

## **Unit: Finding My Place in History - Prepared by Alison Willis**

**Title of lesson: Mobility vs. Migration**

**Timeframe:** 1 week

### **Standards addressed:**

Alaska State History Standard B.4

### **Social Studies Knowledge, Skills, Dispositions:**

Group data in categories according to appropriate data.

State relationships between categories of information.

Form a simple organization of key ideas related to a topic.

**Learning objectives:** At the completion of this lesson, students will know & be able to:

Define mobility and migration.

List some reason for migration and mobility.

### **Cooperative skills addressed:**

Working with partners on computer

### **Technology inclusion:**

Overhead projector

Computer lab

### **Materials needed:**

\***Caribou Journey** Vivian French, Lisa Flather (Illustrator)

\***Caribou Journey** [Debbie S. Miller](#), [Jon Van Zyle](#) (Illustrator)

\***How Do Birds Find Their Way?** Roma Gans, Paul Mirocha (Illustrator)

\*<http://www.nationalgeographic.com/xpeditions/lessons/09/gk2/crowd.html>

\*[http://whyfiles.org/006migration/fact\\_sheet.html](http://whyfiles.org/006migration/fact_sheet.html)

\*<http://www.npwrc.usgs.gov/resource/othrdata/migratio/migratio.html>

\*<http://www.birdnature.com/migration.html>

map of Alaska (outline)

pencils, paper, crayons, colored pencils

macaroni or small pasta

glue

Alaska folder/notebook

Lesson plan on Caribou migration( attached)

Lesson plan - How do you like a crowd? (attached)

## Lesson Design

### 1. Prior assignment/preparation -

Students will have already established an Alaskan folder/notebook.

### 2. Opening activity -

K-W-L What do you know about migration? What do you want to learn? Have various books about animal migration in reading

tub.

### 3. Specific lesson design--

Day one- K-W-L on butcher paper or on a bulletin board that will remain up for the unit. Give the definition of migration- (To move from one country or region and settle in another. To change location periodically, especially by moving seasonally from one region to another.) Brainstorm some reason they think animals or people might move from one place to another.

Day two- Read A Caribou Journey by Debbie Miller. Use developing and closing sections of the lesson (or other pieces as you see fit). Create a chart of the reason a caribou migrates.

Day three- review chart of reasons for caribou migration. Explain that other animals migrate too, for many of the same reasons. More animal migration stories can be added in here for addition days of study. Try to keep the animals to ones that are related to Alaska. Ask students if they can think of any other Alaskan animals or birds that migrate. (geese, whales) Added these animals and any others you study to your migration information lists, both on chart paper and in student notes.

Day four- People also migrate, move from one place to another. They move from state to state, city to city, and country to country. Brainstorm some reason why people might move from one city to another. Use the How do you like a crowd? lesson here. This will illustrate the population size reason for moving. Create a new chart of why people move, have students copy into their notes.

Day five- Revisit the people migration information from the previous lesson. Ask if any of the students ever went to a different school in Anchorage. Normally this is due to a move within the city. When people move within the same city it is called mobility. Reinforce, with examples, the difference between mobility- moving from place to place within the same city/town and migration.

#### **4. Assessment -**

The students will be assessed throughout the week. Their maps showing caribou migration, their population maps, and their notes will show the growth in their learning. As a final check for understanding pose different situations and ask if the situations are examples of migration or mobility. This assessment could be oral or paper and pencil.

### **Lesson : Caribou Migration**

#### **Overview:**

This lesson introduces students to caribou and their migratory behavior. Students will learn some basic facts about caribou and map the migration route of the Porcupine caribou herd of Alaska and northwestern Canada. They will conclude by drawing pictures of scenes along this migration route and writing captions to describe their drawings.

#### **Connections to the Curriculum:**

Geography, life science

#### **Connections to the National Geography Standards:**

Standard 9: "The characteristics, distribution, and migration of human populations on Earth's surface"

#### **Time:**

Two to three hours

#### **Materials Required:**

- \* Computer with Internet access
- \* Blank Xpeditions outline map of Alaska (one for each student or pair of students)
- \* Drawing materials

**Objectives:** Students will :

- \* read and answer questions about a paragraph on caribou;
- \* think of words to describe the caribou and the landscape where they live;
- \* map the range and migration route of one caribou herd;
- \* discuss what it would be like to follow a caribou herd during its migration;
- \* draw pictures pretending they are traveling along the migration route; and
- \* write captions to describe their pictures.

