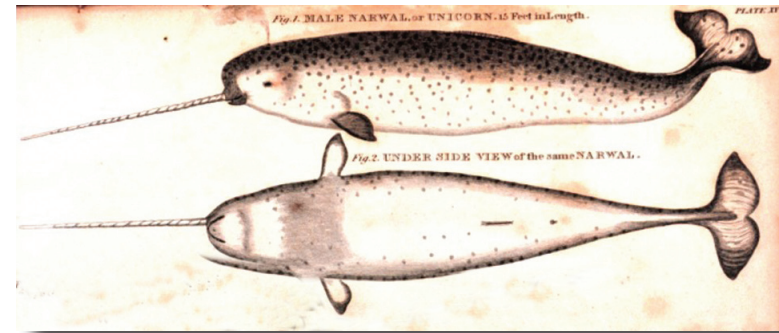


Following the Ocean Unicorn



From An account of the Arctic regions with a history and description of the northern whale-fishery by W. Scoresby. 1820. Courtesy NOAA..

Is this a unicorn? Not really—it's actually a drawing of a narwhal, a whale that spends its entire life in the Arctic. Most male narwhals have a tooth in their upper jaw that forms a long tusk. For several centuries, northern traders sold narwhal tusks throughout Europe, claiming they were unicorn horns. One of the largest groups of narwhals spends most of the winter in Baffin Bay, between Canada and the western coast of Greenland. This is an unusual area, because while most of the Arctic is getting warmer, air and sea surface temperatures near western Greenland are getting cooler, and sea ice concentrations in Baffin Bay have increased significantly since 1953. But at the same time, temperatures in deep water below 1,200 feet in Baffin Bay are slowly getting warmer.

This is important, because the deep water in Baffin Bay is part of a worldwide system of deep currents that connect Earth's largest oceans. Temperature is one of the things that makes this system work, and some scientists are worried that changing temperatures in the Arctic could cause the system to slow down or even stop working entirely. Even though it's getting warmer, the Arctic is still a difficult place to do scientific work, and it has been almost impossible for scientists to gather very much information on deep ocean temperatures.

Believe it or not, narwhals may help solve this problem! Narwhals in Baffin Bay often dive more than 4,500 feet deep to find food. And they do this during the winter when it is impossible for scientists to do deep ocean research in the Arctic region. NOAA's Ocean Explorer 2006 Arctic Winter Ecosystem Exploration attached instrument pack-

What You Will Do

Make a poster about narwhals, how they are being affected by climate change, how climate change may affect humans, and what we can do about it.

ages called "satellite tags" to narwhals to record temperature and depth during deep dives for food. A transmitter in each tag sends the information to a satellite, and the satellite sends the information back to Earth to give scientists the first-ever data on deep-water winter temperatures in Baffin Bay.

Unfortunately, narwhal populations may be declining. There are several possible reasons for this:

- Hunting by indigenous Arctic peoples (which means people who have lived in the Arctic for hundreds of years);
- Increased harvest of fish by humans, reducing the amount of food available for narwhals; and/or
- Climate change.

If you have looked at "Where Will the Polar Bears Go?" you know that climate change is causing problems for polar bears, too. But the problem for polar bears is that there isn't enough sea ice. Baffin Bay is one of the few places in the Arctic where sea ice is increasing; and this causes problems for narwhals because it reduces the amount of open water needed by the whales, and increases the danger that they may become trapped in the ice.



Courtesy Kristin Laidre

Does this seem that what's bad for the narwhals might be good for the polar bears? Not really, because not enough ice where ice should be is just as bad as too much ice where ice should not be. Remember, too, that even though the average temperature in the Arctic is going up, there can still be places that are colder than the average; but these colder temperatures are balanced by temperatures in other places that are higher than the average.

Just as narwhals are helping scientists study the deep ocean, they can also help you tell other people about global climate change.

What You Will Need

- Copies of "Images for Narwhal Posters"
- Information from the introduction for this activity, the "Narwhal Fact Sheet" and "Is Our Climate Changing?" (page 137)
- Crayons, colored markers, or colored pencils
- Poster board
- Scissors

Warning

Be careful with sharp scissors!

