Articles and Questions

Each **free article** of ***What in the World?*** includes:

1) a PDF file

*and*

2) a Word file

These files contain **only** the article and questions. They do **not** contain Answer Keys.

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• save paper and copying costs and help protect the environment

• promote and encourage students’ computer skills

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**A Huge Ice Island is On the Move**

A monster iceberg is lumbering through the vast waters of Antarctica. The ginormous slab of frozen fresh water, called A23a, has fueled people’s imagination around the globe. But it also poses a threat.

**Birth of a giant**

First, some background. Icebergs form when storms, ocean swells, or collisions with other icebergs produce cracks in an **ice shelf** or **glacier**. These fissures cause chunks of ice to break off in a process called calving.

In 1986, A23a calved from the Filchner Ice Shelf, a large expanse of floating ice at the head of Antarctica’s Weddell Sea. A23a is the oldest iceberg in the world and certainly the biggest. At over 3500 square kilometres, it’s roughly two-thirds the size of Prince Edward Island.

And it isn’t just heavy and wide; it’s also incredibly deep, with an average thickness of about 280 metres. To visualize this, imagine an ice block taller than the Eiffel Tower, floating upside down.

But its most staggering statistic is its mass. Scientists say it weighs nearly a trillion tonnes – about the weight of three billion African elephants.

**Trapped!**

Right after A23a separated from Filchner 39 years ago, it became stuck. Its massive keel, the part beneath the ocean’s surface, lodged itself in the shallow waters of the **continental shelf.** There it remained, an immovable ice island, for over three decades.

It might have stayed where it was, slowly melting and shedding ice. But changes were occurring.

Constant wind, large waves, and warmer waters gradually eroded the iceberg’s base beneath the surface. So in 2020, A23a broke free from its icy prison and began to drift north.

**A floating lab**

Scientists knew that the big berg could help them understand the behaviour and environmental effects of floating ice islands wherever they occur. So in December 2023, researchers aboard the RRS *Sir David Attenborough,* a British polar research ship, collected water near A23a. These samples offered crucial data on how icebergs influence ocean chemistry and marine ecosystems.

Scientists soon discovered more about the iceberg’s unique properties. Researchers found, for instance, that as A23a melts, it releases nourishment for **phytoplankton**. Phytoplankton play a crucial role in absorbing the carbon dioxide that contributes to climate change. Feeding these tiny plants in this way may help the ocean to **sequester** carbon deep below the surface. This information could teach us how to enlargenatural carbon sinks.

Researchers are also studying how A23a influences the distribution of carbon and nutrients in the ocean to create thriving ecosystems in otherwise less productive areas.

As well, they’re figuring out how A23a affects the balance of gases between the ocean and the atmosphere. This knowledge could be crucial for developing more accurate climate models.

The iceberg will likely release lots of mineral dust as it melts. This dust, accumulated over thousands of years in the Antarctic ice sheet, could fertilize the ocean and strengthen the marine food chain.

"In many ways these icebergs are life-giving; they are the origin point for a lot of biological activity," said marine scientist Catherine Walker.

**Stuck and unstuck**

As A23a traveled, a fascinating phenomenon once again halted its progress. In April 2024, the iceberg entered the Antarctic Circumpolar Current (ACC), one of the strongest ocean currents on Earth.

Normally, this would have swept it quickly northward into warmer waters. But the iceberg became caught in a rotating cylinder of water formed when ocean currents encounter underwater obstacles. Scientists call this a Taylor Column. In this case, the culprit was likely the Pirie Bank, a **seamount** about 100 kilometres wide. The whirlpool captured A23a and caused it to spin in place like a slow‑motion ballerina.

For months, A23a rotated, turning about 15 degrees each day. This dance not only delayed the iceberg’s journey but also helped preserve it. How? It kept it away from the warmer waters that would quicken its melting.

But in December 2024, it finally broke out of its circular trap. Once again on the move, it continued northward through the **Southern Ocean**.

**downside of A23a**

By early March, A23a was about 280 kilometres off South Georgia, a sub-Antarctic island. This 3500-square-kilometre British territory is known for rich biodiversity that includes many penguin and seal colonies.

Now, scientists are concerned. The reason? As A23a nears this wildlife haven, it might block access to feeding grounds. That could pose a threat to local **flora** and **fauna**, disrupt local ecosystems, and alter habitats.

And the iceberg could break into large fragments at any moment. Chunks could drift for years, creating navigational hazards, upsetting fishing operations, and altering global shipping lanes. The last megaberg that reached the island broke up in 2023. It is still hampering navigation.

"All ice is very dangerous, but the bigger it is, the easier it is to find and avoid," explains Simon Wallace, captain of the South Georgia vessel *Pharos*. So smaller ice can be even more hazardous.

**An unfolding story**

The story of A23a is ongoing. Drifting northwards, it will encounter warmer waters and new currents, evolving to provide new insights into the role of icebergs in the global climate system. Eventually, likely over years, it will break apart.

For now, A23a, a majestic giant on an epic voyage, reminds us of the complex interplay between ice, ocean, and climate.