**Geographic Skills:**

Asking Geographic Questions  
Acquiring Geographic Information  
Organizing Geographic Information  
Answering Geographic Questions  
Analyzing Geographic Information

## **S u g g e s t e d P r o c e d u r e**

**Opening:**

Have students look at this picture of caribou. Ask them if they recognize the animals and know what they are called.

If students say that these are reindeer, tell them that they are almost correct. Write the words "Reindeer" and "Caribou" on the board, and tell the class that they are the same type of animal, but they do different things and live in different places. Reindeer are domestic animals that people use to help them do work. Caribou are wild animals. Reindeer live mainly in northern Europe and Asia. Caribou live in North America and Greenland. Point out these regions on a world wall map, or have students point them out.

Explain that the animals in this picture are caribou; the picture was taken in Canada.

**Development:**

Print and copy the following paragraphs, and have students read them as a class, or read them to younger children. (The information was taken from E-Parks: Caribou.)

- are
- \* Caribou are a type of deer. They are three to five feet tall at the shoulder. Some caribou are brown with white parts. Others almost all white.
  - \* Both males and females have antlers. Males' antlers can grow up to five feet long!
  - \* Most caribou live between seven and ten years. Caribou live in Alaska, Canada, parts of Washington, and Greenland. The largest group lives in Alaska.
  - \* Caribou live in herds, or groups. Herds spend the summer in the northern part of their range. There, they eat and have babies. When autumn comes, they migrate south for the winter. Discuss the meanings of any new vocabulary words, such as "antlers" or "migrate." Then ask students to answer these questions, either in writing or as a class:
    - \* Are all caribou the same color? What colors can they be?
    - \* Where do caribou live?
    - \* Why do you think caribou migrate?
    - \* Do you think caribou are related to the deer you might see near your home?

Have students look at caribou photographs in the Caribou Photo Gallery. Ask them to look at the background scenery as well as the caribou. As they look at these pictures, ask them to write or say words that come to their minds to describe both the scenery and the animals. Write these words on the board.

Explain that caribou migrate each year. They do this in order to find good places to give birth and to eat.

Give each student or pair of students a blank outline map of Alaska.

On a world wall map, point out the summer range of the Porcupine caribou herd on the coastal plain of northeastern Alaska and northwestern Yukon, Canada. You may need to have students take turns coming to the front of the room to see where you are pointing. Ask students to shade in this area on their own maps.

[Note: The Conservation GIS Center provides a detailed map showing the full caribou range.]

Point out the Brooks Range on the wall map. Ask them to draw and label the Brooks Range on their maps.

Explain that the Porcupine herd spends its summers in the flat coastal plain they have shaded. It is in this area that the caribou give birth to their babies. Every fall, they migrate from this area to the Brooks Range to spend the winter. They like this mountainous region in the winter because it's easier to find places where there is not as much snow, such as ridges where the wind has blown the snow away. They can then more easily dig under the snow for plants to eat.

Ask students to draw the Porcupine herd's fall migration route on their maps.

Have students look at pictures of the scenery in the Porcupine herd's summer grounds. Then have them look at this picture of the Brooks Range. Explain that the caribou live in the grassy area during the summer and migrate to the lower parts of these mountains for the winter months.

Ask students what they think a large animal such as a caribou would need when migrating over such a long distance. They might mention such "basics" as food, clean water, and open space.

Ask students to describe the terrain through which the caribou must travel. What is the landscape like? What do they think the weather might be like during the spring and fall, when the caribou are migrating? (In Barrow, Alaska, which is a short distance northwest of the herd's range, the average temperatures are as follows: January: between 0 and minus 10 degrees Fahrenheit; May: around 30 degrees; July: in the mid-40s; October: in the low 20s).

**Closing:**

Review the reasons that caribou migrate: to give birth and to find food. Ask students whether people do the same thing. They should agree that, in general, people do not need to travel long distances to give birth or to find food.

