



## Western Upper Peninsula Center for Science, Mathematics and Environmental Education

### FAMILY SCIENCE/MATH NIGHT LESSON PLAN

Family Math & Science Lesson Plan from students in ED 3510 Communicating Science course (2-credits)  
Western Upper Peninsula Center for Science, Mathematics & Environmental Education at Michigan Technological University  
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## Freezing Feathered Friends

**Presenter's name:** Melody Ward, senior, Applied Ecology

**Age Group:** K-2

**Topic:** observation skills, temperature measurement, habitat, wildlife adaptations

**Michigan Content Standards addressed:**

- Generate questions about the world based on observation (SCI.1.1.Elem.1)
- Develop strategies and skills for information gathering and problem solving (SCI.1.1.Elem.4).
- Identify food chain... (SCI. III.5.Elem.1).
- Describe basic requirements for all living things to maintain their existence (SCI. III.5.Elem.2).
- Identify attribute to be measured and select appropriate unit of measurement for length,...temperature, etc. (MA.II.3.2)

**Lesson Overview:** Activities will investigate how penguins stay warm in freezing cold water, how they carry their eggs on their feet, what they eat, and what eats penguins.

**Sources Consulted:**

1. How to make blubber and feather gloves: <http://ericir.syr.edu/cgi-bin/printlessons.cgi/Virtual/Lessons/Science/Animals/ANM0115.html>
2. [http://www.nationalgeographic.com/kids/creature\\_feature/0101/penguins2.html](http://www.nationalgeographic.com/kids/creature_feature/0101/penguins2.html)
3. [http://www.adelie.pwp.blueyonder.co.uk/Education/education6\\_11.html](http://www.adelie.pwp.blueyonder.co.uk/Education/education6_11.html)

**Objectives**

*After this presentation, students will be able to:*

1. Show and describe how penguins carry their eggs
2. Explain that blubber keeps penguins the warmest
3. List other animals that use blubber to stay warm
4. Identify a penguin and distinguish it from other birds.
5. Describe an Antarctic food chain

**List of All Materials Needed** (include quantities):

*Per group of 2:*

Tub of ice water (large enough to submerge hand)  
Paper towels  
Globe  
Prediction sheets & Pencils  
1 feather, blubber and skin glove each\*

small tubs to hold materials  
Penguin eggs  
gummi worms = krill  
pictures of penguins  
thermometers

\*To prepare blubber and feather gloves, use two zip loc freezer plastic bags and fill one with Crisco (about 1 cup). Use the other bag to place on top of the Crisco so the students are not touching the Crisco. Attempt to zip together by having the top one inside out. Tape closed.

**Room Arrangement or Special Needs:** will probably be messy, will need ice and water, desks pushed together so they can work in groups.

**Attention getter** (5 min)

Have students put their hand in the water to show how cold the water is that penguins swim in. Show pictures of penguins and other birds and ask if anyone can identify the penguin. Ask students to share what they know about penguins.

### **Procedure** (20 min)

Describe characteristics of penguins: where do they live, they don't fly, they swim and hunt in cold water. How do penguins stay warm? Relate to what students wear in the winter to stay warm.

Explain that we're going to investigate the best way to stay warm: blubber, feathers, skin. Hand out the record sheets and ask students (with parents' help) to circle predictions on record sheet while instructor will write responses on board (class will vote). Place thermometers in plain ice water, skin, feather, and blubber gloves. Explain the procedure to follow for evaluating each type of insulation (blubber, feathers, skin):

1. Take temperature of ice water.
2. Feel water with bag on.
3. Take temperature inside of bag.

Have parents write down the temperature. Write on board. Compare the different insulations. Which felt warmest? Which was warmest according to thermometer?

**What do penguins eat?** Explain that a food chain shows what animals eat. Some animals eat plants and some eat other animals. Give examples of food chains: Seeds → Mouse → Owl    Grass → Deer → Wolf

**What eats penguins?** Penguins may be eaten by leopard seals, fur seals, sea lions, sharks, killer whales. Gulls, ibises, snakes, foxes, feral dogs/cats eat penguin eggs on land.

**Describe Antarctic food chain** and draw on board: Algae in water → Fish, Squid, Krill → Penguin

### **Do the penguin walk!**

Explain that Emperor penguins have to carry their eggs and babies on their feet. Have the students take off their shoes and try to walk around with an egg shaped ball of Play-doh. Put eggs in plastic bags so they don't get squished onto the floor or carpet.

### **Learning Assessment** (5 min)

1. What is a penguin? A bird
2. How do penguins get around? They swim up to 13 mph, using their wings like flippers in the water to swim and dive up to 900 feet deep.
3. How do emperor penguins carry their eggs and babies? Males use their webbed feet to keep the eggs off the ice (instead of a nest) and a flap rests on the egg keeping it warm--brooding, or huddling together, until their female returns, right before the chicks hatch.
4. What type of insulation keeps penguins warmest? blubber
5. Where do penguins live? Antarctica
6. What do penguins eat? Antarctic krill (~ 5 cm or 2 inches long)
7. What eats penguins? Penguins may be eaten by leopard seals, fur seals, sea lions, sharks, killer whales, hunted by humans, harmed by oil spills, etc.

**Take Home Handouts:** Prediction sheets

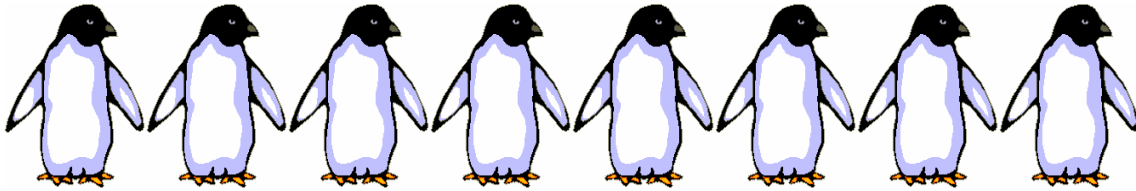
**Cleanup:** Wipe up water. Add ice between presentations. If there's not lots of ice, the water will not be cold enough and feathers will be the same as blubber or better.

**Safety Considerations:** make sure no one slips in water or breaks thermometers.

Name \_\_\_\_\_

# Our Freezing Feathered Friends

## Record Sheet



**My Prediction:** Which will keep us warmest? (circle one)

Skin

Feathers

Blubber

Measure temperature of ice water \_\_\_\_\_

### Insulation

### Temperature

“Skin” glove

\_\_\_\_\_

Feather glove

\_\_\_\_\_

Blubber glove

\_\_\_\_\_