

Critical-Thinking Questions based on the following article:

[As Bering Sea Ice Melts, Nature is Changing on a Massive Scale and Alaska Crab Pots are Pulling up Cod](#)

Teachers: select various questions that are suited for your particular students and time availability. Answer suggestions are provided, some with a little extra information not included in the article. Also included are some extension questions which could be used for small group conversation starters, or whole class discussions.

Comprehension Questions (5th Grade Level):

- 1. What is Derek Akeya hoping for when he fishes in the Bering Sea?**
 - *Answer:* Calm waters and a lucrative catch.
- 2. What is the main difference in the catch Derek Akeya gets on this windy late summer day?**
 - *Answer:* Instead of halibut, he catches Pacific cod.
- 3. Why have Pacific cod numbers increased in the Bering Sea in recent years?**
 - *Answer:* Due to climatic changes, particularly the lack of winter ice.
- 4. How has the absence of winter ice in the Bering Sea affected the environment and marine life?**
 - *Answer:* It has led to changes in the distribution of fish species and the decline of certain marine life, impacting the ecosystem.
- 5. Why is the loss of winter ice in the Bering Sea significant for Native people like Derek Akeya?**
 - *Answer:* The ice has been integral to their culture, aiding in hunting walruses, whales, seals, and other marine life that are crucial to their diet.

Critical Thinking Questions (5th Grade Reading Level): (Can have students choose to do two out of four, etc., depending on time available)

- 1. In your own words, why is sea ice important for the people of Savoonga, Alaska?**

Possible Answer: Sea ice is crucial for activities like hunting walruses, whales, seals, and fishing. It provides a platform for these activities and is central to the Yupik way of life.

- 2. How has the absence of winter ice in the Bering Sea affected marine life? Give examples from the article.**

Possible Answer: The absence of winter ice has led to changes in fish populations. For example, Pacific cod numbers have increased, while halibut and smelts have declined. This impacts the overall balance of the marine ecosystem.

3. What challenges might Yupik hunters face if the traditional food sources like walrus and seals are affected by changes in the environment?

Possible Answer: Yupik hunters may face difficulties in accessing traditional food sources, impacting their food supply and cultural practices. This could lead to challenges in maintaining their traditional way of life.

4. Why does Derek Akeya, a resident of Savoonga, find it challenging to continue traditional activities like hunting on the ice?

Possible Answer: Warmer winters and declining ice make it difficult for Derek Akeya and other Yupik hunters to engage in traditional activities like hunting on the ice, disrupting their longstanding practices.

5. If you were a student in Savoonga, what changes in the environment might impact your daily life and activities?

Possible Answer: Changes like warmer temperatures, declining sea ice, and shifts in marine life could impact daily activities such as hunting, fishing, and accessing traditional foods. It may also affect cultural practices.

Basic Comprehension Questions (10th Grade Reading Level):

1. Based on the article, explain the role of sea ice in the Bering Sea ecosystem and its importance for marine life. How does its absence impact the food chain?

Possible Answer: Sea ice serves as a platform for marine activities, and its absence disrupts the food chain by affecting algae growth, zooplankton, and fish populations, leading to cascading impacts on the ecosystem. The ice has also shaped the culture of people living there, helping them to hunt the walruses, whales, seals, and other marine life that have long formed a crucial part of their diet.

2. What are some of the consequences of the increasing temperatures in the Bering Sea, as mentioned in the article?

Possible Answer: Increasing temperatures result in the decline of sea ice, shifts in fish populations, shifts in marine animal migrations, the spread of toxic algae blooms, and impacts on traditional activities and livelihoods in the region.

3. Describe the shifts in fish populations in the northern Bering Sea and their potential long-term effects on the ecosystem.

Possible Answer: Fish populations like Pacific cod and pollock have increased, while halibut and smelts have declined. These shifts could have long-term effects on the ecosystem, potentially impacting the sustainability of fish stocks as well as on seabirds that eat them. Cod in particular have been found with crab legs in their stomachs,

indicating that crabs have become a large part of their diet. Many of the crab pots have contained more cod than crabs.

4. How do changes in the environment, particularly the decline in sea ice, impact the livelihoods and cultural practices of the Yupik people in Savoonga?

Possible Answer: Changes in the environment affect Yupik livelihoods by disrupting traditional activities like hunting and fishing. The decline in sea ice poses challenges to cultural practices and the subsistence lifestyle of the community; especially when the traditional way of hunting dissipates. They are forced to find other means of obtaining nutrition, a challenge compounded by the lack of jobs available and the high expense of foods shipped in to the island store.