Hold a brief class discussion comparing and contrasting caribou migration with human movement across long distances. Students should recognize that people in the United States generally move for their jobs, to live near their families, for recreational opportunities, or for other reasons that are not essential to their survival. They should recognize that caribou, on the other hand, must migrate to survive.

**Suggested Student Assessment:**

- A. Pose these questions to the class:
- \* If you could follow a caribou herd on its migration from the northern coast of Alaska to the Brooks Range, what would you see?
  - \* What would the scenery look like?
  - \* What would the caribou do along the way?
- B. Ask them to assume that the caribou do not know they are being followed. Discuss students' ideas, and list them on the board.
- C. Have students draw pictures of two scenes they might see on their journey with the caribou. They can do this individually, in pairs, or in small groups. Their pictures should show the animals and the landscape and should demonstrate what they have learned about caribou, the region where they live, and their migration route.
- D. Have students write captions to describe what each picture shows. They may use ideas from their recent class discussion as well as words from the list they created earlier in the lesson to describe the caribou photographs.

**Extending the Lesson:**

For more advanced students: Have students see developments in the most recent Porcupine caribou herd migration by going to the Journey North caribou page. They should click on "Migration Updates," select the most recent journey (at the bottom of the page) and click on the map. [Note: The map images are quite large and may take a few minutes to download.]

Have students look at the map legend with the individual caribou names. Explain that a few female caribou are wearing special collars

that people can use to track their movements. The collars do not hurt the caribou—the animals don't even know they are wearing them. Each of the colored dots represents an individual caribou that is wearing a collar.

Have students choose one caribou to "follow," and ask them to trace that animal's movements on the map. Has she moved north or south? Why has she gone in this direction? Where is she headed? How many miles has she traveled on this migration so far (see the map scale)?

Have students write paragraphs describing this caribou's route and predicting where she will go next.

## **Lesson : How Do You Like a Crowd?**

### **Overview:**

This lesson asks students to consider what it's like to be in heavily and sparsely populated places. Students will experience population density firsthand in a class simulation. They will then map their town or school to show the most and least populous areas.

### **Connections to the Curriculum:**

Geography

### **Connections to the National Geography Standards:**

Standard 9: "The characteristics, distribution, and migration of human populations on Earth's surface"

### **Time:**

Three hours

### **Materials Required:**

- \* Drawing materials
- \* Glue
- \* Small pieces of dry pasta or other materials to glue onto the maps

### **Objectives:**

Students will

- \* discuss their experiences in crowded places;
- \* go through a simulation to show what it's like to be in crowded and uncrowded places;
- \* map their town or school;
- \* glue pasta or other materials onto the map to show the most and least crowded areas;
- \* draw pictures of themselves in crowded and uncrowded places on their maps.

**Geographic Skills:**

Acquiring Geographic Information  
Organizing Geographic Information  
Analyzing Geographic Information

**Suggested Procedure****Opening:**

Ask students if they have ever been to a place that's very crowded. What was it like? Did they enjoy being surrounded by so many people, or did they feel uncomfortable? Ask them to describe some of their favorite places and to state whether they think these places are crowded.

Explain to the class that some parts of the country and the world are more crowded than others. For various reasons (including access to water, food, and jobs) people tend to live in large numbers in some places and in small numbers in other places. Can they think of examples from their own lives (e.g., a city that's been built near a river with plenty of drinking water and access to transportation)?

**Development:**

Conduct a brief simulation to demonstrate what it's like to be in a very crowded place. Direct the majority of the class into a small area of the classroom, and allow a few (three or four) to "claim" the rest of the classroom to themselves.

Once students have taken their places, ask them to be as quiet as possible, and discuss their observations on their current situation. What do they notice? How do the students in the crowded area feel? How do the other students feel?

The crowded students might notice that they have to share space, that they bump against each other, or even that they feel more likely to get into a fight. The kids in the "open space" have more room to move but might feel a little left out or lonely.

Have students return to their regular places in the classroom, and ask them to describe what they think it would be like to live in a place that's very crowded. Can they think of some advantages and disadvantages of living in a heavily populated place?

Draw a map of your town on the board, using suggestions from students about to what should be included and where things should be placed. Make sure the items on the map are places students are familiar with, such as downtown, the mall, or the park. (As an alternative, particularly if you teach in a large city, you might want to draw a map of the school instead of the town.)

