Unit 4/Week 5

Title: Life on the Ice

Suggested Time: 4 to 5 days (45 minutes per day)

Common Core ELA Standards: RI.3.1, RI.3.2, RI.3.4, RI.3.5, RI.3.7; W.3.2, W.3.4, W.3.7; SL.3.1, SL.3.2, SL.3.4, SL.3.5; L.3.1, L.3.2, L.3.4

Teacher Instructions

*Refer to the Introduction for further details.*

**Before Teaching**

1. Read the Big Ideas and Key Understandings and the Synopsis. Please do **not** read this to the students. This is a description for teachers, about the big ideas and key understanding that students should take away **after** completing this task.

Big Ideas and Key Understandings

The extreme conditions at the poles require extreme measure by scientists and researchers in order to unlock the secrets these poles hold to the evolution and history of our Earth

Synopsis

In this nonfiction story, readers learn how and why scientists brave the extreme conditions of both poles in order to do research that will help us learn more about our world.

1. Read entire main selection text, keeping in mind the Big Ideas and Key Understandings.
2. Re-read the main selection text while noting the stopping points for the Text Dependent Questions and teaching Vocabulary.

**During Teaching**

1. Students read the entire main selection text independently.
2. Teacher reads the main selection text aloud with students following along. (Depending on how complex the text is and the amount of support needed by students, the teacher may choose to reverse the order of steps 1 and 2.)
3. Students and teacher re-read the text while stopping to respond to and discuss the questions and returning to the text. A variety of methods can be used to structure the reading and discussion (i.e.: whole class discussion, think-pair-share, independent written response, group work, etc.)

Text Dependent Questions

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| **Text-dependent Questions** | **Evidence-based Answers** |
| According to the text, where are the North and South Poles? | The North Pole is located in the middle of the Arctic Ocean. The South Pole is at the bottom of our planet on the continent of Antarctica. |
| Using specific details from the text, compare and contrast the North and South Poles. | Both are covered by ice  Both are cold  The North Pole is in the middle of an ocean  The South Pole is on the continent of Antarctica  The South Pole is the coldest place on Earth |
| Using context clues, can you decode what “isolated” means? What detail is given that suggests Antarctica is isolated? | Isolated means something is separate or far away from other things. Antarctica is isolated so much that no human had even seen the continent until 200 years ago. |
| What evidence is given to show these places are cold and extreme? | In fall, the sun sets and doesn’t rise again for the entire winter. Months later it shines 24 hours a day all summer long. Very little snow falls in either place, when it does it freezes to ice. Some places in the ice are up to 3 miles thick. |
| The ice in the middle of the Arctic and on Antarctica moves very slowly from the middle to the coast. What can happen to the ice when it reaches the coast? Can you infer from the text how long it has taken the ice to move? | When ice moves to the coast, pieces break off and become icebergs. It can be inferred that it has taken 100,000 years to move from the center to the edge. |
| A Ping Pong ball is small and white. Refer back to the text to explain why pilots say that flying to the poles is “like flying in a Ping Pong ball?” | “The wind kicks up and the snow blows around. It is hard to know where the sky ends and the land begins.” |
| Find evidence that would explain why pilots change the way they fly when flying into and out of polar regions? | Many of the navigational instruments normally used to guide the plane won’t work there—they fly using the stars. |
| Using the text, explain what accommodations pilots have to make when landing at the poles? | Pilots use skis instead of tires to land. They also must keep their planes running to prevent them from freezing up. |
| Why do scientists brave the harsh conditions of the poles? What are three facts they have learned through their study of the ice? | Scientists brave the conditions in order to learn about the world.  They have learned that the ice hasn’t melted since the last ice age. The ice has been pressed into an ice sheet almost 2 miles thick over the last 100,000 years. The ice is layered. |
| What is something that the scientists learned that is the opposite of what they originally thought? | Before, scientists thought climate needed thousands of years to change. Now, they know it can happen much, much faster. |
| Explain why the Antarctic is “a perfect window to the stars.” | It is very clear because it is cold and dry. The night is six months long. |
| List the items of clothing people wear at the poles and the reason they wear these items. What items should NOT be worn and why? | Big boots and big pants (fat boy pants) – keep the cold and wind out; mittens with furry backs – to wipe noses and warm ears. Goggles – protect eyes from sunburn and temporary blindness.  Anything metal should not be worn because “metal that gets so cold will freeze to any skin it touches.” |
| The author writes that our bodies are like furnaces needing fuel to keep running. What happens to our “furnaces” at the poles? | Our bodies (the furnaces) work so hard to keep warm that people eat at least twice as much food as usual. |
| Describe the effect of constant light or lack of light on human beings. | Scientist say that summer’s constant daylight tricks your body into wanting to keep going without rest but in the constant darkness of winter makes you feel tired much of the time. |
| After temperatures reach +10 degrees and planes are able to fly again, what is the last obstacle to taking off and how do pilots get around that obstacle? | Airplanes must go 100mph to take off which is not easy over slippery ice. Sometimes planes travel (or taxi) up to 2 miles to reach that speed. If they still need help, they turn on eight rockets attached to their plane to get the extra boost. |

