

Lesson Plan Title: Light Reflection and Polar Bears

**Developed by:** Heidi Sloan, 2018 Teacher on the Trail™

**Discipline / Subject:** Science

**Topic:** Light Reflection

**Grade Level:** 4<sup>th</sup> – 8<sup>th</sup>, biology

**Resources / References / Materials Teacher Needs:**

Pictures for screen of polar bears perhaps after visiting the zoo

Clear straws, construction paper, glue

Article linked to Google Classroom or print pages 11, 12 for each student

[https://www.adfg.alaska.gov/static/education/educators/pdfs/furs\\_of\\_alaska\\_mammals\\_teachers\\_guide.pdf](https://www.adfg.alaska.gov/static/education/educators/pdfs/furs_of_alaska_mammals_teachers_guide.pdf)

Article linked to Google Classroom or students login on devices

<http://www.earthrangers.com/wildwire/risk/polar-bears-have-clear-hair-so-why-do-they-look-white/>

**Lesson Summary:** Students will learn about the guard hairs on a polar bear and how they reflect light.

**Standards Addressed: (Local, State, or National)**

**VA Science 5.3d** The student will understand the concept of visible light and how it behaves. Key concepts include reflection of light from reflective surfaces.

**Essential Information:** Light travels in straight paths until it hits an object, where it bounces off (is reflected), is bent (is refracted), passes through the object (is transmitted), or is absorbed as heat.

**CCSS.ELA-LITERACY.RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

**CCSS.ELA-LITERACY.RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

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| <p><b>Learning objectives:</b><br/>The student will observe a polar bear and describe how visible light behaves when it reflects off the polar bear’s hair.</p> <p>The student will read for information</p>  | <p><b>Assessment:</b><br/>The student will use clear drinking straws to create and draw a graphic model that illustrates reflection of light off polar bear’s fur/hair to demonstrate understanding.</p> |
| <p><b>Procedural Activities</b></p> <ol style="list-style-type: none"> <li>1. Introduce with photo of polar bear, or ask students to observe the fur of the polar bear at the zoo. Ask: How would you describe a polar bear to a younger child? Students write up responses. (Most students will say they are white.)</li> <li>2. Now ask, ” Do you know why they are white?” Record responses.</li> <li>3. Depending on the age group, ask students to read articles independently from Google Classroom links, their devices, or together as a class. Have students take notes as they read, answering the following questions: <ul style="list-style-type: none"> <li>• How many layers of hair does a polar bear have?</li> <li>• Describe the function of the hair layers.</li> <li>• Describe the layers: what do they look like?</li> <li>• What color is the bear’s skin under the hair?</li> <li>• Why is the bear white?</li> </ul> </li> <li>4. Get the group back together and discuss the guard hairs, how they are clear and hollow, and what they learned from their research.</li> <li>5. Hand out two straws and a sheet of construction paper to each student.</li> <li>6. As you teach about the light reflecting off the hair, students can have a straw to examine for the hollow nature of the guard hairs. Discuss and illustrate the effects of luminescence and light scattering particles from the hollow hairs being hit with direct light. Students should take notes.</li> <li>7. Ask students to create an explanatory graphic by gluing the straws as polar bear guard hairs to their construction paper and illustrating the process of why polar bears are white.</li> </ol> |  |
| <p><b>Materials Students Need:</b> glue, construction paper, scissors, straws</p>   |  |
| <p><b>Technology Utilized to Enhance Learning:</b><br/>Computers for Google Classroom links or for reading online information</p>   |  |
| <p><b>Other Information</b></p>   |  |

**Modifications for special learners/ Enrichment Opportunities:**

For struggling readers, read the articles aloud to students or read with them, helping with difficult vocabulary.

For enrichment, ask students to research and find about any other animals that have similar guard hairs. They should write up their findings.