Have students copy the map onto their own papers.

Give students pieces of pasta and glue (or use materials other than pasta). Ask them to help you decide which parts of the town or school have the most people or are the most crowded. Have them glue multiple pieces of pasta onto the part of the map that represents the most crowded parts of the town. Have them glue just a few pieces of pasta onto places where there are only a few people, and no pasta onto places where no people tend to go. You can demonstrate where they should glue their pasta by drawing pieces of pasta on the map on the board.

**Closing:**

Tell students that they have just created a population map of their town or school, showing the places that have the largest and smallest numbers of people. Review the maps as a class: which parts of the town or school are the most and least crowded?

**Suggested Student Assessment:**

Have students draw pictures of themselves in crowded and uncrowded parts of their town or school. The pictures should illustrate activities they would do in both areas.

Discuss the students' pictures. What do they think would be good and bad about being in each of the places they've drawn?

**Extending the Lesson:**

Repeat this activity using a map of the United States. Give each student or pair of students a blank outline map of the United States. Make sure there's a large U.S. map at the front of the room that all students can see.

Give students glue and pieces of pasta or other materials. On the wall map, place removable pieces of tape on the most highly populated places in the United States, such as the East Coast, California, and the major cities in the middle of the country (e.g., Chicago, Dallas, Denver, Las Vegas). Ask students to glue pieces of pasta to these parts of the map, following your example on the wall map.

## **Lesson : Pacific Salmon**

### **Overview:**

Pacific salmon species, including the sockeye, spend their lives in both freshwater and saltwater. Students will learn about this phenomenon, including the salmon migration route and the fact that salmon are able to return to the streams where they were born after spending years swimming in the ocean. They will see photographs of salmon at different stages of their lives, and illustrate maps with salmon pictures. Students will conclude by performing skits showing the salmon life cycle and migration.

### **Connections to the Curriculum:**

Geography, life science

### **Connections to the National Geography Standards:**

Standard 9: "The characteristics, distribution, and migration of human populations on Earth's surface"

### **Time:**

Two to three hours

### **Materials Required:**

- \* Computer with Internet access
- \* Blank Xpeditions outline map of North America, one for each student or pair of students
- \* Writing and drawing materials
- \* Can of salmon, or another packaged salmon food or food container

### **Objectives:**

Students will

- \* list outdoor sources of fresh and saltwater;
- \* discuss and illustrate a map of Pacific salmon migration routes;
- \* view and discuss slides of salmon at different stages of their life cycle;
- \* illustrate their maps with pictures of salmon during different stages of their life cycle and migration;
- \* perform skits reviewing the salmon's life cycle and migration.

### **Geographic Skills:**

Acquiring Geographic Information  
Organizing Geographic Information

Answering Geographic Questions  
Analyzing Geographic Information

**Suggested Procedure**

**Opening:**

Ask students if they can think of types of fish that people eat. They might say tuna, sardines, salmon, or other species. List their ideas on the board.

If possible, show students a can of salmon, a package of smoked salmon, or another salmon food product. Explain that, as they may already know, salmon is one of the most popular types of fish that people in the United States eat.

Tell the class that even though many people smack their lips when they think about salmon, it's not just a food—it's also an animal that leads a very interesting life!

**Development:**

Write the phrases "fresh water" and "salt water" on the board. Ask students to list places outdoors where they can find fresh water.

Write their answers under "fresh water" on the board. Make sure their list includes "river," "lake," "stream," and "pond"; add these words if necessary. Ask students if they know where they can find salt water. Write "ocean" under "salt water."

Ask students where they have seen fish. They might say aquariums, lakes, rivers, streams, or the ocean. Has anyone ever had an aquarium in their homes? Was the water salty or "fresh" (like the water they drink)? Can fish live in salty water? Students should realize that some fish like living in salt water, while others prefer living in fresh water. Explain that salmon are very special because they can live in both salt water and fresh water.

Give each student or pair of students a North America outline map. Then have students look at this salmon migration map. Explain that this map shows where salmon travel during their lives. Ask them to

describe which part of the United States salmon live in. They should recognize that this map shows the Northwestern part of the United States.

