

**Genre** Myth/Informational Text

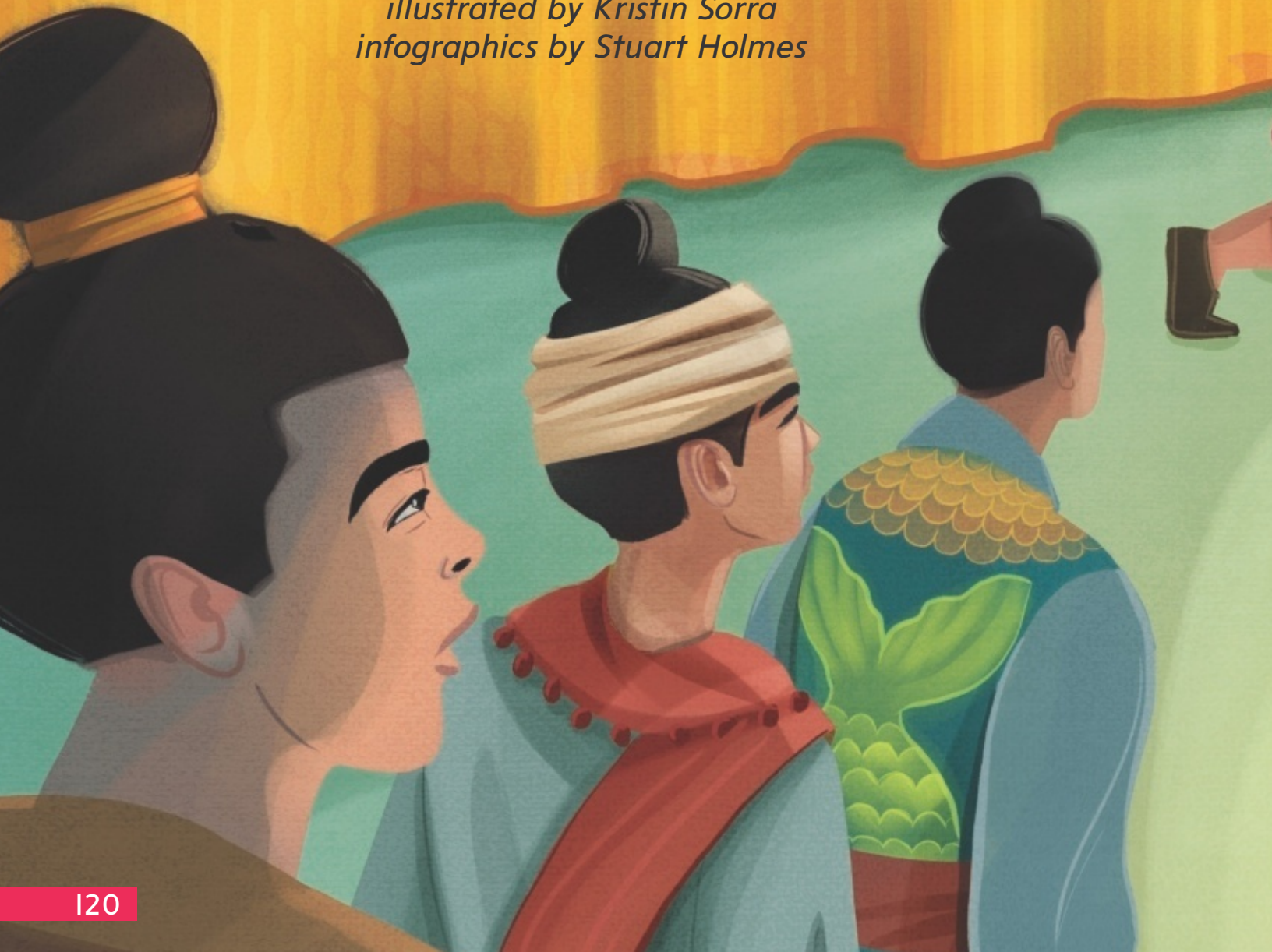
**Essential Questions**

How do we depend on some cycles? How can other cycles endanger us?

# Monsoons

FROM MYTH TO MODERN SCIENCE

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illustrated by Kristin Sorra  
infographics by Stuart Holmes*







**L**ong, long ago, a great king had a kind and beautiful daughter. In fact, she was his only child. The king adored the girl. He wanted only the best for her in all things. When the time finally came for her to marry, the king sent out a proclamation to all the surrounding kingdoms, inviting princes to seek her hand in marriage. Many young men came. One by one, they tried to impress the king and his daughter, but none were good enough.

