KINDERGARTEN
HOW DOES A PENGUIN STAY WARM?
CLASS SCIENCE FAIR PROJECT

Summary: Students work together as a class to generate a science fair project. The students use the steps of the scientific method to ask a question, form a hypothesis, design a test, collect data, and draw conclusions. Their findings are presented to the class and placed on a science fair project board for the school science fair. The topic of this project is how penguins survive in the icy ocean.

Intended Learning Outcomes for Kindergarten:
Objective 1: Framing questions. Designing investigations. Conducting investigations. Collecting data. Drawing conclusions.
Objective 2: Developing social interaction skills with peers. Sharing ideas with peers. Connecting ideas with reasons. Using multiple methods of communicating reasons/evidence.
Objective 3: Ideas are supported by reasons. There are limits to ideas in science. Differences in conclusions are best settled through additional observations and investigations. Communication of ideas in science is important for helping to check the reasons for ideas.

Utah State Core Curriculum Tie:
Standard 4 Objective 1: Life Science
Construct questions, give reasons, and share findings about all living things.

Preparation time: 30 min
Lesson time: 40 min
Small group size: works best with one adult for every 5 children

Materials:
1. gallon Ziploc bags (2 per group)
2. large bowl filled with ice water (one per group)
3. one large container of shortening (one can will work for 4 or 5 groups of students
4. one thermometer per group
5. several half sheets of paper per group
6. one science fair presentation board
7. headings made for the presentation board: what we want to learn, what we think will happen, how we did it, what we saw, what we learned

Preparation: Make one blubber bag for each table. Take the available shortening and using a glove or another bag; divide it equally between the Ziploc bags. If you have 4 groups of students divide the shortening into 4 bags. Push the shortening all the way to the bottom of the bag. Place the second Ziploc bag inside the first. Students will place their hand into this second bag so that they don't get full of shortening while doing the project. To keep the water out of the shortening in the bag, fold the second bag top over the first bag top and be sure the tops of the bags don't get submerged into the water.

Background information:

How does a penguin stay warm in the Antarctic waters? Penguins are warm-blooded animals that need to keep their internal body temperature between 95 – 107 degrees Fahrenheit. Penguins have a fat layer called blubber that insulates them and keeps them warm in the ocean. The feathers on the penguin with the blubber keep it warm while on land. Penguins also stay in groups while on land so that they can block the wind and use each other's body heat to stay warm. We can test if this blubber layer keeps a penguin warm by using shortening.

Pre-lab discussion: Show the students pictures of penguins and ask them how penguins stay warm in the ocean. Ask them how long they would stay warm in the freezing water. Discuss with the students what a science fair is and tell them that they will complete a science fair project today in the classroom.

Instructional procedure:

I. Experiment – Complete the experiment first and then work on the project board.

1. Have students place their hands in the ice bucket for 20 seconds. Some students will not be able to make the entire time. Discuss how that feels and how long they think they could survive in Antarctic waters.

2. Place a thermometer into the ice water mixture. Leave it for one minute and then read the temperature. Go over how to read a thermometer with the students. Place this temperature reading in a data table.

3. Have students place their hand in the inner bag of the blubber bag. Have them take turns putting the bag with their hand into the ice water. Discuss how this feels and how long they think they could survive in Antarctic waters if they had a layer of blubber around them.

4. Have students predict the temperature reading inside the blubber bag.

5. Place a thermometer into the inner bag of the blubber bag. Be sure the thermometer is covered with Crisco. Place it into the ice bucket. Leave it for one minute and then read and record the temperature.

II. Science fair display board: Assign each group a different section of the class science fair display board. Each group can decide what to write and then help the students take turns writing the different words on a half sheet of paper. Students will write up their section and then place it in the appropriate area on the display board. If you take pictures of the students working on the project you can put them on the board as well.

1. Why we did the project -- In a couple of sentences, write the purpose of the experiment. For example, we want to find out how penguins stay warm in the Antarctic.

2. What we think will happen -- We will do this as a group before we do the experiment. An example, we think that blubber will keep a penguin warm in the cold ocean. If they predict a different outcome then use their hypothesis.

3. How we did our project -- Simplify the experiment. Put it in number format of no more than 3 steps.

4. Title –make a title that is catchy and describes the experiment

5. What we saw – Place each group's data table on the project board. Students can also draw some pictures at the same time to add to the board.

6. What we learned -- In a few sentences, explain whether our prediction was correct. Explain what that tells us about penguin's blubber.

Display board sections:

left panel	**center panel**	**right panel**
why we did the project	title	what we learned
what we think will happen	tables, pictures,	
how we did our project	drawings	name of teacher