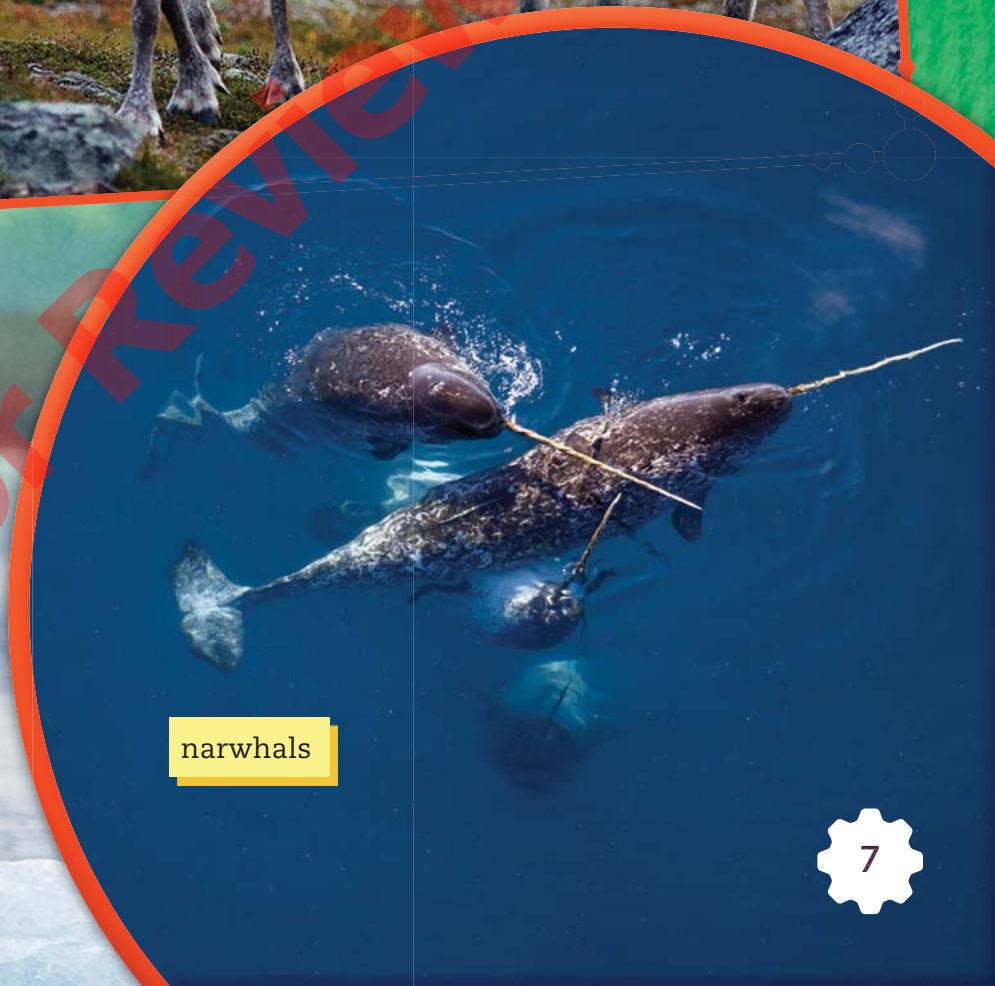
In the air, there are more than two hundred bird species. Snowy owls hunt for prey during the day. Arctic terns nest in the Arctic but **migrate** in the summer. Yellow-billed loons sing and call to each other.

All these animals make the Arctic their home. But as it gets warmer, they will have to adapt or they will go extinct.



seal

Caribou are the only type of deer in which both the male and female have antlers.



narwhals

Arctic People

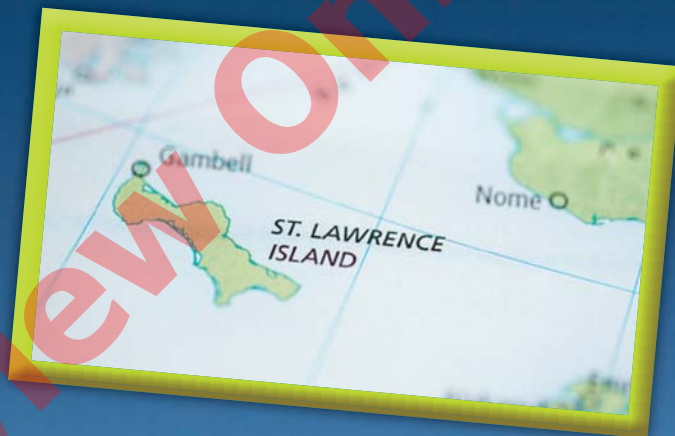
The Yup'ik (YOO-pik) are a group of people who live on St. Lawrence Island off the coast of Alaska. They have lived on the frozen tundra for thousands of years. Yup'ik people are great at hunting and fishing. To cross ice, they use snowmobiles and dogsleds.

The people and animals of the Arctic plan their lives around weather. As it changes, it is harder to predict what each season will be like. How much rain will fall? How much ice will melt? It is important to be able to mark these changes.

Many different languages are spoken in the Arctic. The Yup'ik speak a language called Siberian Yup'ik. In Yup'ik, there are many words for “ice” and “snow.” Until a few years ago, you would only hear those words if you talked to a native Yup'ik speaker. No one had written them down. Then, a scientist worked with a Yup'ik elder to make a “sea ice dictionary.” Together they made a list of terms and what they mean in English. They added pictures, too. This list helps scientists talk with the Yup'ik. They can ask the Yup'ik what they see in the changing land.



Yup'ik Term	English Explanation
siku	the main term for ice; also, the ice-covered Bering Sea



A Yup'ik man stands near the coast of St. Lawrence Island.





STEAM CHALLENGE

Define the Problem

When permafrost melts, the ground becomes soft and mushy. This sometimes damages houses and buildings built on it. Your task is to create a model house that can withstand melting of permafrost.



Constraints: The base of your house must fit inside a cake pan. It must weigh at least a $\frac{1}{2}$ kilogram (1 pound).



Criteria: Your house must remain upright, level, and undamaged as the permafrost melts.





Research and Brainstorm

What happens when frozen soil melts? What types of materials could provide support in multiple weather conditions? Will you need to add any extra supports to your structure?



Design and Build

Sketch a model of your house. Decide what materials will work best. Build your model.



Test and Improve

Place your model in a cake pan filled with frozen mud or ice. Place it under a heat lamp or out in the sun. Observe the movement of the building as the frozen layer begins to melt. Did your structure move? Did your structure become damp or weakened? Modify your design and try again.



Reflect and Share

What materials worked best? How might a building that was built on actual permafrost act differently than your model? Consider other solutions. Which might work best?