One day, two men came hoping to win the hand of the king's daughter. Son Tinh introduced himself as the god of the mountain. He promised to make the princess the queen of all he ruled. The second man said he was Thùỵ Tinh, god of the sea. Likewise, he promised that he and the princess would be king and queen of the underwater world.

The king was impressed with both men. It was difficult to choose between them, so he proposed a contest. He gave the men a list of gifts to bring to the princess. Whoever returned the next day with the gifts would win the right to marry her. Son Tinh and Thùỵ Tinh left, eager to gather the presents and win the contest.



Before the sun rose the next morning, Thủy Tinh came back. He had all of the gifts ready and expected to win his bride. As he strode confidently toward the designated meeting place, the bold smile he wore turned to a frown. Not only had Sơn Tinh arrived before him, but he had brought more gifts, too. Thủy Tinh's frown soon became a scowl. As he drew closer, he saw that the princess had already agreed to marry Sơn Tinh and that the two of them were celebrating happily. Little did he know, the princess had conspired with Sơn Tinh because she liked him best.

Thủy Tinh's rage erupted. He called upon the rivers and streams to overflow and fill the land with water. He commanded strong winds and driving rains to assault the land. Dark storm clouds gathered. Soon rain was falling so heavily that Sơn Tinh could hardly see his new bride through the storm. He looked around in amazement. The fields, unable to absorb all of falling water, began to flood. The waters rose higher and higher. Thủy Tinh wanted the storms and high water to destroy Sơn Tinh. Then he could marry the princess.





Sơn Tinh was not without his own powers, however. He took his bride to the mountains, where he commanded the land to rise even higher. He called forth hills to create barriers to the floods, saving the villages below. The higher the floodwaters rose, the higher Sơn Tinh encouraged the hills to grow. No matter how furiously the two combatants fought, neither one could gain the upper-hand. The fight went on and on.

Finally, Thủy Tinh realized he could not defeat Sơn Tinh. He stopped the wind and rain and returned to his sea kingdom.

However, Thủy Tinh vowed never to forget how he lost the princess. He returns every year to fight Sơn Tinh anew. He floods the ground with rain and shows his anger in the violent winds. And, every year, he gives up and returns to the sea.



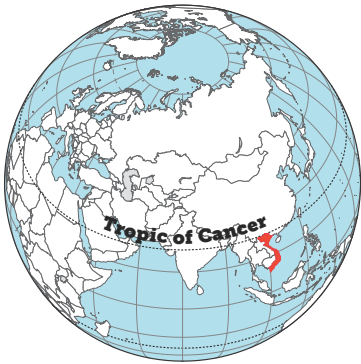




## What Is a Monsoon?

Over the centuries, people all over the world have told stories to help explain why things happen. These stories are called myths. Nature myths are some of the most common tales. The people of Vietnam sometimes share the myth of Sơn Tinh and Thủy Tinh with their children.

Vietnam, like other countries in tropical and subtropical areas, has a weather pattern that is rather predictable. Every year at about the same time, monsoons come. The summer monsoon brings high winds and flooding rains that last for weeks or even months. Then the wet weather stops, and the winter monsoon season begins. A period of dryness settles in. Year after year, this cycle repeats itself.



The nation of Vietnam lies in Southeast Asia. It is surrounded on three sides by China, Cambodia, and Laos. The Gulf of Tonkin and the Pacific Ocean make up its eastern border. As you can see by the map, Vietnam is in a band between the equator and 23.5 degrees north latitude. That line is known as the Tropic of Cancer.

Vietnam's location and some of its land formations, such as mountains, create two kinds of climate: temperate and tropical. Lands further north and in the mountains have a temperate climate. Those areas have four distinct seasons. The southern regions are very different from the northern ones. The tropical climate there has two main seasons: a hot, humid rainy season from May to October and a dry, cooler season from November to April.