Tell the class that this map shows the migration route of Pacific salmon, which live in and near the Pacific Ocean. Explain that some salmon live in the Atlantic Ocean, but their range is not shown here. Further explain that Pacific salmon also live in the waters off western Canada and Alaska. Have students locate western Canada and Alaska and add arrows to their maps to show that the salmon migrate from these places as well.

Have students look carefully at their maps. Do the salmon stay in the ocean, or do they go inland? They should notice that they spend part of the time inland. Explain that salmon spend much of their lives in rivers and streams that are often hundreds of miles from the ocean.

If you are able to project the computer screen onto a larger screen, or if you are able to have all your students look at one or more computers at the same time, take the class through the salmon slide show at Salmon: Spirit of the Land and Sea. [Note: If this is not logistically realistic for you, please see the option below.]

To get into the slide show, do the following:

- \* Select "highband" or "lowband" ("highband" works best unless your connection is extremely slow, in which case you might want to select the optional adaptation below anyway).
- \* Skip the intro.
- \* Select "Saga of the Salmon."
- \* Go through at least the first six slides one at a time.

As you show students the slides, read the following text to them : (Pause when appropriate to discuss students' observations and questions.)

*Slide 1* (eggs and hatchlings): Salmon lay their eggs in streams. Their eggs hatch in the streams and look like this.

*Slide 2* (baby fish): The babies grow and turn into little fish like these. They are called "fry." The fry eat tiny

insects and  
three years

plants. Sockeye salmon fry live from one to  
in the stream.

*Slide 3* (orange salmon swimming in river): After one to three years, the fry have grown, but they are not all grown up yet. They leave the stream and begin swimming toward the ocean. They swim into bigger streams and rivers until they reach the ocean.

*Slide 4* (salmon in rapids): Salmon can swim even in very rough river waters.

*Slide 5* (baby fish): Scientists are trying to figure out why salmon swim to the ocean.

*Slide 6* (salmon swimming in the ocean): When the salmon arrive at the ocean, they swim very long distances. They stay in the ocean for a few years. Some salmon up to ten thousand miles around the ocean! But most amazing thing of all is that, later, they make way back to the same stream where they were born. They travel to that stream to lay their eggs, and then they die.

swim  
the  
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born.  
then

How do they know their way to the stream where they were born? Can you imagine finding your way back to another part of the country or world? Imagine that you went to a place one time when you were a little baby. Could you get back there now, on foot and without a map? That's kind of what it's like for the salmon, except they are very good at it!

*Additional slides:* Go through a few more slides and simply let students look at the salmon pictures.

Option: If it's logistically difficult for you to show students the above slide show, show them these photographs of the salmon life cycle. Don't worry about the more advanced terminology (e.g., alevin or smolt), but describe where the salmon live (e.g., in streams or the ocean) during each stage.

Ask students to look at their maps again and determine where the salmon are born, where they grow into bigger salmon, and where they swim when they are adults. Discuss their ideas, reviewing what they have learned from the slide show.

Have students draw pictures of salmon in these life stages in the appropriate locations on their maps. You may want to review where the salmon pictures should go before they actually do the drawings.

**Closing:**

Review the salmon life cycle by having students look at these photographs. Rather than focusing on vocabulary (e.g., spawning or alevin), review the appearance of the salmon at each stage. Ask students to explain where the salmon live—streams or the ocean—in each picture.

Hold up the package of salmon that you brought into class. Explain that it is not just modern people who like to eat salmon. For hundreds of years before we had canned and packaged food, people enjoyed fresh fish such as salmon. Many Native Americans lived close to the rivers where the salmon swim.

Ask students to think about how the salmon's migration pattern (i.e., returning to their streams via larger rivers) might have affected the movements and trade activities of Native Americans. Discuss how people might have altered their daily activities or moved to different locations to take advantage of the salmon migration, which generally occurs from the spring into the fall.

**Suggested Student Assessment:**

Divide the classroom into two sections: streams (fresh water) and the ocean (salt water). Place posters or banners in each section to label the parts of the room. If time permits, allow students to draw pictures to add to the "ambience" of each section.

