



## Nature Study

Each Friday morning, you will go through two of our nature cards. They are labeled in the upper right corner with the corresponding week. These are short, factual cards with images to help your child become familiar with objects in the natural world.

As you progress through our sessions, you may find it handy to keep your past nature cards in a binder for easy reference when your children come across a familiar object. These seeds you are planting will grow into a wonderful garden of knowledge for your children in years to come.

As you explore nature outside your home, watch and listen for newly discovered delights. Most of all, remember...

*"Point to some lovely flower or gracious tree, not only as a beautiful work, but as a beautiful thought of God."*

~ Charlotte Mason

Nature Study



# Polaris 1

*Alpha Ursae Minoris*

- Polaris, also known as the North Star, is the brightest star in the Little Dipper constellation.
- Because of this brightness, on clear nights it can be seen by the human eye—no special equipment needed.

- Polaris is positioned almost directly above the North Pole, which means that even as the Earth turns, Polaris can still be seen in the same position throughout the night. However, this only works in the northern hemisphere: when you travel below the Earth's equator, the star can no longer be seen.
- This made Polaris incredibly useful for navigation in the Age of Exploration. By staring at this fixed point of light in the sky, sailors in the northern hemisphere could use Polaris to figure out roughly where they were in the ocean, and therefore determine what direction to go in.



# Crux 1

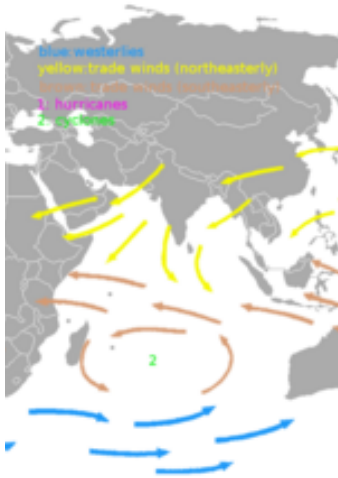
*Acrux*

- Crux (Latin for cross) is a constellation of four stars in the southern hemisphere that form the shape of a cross, which is why it is also known as the Southern Cross.

- Crux is the smallest of the world's 88 recognized

constellations, but even though it is very small, the stars within shine brightly and are visible to the naked eye.

- Just as the North Star is used for navigation in the northern hemisphere, the Southern Cross is used to navigate in the southern hemisphere.
- During the Age of Exploration, the famous explorer Amerigo Vespucci reported seeing the Southern Cross, which would have been visible to him for the first time as he navigated the ocean's waters below the equator.

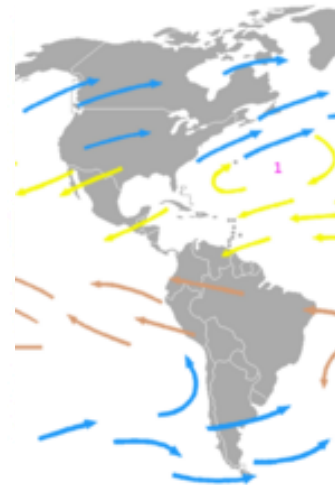


# Easterlies 2

- The Easterlies, or Trade Winds, are winds that steadily flow from the east to the west near the equator.
- This happens because air is constantly flowing from the equator to the North and South Poles, but as the Earth rotates, the air gets pushed around, forming winds that instead blow from the east to the west.

- These winds came to be known as trade winds because, unlike normal wind, which can be unpredictable, the Easterlies can be relied upon to blow in one specific direction and were used by sailors carrying goods to trade or by Age of Discovery-era explorers navigating the globe.
- Trade winds carry dust filled with nutrients from the Sahara Desert all the way across the globe to the Amazon rainforests, where the valuable nutrients fertilize the soil and help the rainforests thrive.

*\*Note: the orange and yellow lines are Easterlies.*

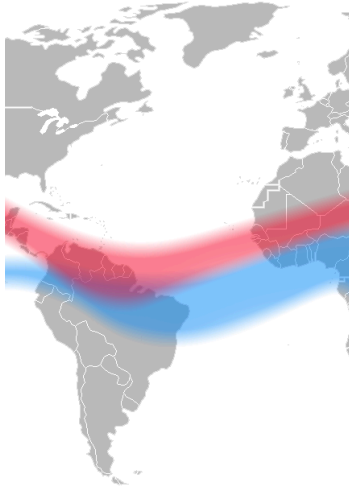


# Westerlies 2

- The Westerlies, or Anti-Trade Winds, are winds that reliably flow from the west to the east, the opposite direction of the Easterlies.
- The Westerlies are very strong winds, particularly in areas over the open ocean, such as in the Southern Hemisphere, because land helps to slow down wind speeds.