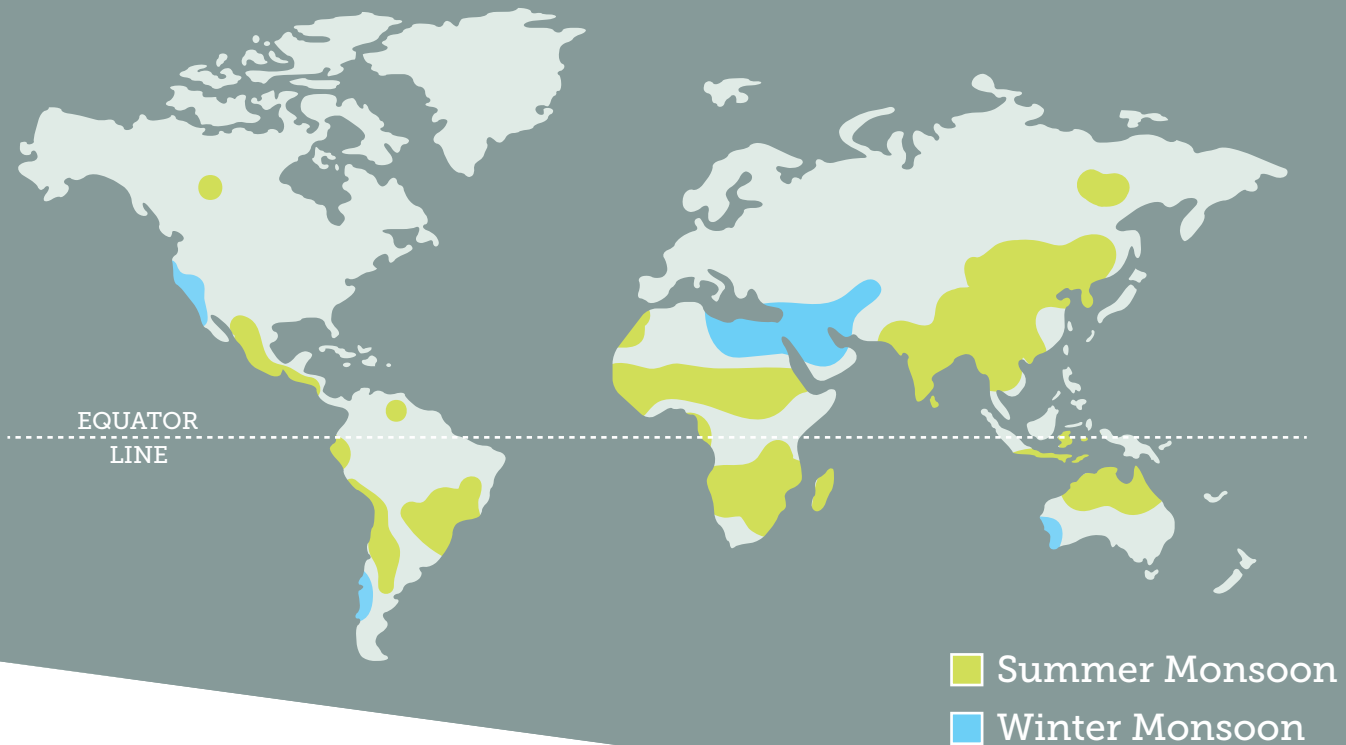
A monsoon is defined as a seasonal change in the prevailing winds of a region. These winds affect how much or how little rain an area receives. During the summer months, the land in Vietnam becomes very warm. The air pressure is lowered over the ocean. As a result, the strongest winds come from the southwest. Those winds carry moisture from the Indian Ocean. They bring heavy rains that often cause flooding. That is a summer monsoon, which is sometimes called a southwest monsoon. More than three-quarters of the year's annual rainfall occurs during the summer monsoon season.

As the air begins to cool over land, the prevailing winds change. Land gives up heat faster than water, so the ocean's temperature is still warm. The difference in temperatures creates an increase in air pressure. Wind patterns reverse, and the strongest winds then come from the northeast. This is the winter monsoon, or northeast monsoon, season. These winds blow from China over colder land. They bring cool, dry air. That air ushers in months of mild weather with very little rainfall.

Wind patterns occur because of air temperatures and pressure. In the winter months, cool air cannot hold onto moisture and its pressure grows. The strong air currents over Russia and China move to the southwest over South Asia, bringing dry weather. In the summer, however, strong winds form over the Indian Ocean. They push the weakening dry winds away, covering the land with moisture and warmer temperatures. This ebb and flow of temperatures, wind, and moisture repeats every few months. These months form the summer and winter monsoon seasons.



## MONSOON REGIONS AROUND THE WORLD



When people think of monsoons, they usually think of South Asian countries, especially India. However, this kind of weather pattern is found in other areas, too. One of the largest areas stretches from Australia to Russia to Africa. In North America, monsoon winds bring rain from the Gulf of California during summer months. That rain can help the ecosystem in the desert areas of Arizona and New Mexico.

