

1. CONTRIBUTOR'S NAME: BROOKE MCBRIDE

2. NAME OF INQUIRY: "SAVING KLONDIKE AND SNOW": HOW SCIENTISTS RESCUED 2 BABY POLAR BEARS.

3. GOALS AND OBJECTIVES:

a. Inquiry/Discussion Questions:

- Why did the scientists have to make a special formula for the baby polar bears?
- Why did they have to make a guess, or a *hypothesis*, about what ingredients to include in the formula?
- What ingredients did they include in the first formula?/What was their first *hypothesis*, or best guess, about what should be in the first formula?
- (See Methods section for remainder of discussion questions and structure of discussion.)

b. Ecological/Scientific Theme(s):

- Scientists use the scientific method (making and testing hypotheses) to solve problems!

c. General Goal: Students must think critically about how zoo veterinarians used the scientific method to save the lives of 2 abandoned polar bear cubs.

d. Specific Objectives:

- Following the video, students will explain why the veterinarians had to make a hypothesis about what to include in the baby bears' formula.
- Students will identify the first hypothesis/ingredients of the first formula and speculate why the scientists may have chosen to include those ingredients.
- Students will explain how the scientists tested their first hypothesis/how they determined whether their formula was right for the bears.
- Students will identify the outcome from the first formula/first hypothesis.
- Students will explain why the veterinarians had to make a second hypothesis/second formula, and identify the outcome of the second formula.
- Students will explain why the veterinarians had to make a third hypothesis/third formula, and identify the outcome of the third formula.

e. Grade Level: K-6

f. Duration/Time Required:

- Prep time: 0 minutes
- Implementing Exercise During Class: 60 minutes (30 minutes for video; 30 minutes for discussion and journaling) .
- Assessment: The 30 minutes of discussion and supervised journaling serve as assessment of students' understanding of the scientific content of the video.

4. ECOLOGICAL AND SCIENCE CONTEXT:

a. Background (for Teachers): On November 6, 1994, twin polar bear cubs were born at the Denver Zoo. The mother bear abandoned the cubs and they were found by zoo staff, nearly frozen to death. The zoo veterinarians weren't sure how to save them, because no one had ever raised baby polar bears! So, they had to make and test their best hypotheses about how to care for them. Thus begins the story of Klondike and Snow. The fiercely dedicated zoo staff nursed and comforted the baby bears 24 hours a day to save their lives. This program provides a rare

opportunity to witness a year in the lives of 2 polar bear cubs, from hours after their birth through their first birthday.

b. Background (to present to Students): Same as for teachers. In addition, students should be asked about all the things that baby mammals depend on their mothers for, (ie. food, warmth, bathing, teaching them life skills, etc.). The zoo staff had to figure out how to give all these things to the baby polar bears, because their mother would not care for them! They had to make their best guesses, or **hypotheses**, about what the cubs needed to survive.

5. MOTIVATION AND INCENTIVE FOR LEARNING: This video is fascinating, yet appropriate for a very broad audience, and the baby polar bears are almost impossibly cute. The video itself generates great enthusiasm for learning and talking about animals.

6. VOCABULARY:

scientific method: a discovery process that involves: 1. making careful observations, 2. coming up with a hypothesis to explain those observations, 3. conducting an experiment to test the hypothesis, and 4. stating a conclusion.

hypothesis: a best guess to explain an observation or phenomenon, which can be tested by further investigation.

formula: a liquid food for baby mammals that is made to be as similar to the real mother's milk as possible.

7. SAFETY INFORMATION: THERE ARE NO APPARENT SAFETY CONCERNS.

8. MATERIALS LIST:

- Video "Saving Klondike and Snow" KCNC-TV 4 Denver, Colorado 1995. Running time: ~30 minutes. Available from amazon.com. A copy is also on reserve and available for loan at Target Range School, Missoula!
- An extended version of the video (running time ~55 minutes) is available from Rocky Mountain PBS, at www.rmpbs.org/videos/v_ks.html.
- Student journals, pencils, pens, and a whiteboard or chalkboard for the teacher.

9. METHODS/PROCEDURE FOR STUDENTS:

- a. Pre-investigation work: If students have not already been introduced to the terms **hypothesis** and **scientific method**, these should first be explained, as they are central to this discussion. The students will be told that zoo veterinarians used the scientific method and tested their hypotheses in order to save 2 baby polar bears!
- b. Investigation work: There are no data for students to collect; rather, they participate in a fill-in-blank discussion that the teacher leads following the video.
- c. Discussion format for teacher to write on the board (see attached).

10. ASSESSMENT: Students are assessed for their understanding of the scientific method (making and testing hypotheses) by their participation in the discussion and their ability to fill-in-the-blank. Their journals may also be assessed for their understanding and recollection of the video content.