Divide the class into groups of four or five. Ask each group to write and perform a skit about the life of a salmon. Their skits should:

- \* describe where salmon are born and what the eggs look like;
- \* describe what salmon look like and do as they grow;
- \* explain where salmon go when they leave the stream;
- \* describe salmon swimming in the ocean; and

\* describe where salmon go when they are ready to lay eggs.

Students should use the different parts of the room as the setting for their skits. Their skits can be funny or dramatic as long as they address the main points listed above.

As an alternative to skits, you can have students write stories about the life of a salmon. They can illustrate their stories with pictures that you display in the freshwater and saltwater sections of the classroom.

**Extending the Lesson:**

\* Introduce students to current theories about how salmon find their way to their streams of birth. Explain that most scientists believe that salmon use special magnetic navigation to figure out which way to travel. When they get close to the mouth of the river that leads to the stream where they were born, they begin to smell the stream's special scents. They then "follow their noses" to their home stream.

To help students understand the concept of magnetic navigation, do this activity:

Divide the class into pairs or small groups, and give each group a compass. If this is not possible, use one compass that can be rotated throughout the class so that everyone has a turn. Show students how to locate north with the compass. They will notice how the compass needle remains fixed as they move the compass to be aligned to the north.

Once they figure out which way is north, they can also figure out the other directions. Allow groups a few minutes to practice locating north, south, east, and west in the classroom. Ask them to rotate the compass so that everyone gets a turn holding it and aligning the needle.

Explain that using a compass is a very common, and very old, way for people to figure out where they are and how to get where they want to go. As students might imagine, salmon do not use compasses. They might, however, have a different sort of "compass" in their brains that tell them which directions to travel. They might remember the direction

of their home  
swimming through the ocean.

stream all the time that they're

- \* Help the class go through the Salmon Challenge, a simulation where they "adopt" their own salmon and see how it fares. Older students might be able to do this on their own with less guidance.
- \* Have students do the Salmon Puzzle (or another one of the simple games) at Alaska's Department of Fish and Game Web site.

## **Lesson : Beluga Whales in the Ice**

### **Overview:**

This lesson asks students to think about how beluga whales survive in icy Arctic and subarctic waters and why they sometimes need to migrate. Students will view and sketch photographs of ice at different stages of thickness, look at pictures of belugas, and discuss how belugas' bodies are adapted to life in the ice. They will conclude by writing and illustrating paragraphs about how belugas survive in the ice and where the whales go when the ice becomes too thick.

### **Connections to the Curriculum:**

Geography, life science

### **Connections to the National Geography Standards:**

Standard 9: "The characteristics, distribution, and migration of human populations on Earth's surface"

### **Time:**

Two to three hours

### **Materials Required:**

- \* Computer with Internet access
- \* Wall map of the world
- \* Writing and drawing materials

### **Objectives:**

Students will

- \* sketch and write words describing photographs of Arctic and subarctic waters;
- \* hypothesize how sea animals might be able to live in this icy water;
- \* locate and circle some important physical features of the beluga whale on a printout showing the beluga's body;
- \* hypothesize how the beluga's special body features might help it survive in icy waters;
- \* write paragraphs explaining what belugas might do in late summer as the ice becomes thicker and winter approaches; and
- \* illustrate their paragraphs.

### **Geographic Skills:**

Acquiring Geographic Information  
Organizing Geographic Information  
Answering Geographic Questions  
Analyzing Geographic Information

## **S u g g e s t e d P r o c e d u r e**

### **Opening:**

Write the word "Arctic" on the board.

Hold up a globe, and ask one or two student volunteers to point out the North Pole.

Run your fingers over the Arctic region as you introduce students to the word "Arctic." They will see that the North Pole is in the center of the Arctic region.

Point out the differences between the Arctic islands and land masses and the Arctic Ocean. Explain that the Arctic Ocean covers most of this region, including the North Pole. Some parts of the Arctic Ocean are covered with ice all or most of the time, but there's still an ocean underneath that ice. Tell them that they will see some pictures of the ice in a few minutes.

Ask students to describe what they think the weather might be like in this part of the world. They should recognize that it is very cold compared to other parts of the world.

Explain that some people live in the Arctic region, but that it is not an easy place to live. It is much more common for animals to live there. These animals need special features that help them adapt to the cold environment. Some also migrate away from the coldest areas to spend the winters in places that are not as cold. Can students think of times when people might migrate away from cold places in the winter?