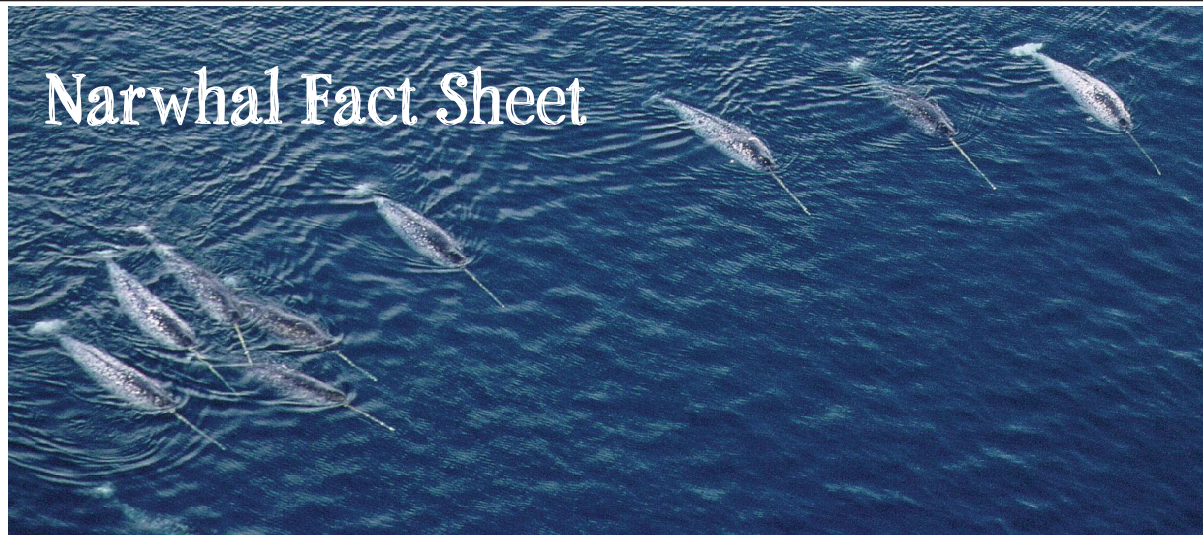
How to Do It

1. Use the images and information to create a poster that explains about narwhals and how they are being affected by climate change. You may also want to include information about why climate change is important to us, what we can do about it, and possibly some ideas and information from the "Where Will the Polar Bears Go?" (page 139) activity, since it also deals with climate change and Arctic animals.
2. Show your poster at school, to your parents, and to other groups. The more people know about climate change and how it affects life on Earth, the more they will take action to protect Earth's ecosystems.

Want to Do More?

Visit <http://www.oceanexplorer.noaa.gov/explorations/06arctic/welcome.html> for more information about narwhals and NOAA's Ocean Explorer 2006 Arctic Winter Ecosystem Exploration.

This activity was adapted from "The Ocean Unicorn" (10 pages, 292 kb) by Mel Goodwin, The Harmony Project, Charleston, SC; from the Ocean Explorer 2006 Arctic Winter Ecosystem Exploration [<http://www.oceanexplorer.noaa.gov/explorations/06arctic/background/edu/media/unicorn.pdf>]



