

Burr, It's Cold in Here

ACTIVITY OVERVIEW

STEM Focus Area: Animals

Facilitator Learning Goal: Youth will understand that polar animals keep warm because they have layers of blubber, or fat, under their skin to provide insulation.

Youth Learning Target:

- "I can conduct experiments."
- "I can understand the importance of blubber for marine mammals."

LEARNING ENVIRONMENT

Activity Duration: 30 minutes

Group Size: Any Size

Minimum Group Size: none

Type of Space: Indoor

Age of Youth: Grades 3-4

Guiding Question: What is the question to explore OR the problem or challenge to solve?

How do marine mammals stay warm in frigid water?

Through this activity, youth will:

- Predict and hypothesize which materials will provide the most insulation.
- Test and revise their gloves to see if they can make more insulated.
- Draw conclusions and relationship between materials and their ability to insulate.

Facilitator Prep

Facilitators will need to prepare "blubber gloves" in advance (one per small group) by filling a quart sized storage baggie (seal tops NOT zipper tops) with vegetable shortening, then turn a second storage baggie inside out, inserting it into the baggie filled with shortening and sealing the bags together.

Literacy Connection: Great books to get youth support learning about (available on Amazon).

- [In Arctic Waters by Laura Crawford](#)
- [Ultimate Spotlight: Polar Animals by Sandra Laboucarie](#)
- [A Whale of the Wild by Rosanne Parry](#)

DoS:

✓ **Predict and hypothesize**

Develop and use models

Measure materials

Observe

Investigate

Record observations

Analyze and infer

Share and communicate data

Interpret data

- ✓ **Test and revise**
- ✓ **Draw conclusions and relationships**
- ✓ **Have voice and agency, make decisions and guide their own learning**

PREPARATION

Materials

- buckets of water and ice (deep enough to submerge a hand up to the wrist)
- gallon zipper bags
- vegetable shortening
- tissue paper
- cotton balls
- feathers
- faux fur or felt
- facial tissues
- paper towels

Room

This activity will need to take place in a setting that is easy to clean up if water spills.

Content

Blubber is a thick layer of adipose tissue (fat) under the skin of cetaceans (whales and dolphins), pinnipeds (seals, sea lions, walrus and otters), penguins and sirenians (manatees).

Blubber is important for animals, especially those in the ocean. For animals that feed and breed in different parts of the ocean, they can metabolize blubber for energy. Blubber helps aid in buoyancy so they can swim and float better, and it aids in thermoregulation (the ability for an animal to keep its body temperature within a certain range) because it has more blood vessels than other fat.

Common misconceptions:

- Blubber is a result of eating too much.
- Blubber only provides warmth.
- All animals have blubber.
- Blubber is the only form of insulation for Arctic/Antarctic animals.

Inquiry

Your primary goal as facilitator is to encourage youth to investigate which materials insulate the best. You can prompt those discussions with questions like the following:

- Why did you decide to test these materials?
- What would happen if you added more of this material?
- What would happen if you combine materials?

- Why do you think this material is a good/poor insulator?

DoS:

- ✓ Organization: I practiced the activity/technology, prepared materials/extras/place to record youth ideas, completed an activity (including timings).
- ✓ Materials: Materials are appropriate for teaching the learning goals; youth will be able to use them and will think they are appealing.
- ✓ Space Utilization: The space is set up appropriately for the activity and there will be no safety issues or distractions.
- ✓ Relevance: I have researched why the content matters to youth's everyday lives.
- ✓ Content Learning: I have become familiar with the content.
- ✓ Inquiry: I have become familiar with how authentic, age-appropriate inquiry practices look in this activity.

INTRODUCTION TO ACTIVITY (5 MINUTES)

Have a bucket of ice water. Let youth stick their hands in and describe how their hands are feeling.

Polar waters are cold! But yet animals can survive in that water.

What ways do you stay warm in winter? Make a list of youths' answers on a whiteboard or chart paper.

Imagine swimming outside during the winter time. What would that be like? How do animals, such as polar bears or seals, handle being able to swim in icy cold water in the arctic?

These animals have thick layers of insulation. Insulation is something that stops the passage of heat. So it either helps keep heat in or helps keep heat out.

DoS:

- ✓ Space Utilization: I will use the space informally avoiding the lecture hall format.
- ✓ Purposeful Activities: This intro section gets youth on track for the learning goal.
- ✓ Content Learning: If age appropriate, I will accurately present content.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Relationships: I will make each youth feel welcome.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

ACTIVITY ENGAGEMENT (20 MINUTES)

Split youth into small groups during this activity. In each group, each youth will make 1 glove.

In small groups:

- Give each group a bucket of ice water.
 - o Instruct youth to take turns placing their bare hand in the ice water. Can they keep it in there for a count to 10? Have them describe how their hand is feeling.
- Provide youth with a variety of insulating materials: feathers, felts/faux fur, cotton balls, yarn, tissue paper, aluminum foil, etc.
- As a group, decide which materials the group wants to test.
- Have each youth fill a quart size storage bag with one of the insulating materials that the group decided to test.
- Using a second bag turned inside out, have them seal the two bags together to make a glove.
- Instruct youth to run the ice-water dip test again each taking turns with the different gloves and compare which materials work better.

Have the groups discuss the following questions/scenarios:

- What material insulates the best?
- What material insulates the worst?
- What happens if we add more material, does it work better?
- What happens if we combine materials?

After all the groups have completed at least 2 rounds of testing, provide each group with the shortening gloves to test. What do they notice now? Does the shortening bag work better or worse than the bags they created? Why?

DoS:

- ✓ Space Utilization: I will use the space informally avoiding the lecture hall format.
- ✓ Participation: All youth will have access to the activity.
- ✓ Purposeful Activities: This core section helps youth to move toward the learning goal.
- ✓ Engagement: This activity has youth physically engaged with their hands and their minds.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Reflection: If appropriate, I will ask youth questions during the core activity that will help them make sense of what they are learning.
- ✓ Relationships: I will take steps to share my enthusiasm and create a nurturing, safe learning environment.
- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.

FINAL REFLECTION AND RELEVANCE (5 MINUTES)

Come back together as a group and partner share which materials they tested and which worked best.

As a large group:

- Why did the shortening work best? What is shortening made out of?

Shortening is a solid form of vegetable fat. Fat is important for animals, especially those in the ocean. For animals that feed and breed in different parts of the ocean, they can metabolize blubber for energy. Blubber helps aid in buoyancy to they can swim and float better, and it aids in thermoregulation (the ability for an animal to keep its body temperature within a certain range) because it has more blood vessels than other fat.

How can we apply what we've learned about blubber to our lives?

DoS:

- ✓ Space Utilization: Again, I will use the space informally.
- ✓ Participation: I will prompt youth who do not have access to the activity to participate.
- ✓ Purposeful Activities: The closing section helps youth to reach the learning goal.
- ✓ Content Learning: I will help youth make connections between different ideas. I will create opportunities for youth to ask questions/provide ideas that show a deeper level of understanding.
- ✓ Inquiry: In this or another section of the activity, youth carry out one or more inquiry practices.
- ✓ Reflection. I will provide youth with a sustained opportunity to make sense of their learning.

- ✓ Relevance: In this or another section, I will guide the youth in a sustained discussion of how the activity relates to their everyday lives.
- ✓ Youth Voice: In this or another section, I will allow youth the opportunity to make decisions about their learning experiences.