OIMB GK12 CURRICULUM

6th Grade **60 minutes**

BEAUTIFUL BLUBBER EXPERIMENT

Oregon Science Content Standards:

6.3 Scientific Inquiry: Scientific inquiry is the investigation of the natural world based on observations and science principles that includes proposing questions or hypotheses, and developing procedures for questioning, collecting, analyzing, and interpreting accurate and relevant data to produce justifiable evidence-based explanations.

6.3S.1 Based on observations and science principles, propose questions or hypotheses that can be examined through scientific investigation. Design and conduct an investigation that uses appropriate tools and techniques to collect relevant data.

6.3S.2 Organize and display relevant data, construct an evidence-based explanation of the results of an investigation, and communicate the conclusions.

6.3S.3 Explain why if more than one variable changes at the same time in an investigation, the outcome of the investigation may not be clearly attributable to any one variable.

Ocean Literacy Principles:

5: The ocean supports a great diversity of life and ecosystems.

Goals:

1. Students recognize the effectiveness of blubber as an insulator.
2. Students practice the scientific method and graphing.

Concepts:

- Blubber helps keep elephant seals and other marine mammals warm, and is an important energy resource. It is a very effective insulator.
- Experiments help us understand the world around us.
- Graphs are a useful way of presenting information.

Materials:

- trays, 1 per group
- cups
- bubble wrap, cotton balls, fake fur, Crisco (fake blubber)
- thermometers
- tape and rubber bands
- ice
- Stopwatches, 1 per group (or watch or wall clock)
- experiment worksheet, 1 set per student

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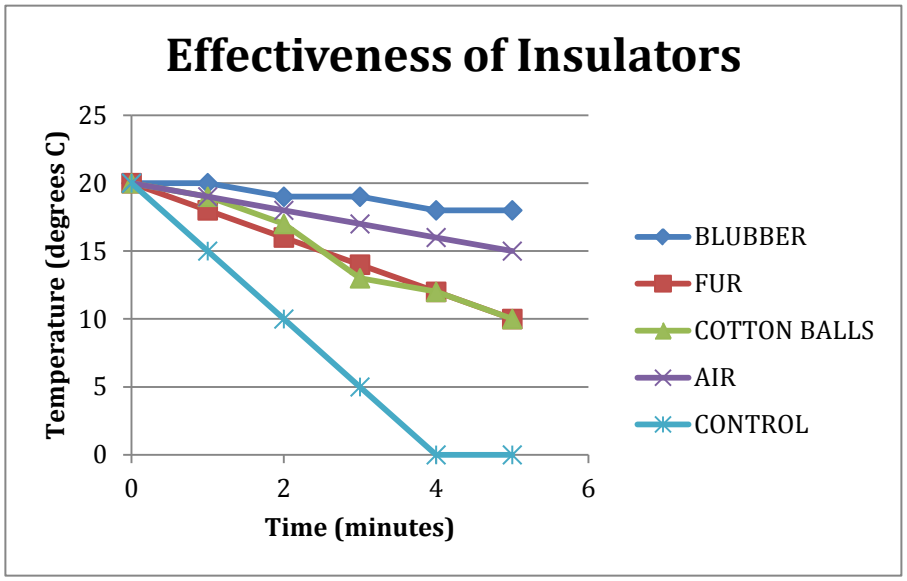
Lesson plan:

1. Review elephant seal information from previous lessons focusing on diet, use of islands and important adaptations. (It is helpful if this lesson follows the MARE Mirounga Mirounga lesson.) What do elephant seals use blubber for? *(As insulation and as an energy reserve.)* What is an adaptation? *(A behavior or body part that helps an organism perform better in its environment.)*
2. Review the scientific method. *(question, hypothesis, methods, results, discussion/conclusion – iterative process)*
3. Pass out the experiment worksheets, one set per student.
4. Discuss the questions "Which material is the best insulator from the cold? Which is the worst?" Show students the 4 materials you have brought to test: fur, blubber (Crisco), air (in the form of bubble wrap) and cotton balls. Have the students make their own hypothesis as to the best insulator and provide a reason. Have the students write both their hypothesis and their reason(s) on their worksheet. Remind them that it is OK if their prediction ends up being incorrect. They will still get results to give them an answer. The hypothesis gets things rolling.
5. Describe the materials available: cups, ice, thermometers, tape/rubber bands, insulating material, stopwatches (or watches or clock). The experimental design should involve wrapping the thermometers in various insulators, placing the thermometers in ice, and measuring temperature change over time.
6. Work together as a class to refine the procedure to answer the question within the class period. Discuss:
    - why it is a good idea to have a control group *(no insulation at all-- so that you have something to compare the other insulators to)*
    - why they should only change one variable in each treatment *(otherwise they won't be able to tell what change influenced the result)*
    - why it is good to repeat the experiment more than once *(to see if results are consistent and in case mistakes are made)*
7. Make sure students understand what they are supposed to do.
8. Give each group their materials.
9. On GO, have each group put their thermometer and insulation into their cup/cups of ice. Have the groups collect temperature data every minute for 5 minutes.
10. Repeat for a second (and third) trial.
11. Gather class information for each treatment and display the information. Have students copy this onto a combined data sheet. Using the data, create a line graph. Draw an example on the board/projector.

Example data table and graph:

Temp °C

Time (minutes)	BLUBBER	FUR	COTTON BALLS	AIR	CONTROL
0	20	20	20	20	20
1	20	18	19	19	15
2	19	16	17	18	10
3	19	14	13	17	5
4	18	12	12	16	0
5	18	10	10	15	0



12. Discuss the results of the experiment and draw some conclusions. Why is blubber the best insulator? Which is the worst? Why did we include a control? What could we do differently next time to improve our experiment?
13. Review the steps of the investigation.