Several male narwhals in West Greenland. Courtesy Mads Peter Heide-Jorgensen

- Narwhals belong to the genus *Monodon* and the species *monoceros*.
- Narwhals belong to the class Mammalia and the order Cetacea.
- Male and female narwhals have two teeth, in the upper jaw. In most female narwhals, the teeth never erupt through the gum. In most males, the left tooth forms a long tusk. In rare cases, males may develop two tusks, and females may also develop one or two tusks.
- The most widely accepted explanation for the function of the narwhal's tusk is that it is possibly involved with mating behavior or as a weapon in battles over possession of females.
- Narwhals spend their entire lives in the Arctic.
- Narwhals eat fish (including polar cod, Greenland halibut, flounder, salmon, and herring), cephalopods (squids and octopuses), and shrimp.
- Narwhals can dive to depths of 4,500 feet or more.
- Narwhals need to come to the surface of the ocean periodically, because they are mammals and must surface to breathe air.
- Normally, a female narwhal produces one calf at a time.
- Narwhals seem to prefer deep water near loose pack ice. In the summer, they occupy deep bays and fjords in the Canadian High Arctic and Greenland. As winter approaches, narwhals migrate into the pack ice of Baffin Bay, the northern Davis Strait, and adjacent waters.
- Narwhals can live for 50 years or more.
- Narwhals have been traditionally hunted by indigenous Arctic peoples who value them as a staple food (the skin is rich in vitamin C), as well as for their tusks (though international efforts to control the global ivory trade may have reduced tusk sales in recent years). Narwhal sinews (tissues that attach muscles to bones) may also be used as thread.

Images for Narwhal Posters



Narwhals. Courtesy Kristin Laidre

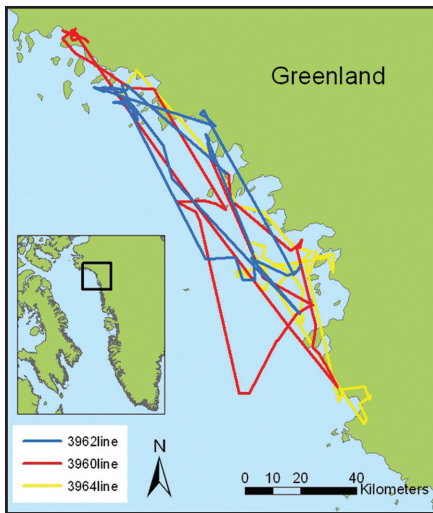
Melville Bay is the site of many active glaciers. The area is filled with large icebergs that dwarf the *Sila*, the boat used for narwhal tagging/tracking. Courtesy Kristin Laidre.



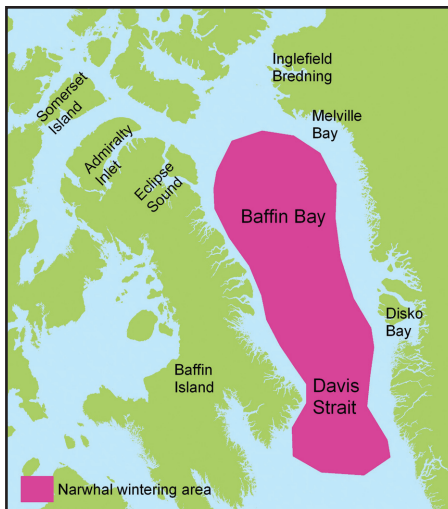
Male narwhals. Courtesy Mads Peter Heide-Jorgensen

Narwhals. Courtesy Kristin Laidre





Satellite-based locations for three narwhals tagged in Melville Bay in September 2006. Whales are still in their coastal summering grounds but will migrate offshore by mid-November. Courtesy Kristin Laidre



Narwhal wintering areas (pink) in Baffin Bay and Davis Strait. Courtesy Kristin Laidre



Instrument packages called “satellite tags” are attached to narwhals by plastic coated wires affixed to two nylon pins (1/4 inch diameter) inserted through the dorsal ridge on the whales’ back (the whales shed the tags after several months; 14 months is the longest time a tag has stayed on a whale). An alterna-

tive method of attaching the tags involves placing the tags into small cylinders that are implanted in the layer of blubber along the whales’ back using hand-held thrown poles similar to harpoons. Tags attached using the latter methods are only expected to provide data for four to five weeks.



Male narwhal (ID 3964) captured and satellite tagged. You can see where he went in the map to the left. Courtesy Kristin Laidre

Does Tagging Hurt Narwhals?

Researchers say “No, we have quite good evidence that tagging does not hurt them—both in the short and long term.” Satellite tags are only attached into blubber where there are few nerve endings, and the whales do not react at all when the tags are attached. As soon as the whales are released, they immediately resume normal behavior. In addition, whales that have been recaptured several years after tagging show no evidence of being harmed by the tagging process.