

MS Polar Bear Literature Dive Lesson Plan

At a Glance

Students practice reading scientific articles to better understand the current scientific research related to the polar bear.

Advance Preparation

- Decide how you want students to view articles (on a computer/tablet or printed out).
- The following resources are meant to support your teaching of scientific readings, and are laid out in order of student reading level from youngest to oldest:
 1. *The Vocabulary of Science*: <https://www.readingrockets.org/article/vocabulary-science>
 2. *Supporting Literacy in the Science Classroom*: <https://www.edutopia.org/article/supporting-literacy-science-classroom>
 3. The *How to Read a Scientific Paper* infographic can be read individually or gone through as a class. <https://www.elsevier.com/connect/infographic-how-to-read-a-scientific-paper>

Objectives

- Learn the process of reading a scientific article
- Learn how to pull out relevant information from scientific articles to share with others

Materials

- PDF's of articles for each student to read
- “Check for Understanding” questions for each student (online or print-out)

Lesson

- Introduce your students to the process of reading a scientific paper, article, or blog utilizing the links provided or any other documents that you find helpful.
- Provide your students with the two articles related to the polar bear, starting with the Pre-Lesson Article.
- There are vocabulary words provided in the Teacher Summary section. You can introduce them before or after students read the articles, whenever you feel it fits best in the lesson for your students.
- Provide each student with the “Check for Understanding” questions. These questions could be done while reading the article (worksheet style) or after students are done reading the articles (quiz style). We suggest going through the “Check for Understanding” questions as a class after students have completed individually to see if there are any concepts in the questions that need more clarification.

Teacher Summary

Pre-Lesson Article: Pilfold (2017). Keeping an Eye on Polar Bear Maternal Dens.²

KEY POINTS:

- Nick's story of traveling to Svalbard in Norway with partners Polar Bears International and the Norwegian Polar Institute.
- They looked for polar bear maternity dens in the snow banks so that they can set up cameras to record them emerging from their dens. This is so that they can study how these behaviors may change with climate change.
- They tracked a collared female to where her transmitter had last sent signal and set up the camera facing where they saw a hole in the slope.

Vocabulary:

- Snow bank - a slope, mass, or mound of snow³
- Reconnaissance - preliminary surveying or research³
- Transmitting - broadcast or send out (an electrical signal or a radio or television program)³
- Maternal - denoting feelings associated with or typical of a mother; motherly³
- Fjord - A long, narrow, deep inlet of the sea between high cliffs, typically formed by submergence of a glaciated valley³

Check for Understanding Questions: (Answers are bolded for teacher reference)

1. In the article, Nickolas Pilfold says that in the past the fjord they go by would have been:
 - A. Open water
 - B. Frozen solid**
 - C. Really warm
 - D. Empty of food
2. What do polar bears hunt?
 - A. Penguins
 - B. Seals**
 - C. Whales
 - D. Fish

3. Maternity dens are places where polar bears:

- A. Eat
- B. Die
- C. Are born**
- D. Mate

4. What are the San Diego Zoo researchers in this article concerned climate change will do to female polar bears and their cubs?

Answer: They're concerned the lack of ice will make it harder for female polar bears to find food.

5. What do you think the San Diego Zoo researchers will learn from the camera traps?

Answer: How polar bears behave as they emerge from dens, and how these behaviors change with climate change. (Or anything else your students think may show up from camera traps!)

Post-Lesson Article: Owen and Swaisgood (2010). Partnerships in Polar Bear Conservation Research.¹

KEY POINTS:

- Sensory ecology - how organisms use their senses to survive and communicate - was poorly understood for polar bears
- The San Diego Zoo Institute for Conservation Research (ICR) and Polar Bear International (PBI) began a research project in 2004
- The ICR adapted a project done on pandas to look at the impacts of noise disturbance on polar bears in the arctic
- The coastal plain of Alaska's North Slope has the largest petroleum stores in North America. It is also where pregnant female polar bears den in the fall, remaining in them throughout the winter.
- The overlap of these areas shows the potential for biologically significant disturbance.
- Partnering with Hubbs-Seaworld Institute, the three organizations came together to look into what frequencies polar bears can hear and how the noises from industrial and vehicular activities impact them.
- Next steps: looking at how scents play a role in mate location and courtship.

Vocabulary:

- Precarious - not securely held or in position; dangerously likely to fall or collapse³
- Sobering - creating a more serious, sensible, or solemn mood³
- Interdisciplinary - relating to more than one branch of knowledge³
- Lockstep - close adherence to and emulation of another's actions³
- Confluence - an act or process of merging³

Check for Understanding Questions: (Answers are bolded for teacher reference)

1. Who is one of the key partners that the San Diego Zoo works with to help save polar bears?
 - E. World Wildlife Fund
 - F. Polar Bears International**
 - G. The Polar Bear Specialist Group
 - H. National Research Defense Council

- I. I'm not sure
2. What other species of bear was the San Diego Zoo studying noise disturbance on at the same time?
- A. Andean bears
 - B. Brown bears
 - C. Giant pandas**
 - D. Spectacled bears
 - E. I'm not sure
3. What has left polar bears possibly more susceptible to negative human disturbance besides climate driven habitat loss?
- A. Declines in body condition**
 - B. Increases in body condition
 - C. Increased food availability
 - D. Declines in oil interests
 - E. I'm not sure
4. What is it that zoos are able to do to help save polar bears, according to the article?
- Answer:** Zoos are able to study polar bear sensory ecology, reproductive physiology and behavior more easily since they have access to polar bears in zoos.
5. What further type of disturbance are researchers concerned the large petroleum stores found on the coastal plain of Alaska's Northern Slope will hold for polar bears?
- Answer:** Researchers are concerned that noise disturbance from activity surrounding the petroleum stores may stress the polar bears, and result in reduced cub survival.

References

1. Owen and Swaisgood (2010). Partnerships in Polar Bear Conservation Research. *Associations of Zoos and Aquariums*.
2. Pilfold (2017). Keeping an Eye on Polar Bear Maternal Dens. <http://zoonooz.sandiegozoo.org/2017/05/03/keeping-an-eye-on-polar-bear-maternal-dens/>
3. <https://en.oxforddictionaries.com/>