Reading: Finding the Way

Close Reading Strategies

As you read, use the following close reading strategies to support your understanding.

1. Identify the question(s) you are trying to answer with the reading.
2. Read once for understanding to see what the reading is about.
3. Read a second time to highlight a few key ideas that help answer the questions you had.
4. Summarize the key ideas in your own words, in diagrams, or both.
5. Jot down new questions that the reading raises for you.

Finding the Way

Have you ever been lost? What did you do? Today, many people use their smartphones to navigate in unfamiliar places. But what would you do if you didn't have a smartphone or a computer to help you find your way?

Ancient civilizations used other methods to figure out where they were and which way they needed to go. Familiar landmarks, the flight paths of birds, weather patterns, and the direction and location of the Sun and stars helped travelers move from place to place. And ancient travelers also relied on compasses to help them figure out what direction they were facing.

Chinese scientists made the first known magnetic compasses over 2000 years ago. They used a naturally occurring magnetic rock called *lodestone,* pictured here. Early magnetic compasses used a magnetized needle attached to a lightweight piece of wood or cork. The wood or cork floated in a small water dish. Floating in the water allowed the needle to turn to show direction. Have you ever used a magnetic compass, or seen someone else use one?

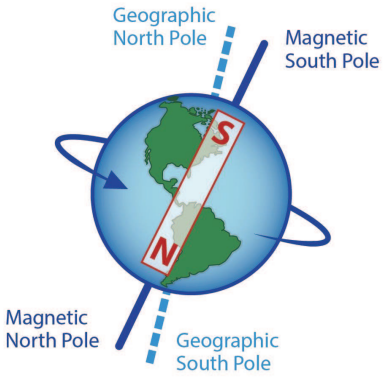
A magnetic compass can be used by hikers to navigate. Modern magnetic compasses typically have a magnetized needle mounted over a display that shows the four cardinal directions–north, south, east, and west. The needle of a magnetic compass always points north no matter which way it is positioned. Why do you think this is?

The Earth has a magnetic field, which is why the compass needle always points toward the North Pole. In class you used magnetic compasses to map the magnetic field of a bar magnet. You also used a computer simulation to better visualize this field. You probably noticed that the needle of the magnetic compass always points towards the south pole of the magnet. So why does a compass needle always point to the North Pole of Earth?

To understand this, we need to differentiate between the *geographic poles* of Earth and the *magnetic poles* of Earth. The geographic poles of Earth refer to the northernmost point and the southernmost point on the planet. We call these the North and South Poles. They are aligned with the axis of the Earth. These are the points around which the entire planet spins over the course of a day, making one full rotation every 24 hours.

But the geographic North Pole is not the same as the magnetic north pole of the Earth. Where do you think the magnetic north pole of the Earth is located?

The geographic North Pole and the magnetic north pole are at opposite ends of the Earth! The North Pole of the Earth is actually very close to the magnetic south pole. This should sound familiar - you saw that a compass points toward the south pole of a magnet in this lesson. You might hear people say that a compass points toward the North Pole. Now you know that this is only true of the geographic North Pole - it is actually pointing toward the magnetic south pole!



In addition, the magnetic field does not line up perfectly with the axis of the Earth. This is important for anyone navigating with a compass. The distance between the geographic North Pole and the magnetic south pole affects the accuracy of a magnetic compass. Navigators must make adjustments to be accurate. The effect is more significant the closer one gets to the geographic poles and is less noticeable near the equator.

Look for directions for making your own compass here:
https://media.nationalgeographic.org/assets/file/MakeyourownCompass.pdf