### **Development:**

Have students look at the following photographs of ice in Arctic and subarctic waters. It would be ideal if you could project the images to

the entire class at the same time. If this is not possible, have students take turns looking at the pictures on the computer.

- Ice floes in the Northern Bering Sea
- A congealed old ice pressure ridge, Alaska North Slope
- "Pancake ice" in the Bering Sea
- Edge of pack ice, Northern Bering Sea
- Winter sea ice terrain of the Beaufort Sea

As they look at each picture, ask them to:

- \* sketch what the ice looks like; and
- \* write words describing the ice.

[Note: You may want to have students place their sketches and words into a two-column chart, with the sketches in the column and the words in the second.]

first Discuss students' observations of these photographs. Also discuss these questions:

- \* In which type of ice do you think it would be easiest for an animal to swim?
- \* Did any of the pictures show ice that looked impossible to swim in?
- \* Which picture looks most like winter? Which picture looks most like summer?

Ask students to think about animals that might live in the Arctic Ocean. How could these animals swim in such icy water? What special features might they need? What might they do in the winter when the ice becomes very thick? Discuss students' ideas as a class.

Tell the class that the beluga whale is a special animal that lives in the Arctic Ocean and other waters near the Arctic Ocean.

Show students this beluga distribution map, and explain that beluga live in the purple zone on this map.

Have students look at pictures of beluga whales at these Web sites:

- Mystic Aquarium Homepage
- Mystic Aquarium: Beluga Whale
- Shedd Aquarium—click on "Animals" and then select "Beluga Whale"

Ask students what they think are the most interesting things about the beluga's appearance. List their ideas on the board. Have them draw the outline of a beluga whale, or let them trace a printout of one of the pictures above.

Help students locate the beluga's "melon" (head) and write the word on their drawings. Then ask them to write the word "blubber" in the middle of the whale. Explain that blubber is whale fat. Although we can't see the blubber, we know that belugas have two layers of it under their skin.

Tell the class that the beluga's melon, blubber, and white color help it live in icy waters. Ask students to think about how each of these features might be useful. Provide some hints such as "belugas often swim under the ice but must make their way to the surface to breathe" and "killer whales and polar bears sometimes hunt belugas."

Have students discuss their ideas as a class or with partners. If they work in pairs, have them summarize their discussion in a list of ideas and report back to the class on what they have discussed.

After reviewing the class's ideas, inform students that belugas use the tops of their heads (their melons) to help them break through the ice when they need to get to the surface. Their white skin makes it hard for killer whales and polar bears to see them. Their blubber helps keep them warm. As an option, have students draw pictures of belugas involved in these activities (e.g., surfacing for air, being hunted, and trying to stay warm) to help them understand and remember these concepts.

**Closing:**

Ask students to consider what they have learned about ice in the Arctic and subarctic regions, and about beluga whales. What do they think belugas do when winter comes?

Explain that many belugas migrate away from the heaviest ice. They live in ice that is broken into pieces, but they cannot live under solid ice because they must come up for air.

**Suggested Student Assessment:**

Use the world wall map to point out Alaska and its southwestern coastline along the Bering Sea.

Define the word "bay"—it may be helpful to point out a major bay, such as Hudson Bay, on the world map, and then tell students that there are many much smaller bays all around the world's coastlines.

Ask students to imagine this scenario:

It is late summer in the North. Many belugas are swimming in a bay on the western coast of Alaska. There is no ice in the water. They are eating a lot of fish.

Soon, the bay will have ice in it. It will get much colder. The ice will become very thick. What will the belugas do?

Ask students to write paragraphs explaining how the belugas will deal with the ice. Their paragraphs should address:

- \* how the belugas use their special body features (melon, white color, and blubber) to survive in an icy sea;
- \* what the ice will look like as time passes and it becomes thicker; and
- \* where the belugas might go to get away from the ice as it becomes thicker.

Have students draw pictures to illustrate the things they have discussed in their paragraphs.

Younger students can simply draw the pictures to show the belugas interacting with their icy environment.

**Extending the Lesson:**

Have students go through the beluga slide show. Ask them to create additional slides showing some of the things they have learned about belugas and their adaptations to the ice.