- The Westerlies became vitally important during the Age of Discovery because the strong winds were depended upon by European and Asian traders to help sail their ships to reach spice markets in Australia and Southeast Asia.
- Westerlies help drive many ocean currents with their powerful winds, including the West Wind Drift (also called the Antarctic Circumpolar Current), the largest ocean current in the world.

*\*Note: the blue arrows are Westerlies.*



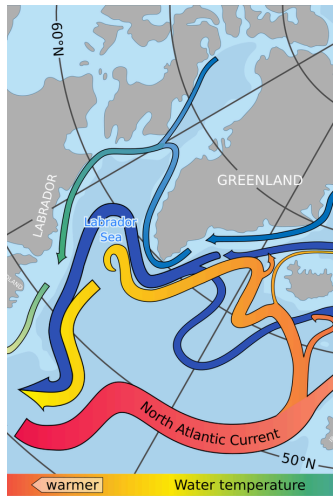
## Doldrums 3

- Doldrums, as sailors call it, or the Intertropical Convergence Zone (the more formal name), is the place where the two trade winds, the Westerlies and the Easterlies, meet.
- Doldrums are characterized by unusually calm weather and weak, gently blowing winds.
- This is because the Intertropical Convergence Zone is found at the equator, where the heat from the abundant sunlight causes the air to rise upwards (much like the air in a hot balloon) instead of blowing horizontally.
- Because of the still winds and gentle waters, ships during the Age of Discovery often got stuck in the doldrums for days or weeks at a time, including Sir Walter Raleigh's 1612 expedition and Magallán's earlier 1519 journey.



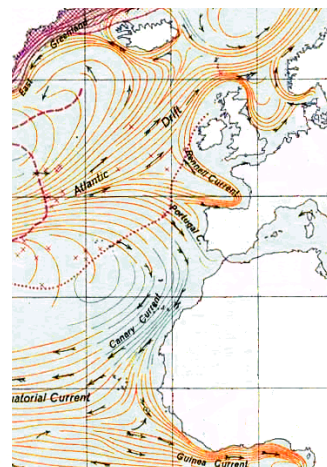
## The Gulf Stream 3

- The Gulf Stream is a fast-moving, warm current that moves through the Atlantic Ocean.
- It is part of the North Atlantic Gyre: a giant system of ocean currents that moves throughout the North Atlantic Ocean and includes the Gulf Stream, the North Atlantic Current, the Canary Current, and the North Equatorial Current.
- It begins all the way in the Gulf of Mexico, goes through the Straits of Florida and along the eastern coasts of the United States, then eventually moves in the direction of Northwest Europe.
- During the Age of Exploration, Europeans discovered the Gulf Stream when Juan Ponce de León found it during his 1512 expedition. After this discovery, it was frequently used by Spanish ships to help them sail faster when traveling from the Caribbean to Spain.



## The North Atlantic Current 4

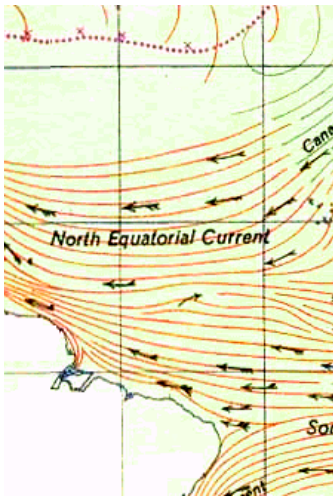
- The North Atlantic Current is a strong, fast-moving current that continues the Gulf Stream's movements, extending its reach towards Northwest Europe.
- It begins near Newfoundland in the Southeast Newfoundland Ridge, turns north, then veers east and crosses the Atlantic.
- The North Atlantic Current moves very quickly, especially near the North American coast, where it can at times reach speeds of up to 2 knots: the equivalent of 2.3 miles per hour!
- The North Atlantic Current carries tropical, warmer waters across the Atlantic, which helps keep Northern Europe from having extremely cold winters, and also helps prevent the formation of ice in that part of the ocean.