**continental shelf:** seabed around a large landmass where the sea is relatively shallow compared with the open ocean

**fauna:** the term for all the animal life in a specific area, time period, or environment

**flora:** the term for all the plant life in a specific area, time, or environment

**glacier:** large area of ice and snow that slowly flows over land

**ice shelf:** a floating sheet of ice that is attached to a landmass

**phytoplankton:** microscopic organisms that live in watery environments, both salty and fresh

**seamount:** an underwater mountain with steep sides rising from the sea floor

**sequester:** to keep apart from others; segregate or isolate

**Southern Ocean:** the broad ocean region surrounding Antarctica

 **Comprehension Questions**

1. What is an **iceberg?** How is an iceberg created?

2. List at least three important facts about Iceberg A23a.

3. Describe what happened in the 30 years after it calved.

4. What happened in 2020? Explain why this occurred.

5. Describe what happened to A23a in 2024.

6. Describe what happened to A23a in 2024. What happened in December of last year?

7. Where was the huge iceberg located in early March?

8. Why were scientist concerned? Explain.

 **Questions For Further Thought**

1. Catherine Walker, from the Woods Hole Oceanographic Institution, is quoted in this article as saying: “***… icebergs are life-giving; they are the origin point of a lot of biographic activity.***” What is your understanding of this quote? Give examples to support your response.

2. An iceberg as large as A23a poses a threat as it moves through the ocean. As you see it, what is the most significant problem caused by a large iceberg? Explain.

3. The article states: “***The story of A23a is far from over. As it drifts northwards, encountering warmer waters and new currents, it will continue to change and evolve.***” What do you suppose scientists might be interested in learning about A23a as it moves north? Give reasons to support your response.

4. A team of 15 Canadian scientists are travelling from Chile to Antarctica this March for a month-long exploration of the southwest Antarctic region. As you see it, what would be the most difficult aspect of this type of mission? What would be the most rewarding aspect?

 **Questions For On Line Exploration**

*Note:* The links below are listed at **www.lesplan.com/links** for easy access.

1. To get an idea of the size of Iceberg A23a, explore these photos and drone footage:
**https://www.capturenorthstudios.ca/keep-exploring/photos-and-video-of-a23a-the-largest-iceberg-in-the-world**

2. Find out more about where A23a is headed:
**https://www.youtube.com/watch?v=fH6VxXQd1L0** [2:18]

What is the connection between Iceberg A23a and global warming?

3. Watch this animation showing how A23a compares to some of the world’s largest icebergs:
**https://www.youtube.com/watch?v=fH6VxXQd1L0** [3:07]

What did you learn?

4. Icebergs originating in Antarctica are named in a specific way. Find out more from this video:
**https://www.sciencelearn.org.nz/videos/744-naming-icebergs** [0:42]

What does the name “A23a” tell us about this iceberg?

5. Learn more about why icebergs are important to arctic ecosystems:
**https://www.youtube.com/watch?v=hPuHe\_FbAJk**

List 3 ways icebergs can help ocean animals and plants.

6. Antarctica is a unique continent that is only inhabited by scientists in research stations. Learn more about what scientists do in Antarctica and where they live:
**https://education.nationalgeographic.org/resource/antarctica/**

What do you think motivates scientists to work in Antarctica?

 **Putting It All Together**

**A. Write the letter that corresponds to the best answer on the line beside each question:**

\_\_\_\_\_\_ 1. **When cracks occur in an ice shelf or glacier and a new iceberg is formed, this is called:** a) birthing b) calving
 c) carving d) emerging

\_\_\_\_\_\_ 2. **Which ice shelf did A23a break away from?** a) Filchner Ice Shelf b) Greenland Ice Shelf
 c) Antarctica Ice Shelf d) Ronne Ice Shelf

\_\_\_\_\_\_ 3. **Last year A23a was caught for eight months in a:** a) Tidal vortex b) South Atlantic gyre
 c) Karman bubble d) Taylor column

**B.** Mark the statements **T** (**True**) or F (**False**). If a statement is **True**, write one important fact to support it on the line below. If a statement is **False**, write the words that make it true on the line below.

\_\_\_\_\_\_ 4. **True** or **False?** A23a is the oldest and biggest iceberg in the world.

\_\_\_\_\_\_ 5. **True** or **False?** A large melting iceberg releases nutrients that nourish the ocean.

\_\_\_\_\_\_ 6. **True** or **False?** A23a will be less dangerous to shipping if it breaks into many smaller pieces.

**C. Fill in the blanks to complete each sentence.**

7. The average thickness of A23a is greater than the Eiffel \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

8. Last April A23a entered the strong Antarctic Circumpolar \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

9. A23a is close to the British sub-Antarctic island of South \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

**D. Respond to the following question in paragraph form. *(Use a separate sheet of paper if necessary.)***

10. As you see it, are icebergs *more beneficial* or *more detrimental* to the environment and to people? Explain.

**Assessment Rubric**

This rubric may be helpful in providing students with formative, strength-based feedback and/or assessing students’ responses holistically. This easy-to-modify activity is included in the doc file which you can download from:
**www.lesplan.com/subscribers**

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|  | **Emerging** | **Developing** | **Proficient** | **Extending** |
| **Supports thinking** | Answers or reflections are brief and include obvious facts/details/ evidence. | Answers or reflections are general and supported with some relevant facts/details/evidence. | Answers or reflections are clearly supported with specific, relevant facts/details/evidence. | Answers or reflections are insightful and supported with specific, relevant facts/details/evidence. |
| **Shows understanding** | Responses show a basic understanding of the text, topic, issue or message. | Responses are thoughtful and show a general understanding of the text, topic, issue or message. | Responses are thoughtful and show a complete understanding of the text, topic, issue or message. | Responses are insightful and show a deep understanding the text, topic, issue or message. May synthesize ideas or explain the ‘so what’. |
| **Thinks critically** | Makes straightforward connections or inferences. Focuses on retelling. | Makes logical connections to self (T:S) and/or background knowledge (T:S). Inferences are logical | Makes meaningful connections to self. Considers ideas between texts (T:T).Inferences are plausible. | Makes powerful connections that go between texts and/or beyond the text (T:W). Inferences are plausible and insightful. |