Vocabulary

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|  | **KEY WORDS ESSENTIAL TO UNDERSTANDING** | **WORDS WORTH KNOWING**  General teaching suggestions are provided in the Introduction |
| **TEACHER PROVIDES DEFINITION**  not enough contextual clues provided in the text | Pole  extreme  region | continent  surrounding  coasts  skis  climate  furnace |
| **STUDENTS FIGURE OUT THE MEANING**  sufficient context clues are provided in the text | particles  plunging  isolated  gliding  constant | concrete  wilderness  telescopes |

Culminating Task

* Conditions at the North and South Poles are the harshest on Earth, but the ice at the Poles holds many clues as to the evolution of Earth and the changes it has undergone over the millennia. Scientists flock to the Poles in order to study the ice, attempting to live as comfortably as possible in the extreme conditions. Citing details from your text, write a paragraph that discusses at least three adaptations humans have made in order to survive difficult polar conditions and how these adaptations have helped humans live at the Poles for short periods of time. Please include the page numbers on which you found your supporting details.

Answers may include the following adaptations:

* + Due to polar conditions, pilots must navigate the old-fashioned way, using the stars instead of modern navigational equipment
  + Planes land with skis instead of wheels on the ice. Once they’ve landed, the skis are lifted in order to prevent them from freezing to the ground
  + Plane engines are left running, as they may not restart once stopped due to the extreme cold
  + Visitors to the Poles wear many layers of clothing to stay warm in the cold and wind, including heavy boots, heavy overalls, furry mittens and goggles to prevent snow blindness. No metal is worn, as it may stick to the skin when exposed to extreme cold temperatures
  + Visitors eat twice as much food as normal to keep their bodies fueled. Our bodies work harder in harsh conditions and require more food or fuel
  + Visitors learn to build temporary shelters to survive emergency situations outdoors. They learn to huddle together for warmth
  + Some refrigerators are heated to prevent the spoilage of food
  + Upon departure, planes can taxi up to two miles in order to achieve maximum speed for liftoff. They are also equipped with eight rockets to give them an extra boost if needed

Additional Tasks

* Some of the research done at the South Pole involves how humans adapt and survive in extremely isolated conditions. The text states that this research may someday help us develop colonies on the planet Mars, where conditions are as extreme if not more extreme than polar conditions. With a small group, use the information from the text, and write a simply survival plan for a group of researchers going to a Mars colony. What adaptations will you have to make? Will you live under ground or above ground? What kinds of food will you take? What kinds of clothing will you need? How will your space transport land and take off? What will you do to stay healthy and in good shape while on Mars? What kind of research will you do?

Answer: Students can go through the text and locate adaptations scientists made while living in Antarctica and develop a list of their own on chart paper. This project will have many answers and should help students synthesize the information they’ve learned about conditions at the Poles and how researchers can live there.

* Working with a partner or small group, use nonfiction texts or the Internet to do a short research project about polar climate. Explain why the Poles are dry, even though they are covered in ice. Present your findings to the class using at least one visual aid.