## The Canary Current 4

- The Canary Current is a slow-moving ocean current that is mostly driven by wind on the surface of the ocean's water.
- The Canary Current is a southern branch of the North Atlantic Current and begins where the North Atlantic Current breaks into two parts.
- The Canary Current is named after the Canary Islands, which disrupts its flow as it rushes slowly around them. Christopher Columbus himself landed on the Canary Islands during some of his voyages, where he learned about this current and later used it to begin his voyage to the Caribbean (which he thought was the Indies).
- The Canary Current is the branch of the current that flows southwest towards Africa, reaching the West African country of Senegal before turning further west, eventually feeding into the Atlantic North Equatorial Current.

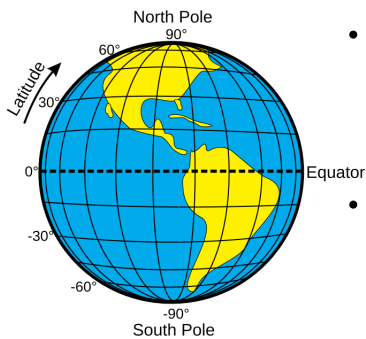
## The North Equatorial Current 5



- The North Equatorial Current (or NEC) is an ocean current that travels steadily westward.
- The name “North Equatorial Current” comes from the fact that it flows near the equator, making it one of the warmest ocean currents because the equator gets so much sunshine.

- The North Equatorial Current is driven by the wind, particularly the northern part of the easterly trade winds.
- The NEC has a southern counterpart: the Southern Equatorial Current, which is driven by the southern part of the easterlies.

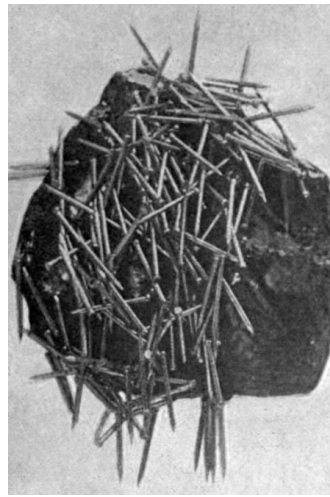
## Latitude 6



- Latitude is one of the ways the Earth is measured, helping people tell where things are on the planet.
- To give directions to where things are, people imagine a grid covering the earth known as geographic coordinates. Latitude would be the imaginary lines running north and south (up and down) over the planet’s surface.

- A tool called a sextant was used by sailors for centuries to figure out what a ship’s latitude was on the open sea by measuring the angle between the horizon and the sun or a different star.
- By determining what their ship’s latitude was (where they were relative to north and south), sailors could figure out what direction to steer their ship in order to get to where they needed to go.

## Lodestone 5

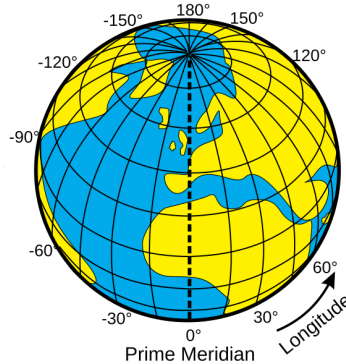


- Lodestones are made from a dark-colored mineral called magnetite that is naturally magnetic. When something is magnetic, that means it pulls other materials like iron and steel to itself.
- Though the reasons why lodestones are magnetic aren’t known for sure, but

one leading theory is that they are magnetized through lightning strikes, which have a strong magnetic field.

- The first magnetic compasses were made from lodestones, which is why they were given their name: lodestone means “leading stone” in Middle English.
- Even after more advanced compasses were created, lodestones remained crucial for sailors because lodestones were used to keep compasses, which often lost their magnetic properties, in working order by touching them to the iron needles within the compasses, remagnetizing them.

## Longitude 6



- Longitude is another part of the imaginary grid that makes up geographic coordinates. Longitude is the lines running east and west (from side to side) across the planet.
- Longitude is measured starting from one big invisible line running up and down from the North Pole to the South Pole. This line is known as the Prime Meridian. Longitude tells you how far east or west of the Prime Meridian line you are.

- It was very difficult for early sailors to figure out what their longitude was. Oftentimes, they would determine their latitude, which was simpler, and then use that along with the speed their ship had been traveling at and the rough distance they had gone that day to make an educated guess on their longitude.
- This issue was finally solved when the chronometer was invented in the 1730s. The chronometer was an advanced, more accurate way to keep track of time aboard a ship, helping them calculate longitude.