11. EXTENSION IDEAS: This video could be shown as part of a larger unit on animal adaptations, specifically, the adaptations of Arctic animals to the cold Arctic habitat. Because polar bears are such "charismatic" animals, there are numerous teaching resources available!

These include:

- **About Polar Bears...** www.kokomo.k12.in.us/Boulevard/polar_bears.htm . This website contains numerous pictures and facts about polar bears' specific adaptations to life in the Arctic, including information on their fur, skin, and paws.
- **Animal Adaptation Web Adventure...** www.teachervision.fen.com/tv/curriculum/weeklywebadventures/animal_adapt/t_home.html . This site offers a great variety of lessons, activities, and information on animal adaptations, with a section specifically about polar bears.
- **Northern Experience...** www.ccs.k12.in.us/polar/polarbear.html This site allows students to view the famous Arctic migration of polar bears and to witness daily photographs taken during a scientific expedition. They may also read daily journal entries recorded during the peak of the polar bear migration, find links to more information on Arctic life, and send emails to ask questions. Teachers may obtain lesson plans and worksheets, find relationships to educational standards and much more!
- **Polar Bear Adaptations...** www.utmsi.utexas.edu/people/staff/dunton/k12/Polar%20Bear%20Adaptations.htm This is a fun-looking activity that involves constructing puppets which illustrate a polar bear's many adaptations to life in the Arctic.
- **Polar Regions Theme...** http://atozteacherstuff.com/Themes/Polar_Regions/ This site has a huge number of lesson plans, craft projects, and inquiries on polar bears, penguins, and other Arctic animal adaptations!

12. **SCALABILITY:** This video is truly appropriate for all ages. Adults and kindergarteners alike will be enthralled by the amazing story, so it is an excellent launching point for many educational activities. Post-video activities can range from kindergartners simply drawing pictures of the polar bears and answering simple questions about the video, to much older students researching and writing their own reports on animal adaptations, or even zoo-keeping.

13. **REFERENCES:** (See above websites for descriptions of video content and extension ideas).

14. **LIST OF EXPERTS AND CONSULTANTS:** In Missoula, an excellent resource for teaching about mammals is Dan Curtin at Missoula Fish and Wildlife. He has an awesome teaching collection of mammal pelts, with everything from weasels to wolves, which the students are allowed to handle. He is extremely knowledgeable about each animal and its specific adaptations. Also, he has many stories of his own professional experiences handling bears, mountain lions, etc., which fascinate the students.

15. **EVALUATION/REFLECTION BY FELLOWS AND TEACHERS OF HOW IT WENT:** Everyone loves this video! Students, fellows, and teachers alike were all at rapt attention for the duration of the movie. The whole class would laugh and "AAWWW!" in unison at the adorable bear cub antics. Students were very eager to answer questions and participate in the discussion after the video. Others made very impressive illustrated journal entries. There's something about baby polar bears that just demands the students' attention and sparks their curiosity! It was a great indoor activity for a below-zero day.

“Saving Klondike and Snow”

Post-video discussion format

General questions and answers:

- Why did scientists have to make a special formula for the baby polar bears? (Because the mother bear would not give the cubs her milk).
- Why did they have to make a guess, or a **hypothesis**, about what ingredients to include in the formula? (Because no one had ever raised a baby polar bear, and no one really knew what exactly was in polar bear milk!).

Write on board and lead discussion as such (have students tell you the information to fill in below each line):

- What ingredients did they include in the first formula?/What was their first **hypothesis**, or best guess, about what should be in the first formula?
- Why did they choose to include these ingredients? (Because they thought they were the closest to what might be in a mother bear’s milk). Why is calcium important?/Why cod liver oil?/etc.
- How did they test their first hypothesis?/How did they determine if their formula was right for the bears? (They fed the formula to the bears and carefully monitored their growth and health.)
- What was the outcome from their first hypothesis?/What happened when they fed the bears the first formula? (See below.)
- Why did they have to make a second formula/hypothesis, and what happened? (See below.)
- Why did they have to make a third formula/hypothesis, and what happened? (See below.)

| <u>1st formula/hypothesis</u> | <u>What happened?</u> | <u>2nd formula/hypothesis</u> | <u>What happened?</u> | <u>3rd formula/hypothesis</u> |
|--|-----------------------|--|-----------------------|--|
| Vitamins | Klondike got sick | “ all ingredients were kept | Snow got sick | “ all ingredients were kept |
| ½ and ½ cream | (swollen belly) | “ same except for the oil. | (rickets) | “ same except for the oil. |
| Puppy formula powder | → | “ | → | “ |
| Calcium | | “ | | “ |
| Cod liver oil | | Safflower oil | | Cod liver oil |
| | | | | → IT WORKS! |