Assessment: Experiment report and graph

GK12 Fellows: Erin Morgan and Kira Treibergs

Name _____

Beautiful Blubber Experiment

QUESTION -- WHICH OF OUR SAMPLE MATERIALS WOULD MAKE THE BEST INSULATOR?

Background Knowledge
What do you know about the insulating properties of the following?

Air _____

Fur _____

Blubber _____

Cotton Balls _____

Hypothesis and Reason
Based on what you know, which do you think would be the best insulator and why? (The answer is your hypothesis.)

Experimental Design (Describe and draw your experimental design.)

Data

In the boxes below, record the temperature (in degrees C) you measured for each insulator. In the box labeled 0 minutes, record the temperature on your thermometer before you put it in the ice (room temperature).

	0 minutes	1 minute	2 minutes	3 minutes	4 minutes	5 minutes
Control (no insulation)						
Air (bubble wrap)						
Fake Fur						
Blubber (Crisco)						
Cotton Balls						

In the boxes below, record the temperature (in degrees C) you measured for each insulator. In the box labeled 0 minutes, record the temperature on your thermometer before you put it in the ice (room temperature).

	0 minutes	1 minute	2 minutes	3 minutes	4 minutes	5 minutes
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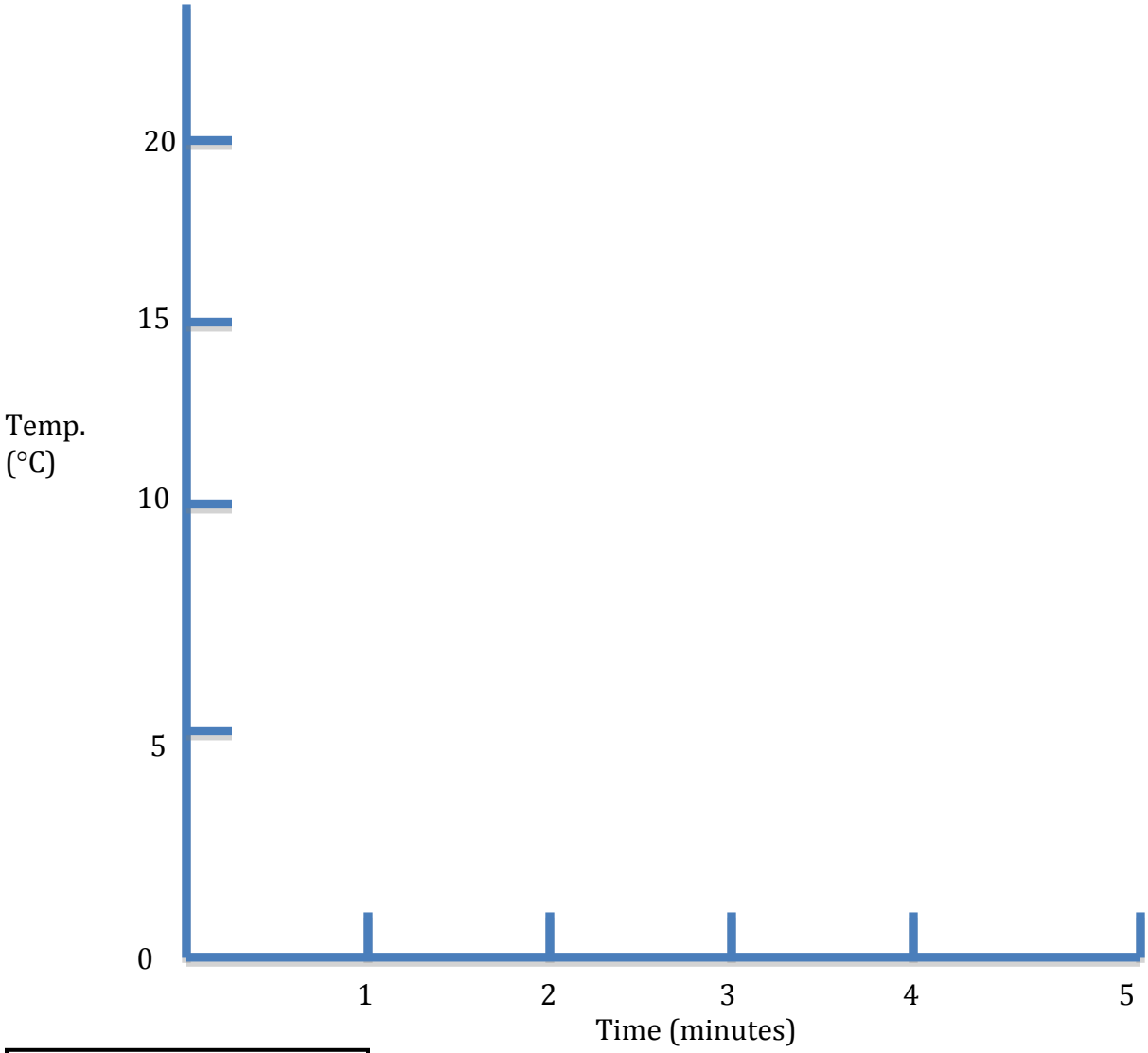
Control (no insulation)						
Air (bubble wrap)						
Fur						
Blubber (Crisco)						
Cotton Balls						

Beautiful Blubber Graph Name:_____

Graph title:_____

Plot your data points on the graph below and connect them with lines.



KEY:

= control
= air
= fur
= blubber
= cotton balls

In the key, indicate the line color used for each treatment.

Conclusions: Answer the question asked at the beginning of the experiment. Give reasons for your conclusion.

What would you do differently next time to improve this experiment?

What new questions do you have as a result of this experiment?