5. Discuss the challenges faced by crab fishermen in the northern Bering Sea due to the loss of ice. How does this affect their traditional practices and economic activities?

Possible Answer: The loss of ice disrupts traditional crab fishing practices, leading to decreased harvests. There has been an increase in pollock and cod, the latter of which eats crabs and often displaces crabs in the crab pots. More crabs are also nearing Russian waters, leaving smaller harvests for many fishermen. This affects the economic activities of crab fishermen in Nome, impacting their livelihoods and community traditions.

Critical-Thinking Questions (10th Grade Level):

1. Explain the role of winter ice in the Bering Sea ecosystem and its impact on the food chain.

Possible Answer: Winter ice serves as a platform for growing algae, a vital part of the food chain. Its absence affects the availability of nutritious prey for fish and seabirds. Ice also keeps the sea calm so when there is less of it, the waves increase shoreline erosion and prevent shore-fast ice from forming which in turn leads fewer whales to the area. There are also shifts in migratory patterns of marine animals and seabirds.

2. What are the consequences of the decline in winter ice for fish populations, as mentioned in the article?

Possible Answer: Fish populations, such as pollock, are migrating north in search of food, and the overall fish population may decrease in the long term, affecting the fisheries in the Bering Sea.

3. How does the warming climate contribute to the spread of toxic algae blooms, and what potential impacts do these blooms have on marine life?

Possible Answer: Warmer temperatures support the spread of toxic algae blooms, impacting marine life. High levels of these algae raise concerns about their effects on fish and other marine organisms that rely on the phytoplankton and zooplankton for food sources.

4. Discuss the challenges faced by crab fishermen in the northern Bering Sea due to the loss of ice.

Possible Answer: The absence of ice has disrupted traditional crab harvesting methods, leading to a decline in crab populations. Cod, attracted to the area, may be impacting the crab population, as many cod are found captured in the crab pots. Crabs are also migrating to different areas nearer to the Russian regions.

5. Reflect on the personal and cultural implications of the changing Arctic environment for individuals like Derek Akeya and the Yup'ik community. Is this a region you would like to live in? Why or why not?

Possible Answer: The changing environment affects traditional activities like hunting and fishing, impacting the cultural practices and livelihoods of communities like the Yup'ik. It also brings challenges for future generations adapting to a different Arctic reality, particularly around socio-economic issues with the transition from subsistence hunting to needing to purchase fuel and other goods without substantial monetary income. Without sea ice, they are forced to use more engine-powered boats because they can't use the ice to hold them and their boats to hunt. This in turn necessitates the need to buy fuel, a tremendous challenge when there are few ways to earn money. There is also a dire lack of fresh fruits and vegetables; with only one small store on the island, groceries have to be shipped in and are incredibly expensive, increasing the hardship on villagers even more with their decreasing reliance on subsistence hunting.

Opinion: whether they would like to live in the region or not—at least two substantive pieces of evidence that relate to something from the overall lesson, not just the article itself

6. How has the change in ice impacted whale and seal hunting for Savoonga residents?

There is less shore-fast ice (ice attached to the shore) and less multi-year or thick ice, which means residents are unable to take boats out onto the ice to hunt. Traditionally, residents would push boats across the ice to find open water to hunt; now there is no ice, or the ice is too thin. They need to travel further in motorized boats, which requires fuel, and therefore money to purchase. (From infographic "Ice and Bering Sea Food Chain"). Also, without the algae and phytoplankton being produced from sea ice, there is less food for copepods like krill which are vital components of marine mammal diets.

Extension Questions:

1. Which of the photos helped you understand the lifestyle of the Yupik the most? Describe the photo and explain how it helped you more thoroughly understand the article.
2. Choose a different photo or image from the video. Write two questions about what it makes you wonder.
3. Choose one of the people pictured and write 3 interview questions you would like to ask them.
4. At the end of the article, it mentions that Derek married a woman from Minnesota. He then moved to her hometown for a few months “where the corn grew sweet and there were plenty of ripe summer tomatoes.” He then goes on to say that he “missed Savoonga and the much more difficult food-gathering tasks that bound his people to the land and the sea.” Ultimately he claims he “just couldn’t do it—everything was just too easy.”
What does this tell you about his relationship with the land and the sea? What similarities or differences do you have with your cultural ties to your heritage? How do your cultural ties compare with Derek’s? What kind of conversations do you think he and his wife would need to have before returning from her hometown to the lifestyle in Savoonga?