The heavy rains may cause flash floods, too. Because monsoon storms can drop a significant amount of water in a short period of time, not all of it can be absorbed into the earth. This is especially true for dry regions where the soil is hard and packed. When the water cannot soak into the soil, it can generate a flood within minutes. These turbulent waters can roar across the land, tearing up trees and moving heavy boulders. If people do not move quickly, they can be caught unaware.

Monsoons are a normal part of weather patterns in other regions of the world, too. As you can see on the map, besides South Asia, monsoons occur in parts of Australia, Africa, and North, South, and Central America. Like elsewhere in the world, these monsoons may cause life-threatening flash floods. However, they can also bring much-needed rains for drinking water or for farming.



## How Does the Summer Monsoon Season Affect Vietnam?

Several countries are dependent on the monsoon cycle for their agriculture. Vietnam is one of those countries. It depends on the rainfall during summer monsoons for many essentials. The nation relies on agriculture for most of its income. It is one of the top five producers of rice in the world. Other important crops include tea, sugar cane, coffee, and peanuts. All of these crops need adequate rainfall in order to grow. Farmers depend on the rain of the summer monsoon season to water the crops. The season usually lasts from May to September or October.

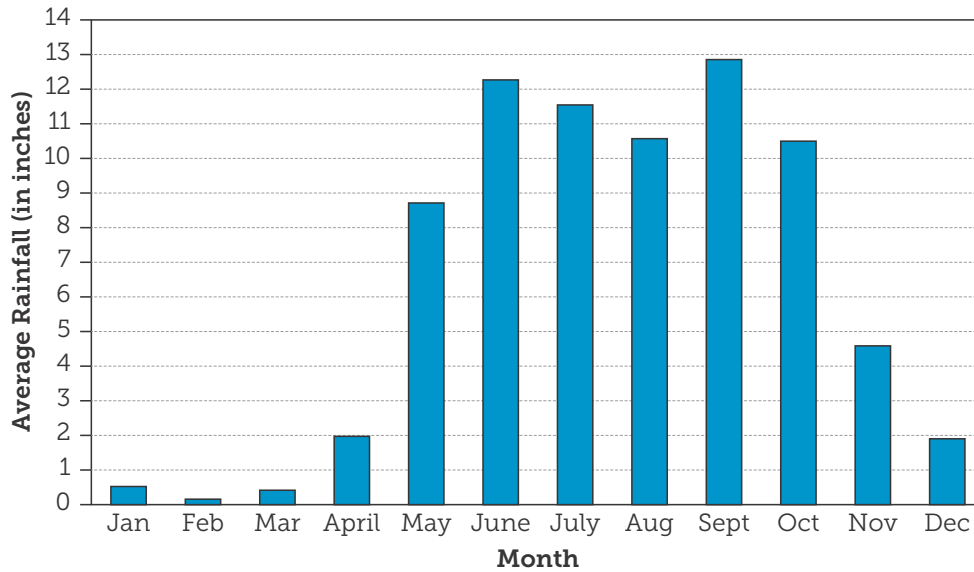
Rice is the most important Vietnamese crop. It is a main food source for the Vietnamese. It is also the nation's number one exported product. Rice has been grown in Vietnam for more than 2,500 years. There it is often planted by hand rather than by machine. Seedlings, small plants started from seeds, are planted in the spring. Rice grows best in flooded fields with the water covering about one-third of the stalk. The plants mature and are ready to harvest after the summer monsoon season has ended. In irrigated areas, workers can plant a second crop in November and harvest it about three to four months later.

Workers in rice paddies push young plants into the rich earth below standing water. Throughout the summer, the monsoon rains keep the plants watered so they can produce a good crop.





**AVERAGE MONTHLY RAINFALL IN HO CHI MINH CITY, VIETNAM**



When the annual rains are not enough to plant and grow the tender plants in the rice paddies, many people are affected. Farmers need the income from their crops to live and to buy new plants for the following year. Shortages of rice and other staples cause prices to go up. People have to spend more for their food. The government relies on the income that rice and other crops bring into the country.

Too much rain also causes problems. Massive flooding can trigger landslides, destroy buildings, and sometimes kill people and animals. Floods damage buildings and are dangerous for people, too. People can be swept away, drowning in the rushing waters. Crops rot in the fields. People are more likely to become ill with certain diseases. Drinking water sources become impure due to floods, and standing water is the breeding ground for mosquitoes. Mosquitoes can carry life-threatening diseases like malaria.

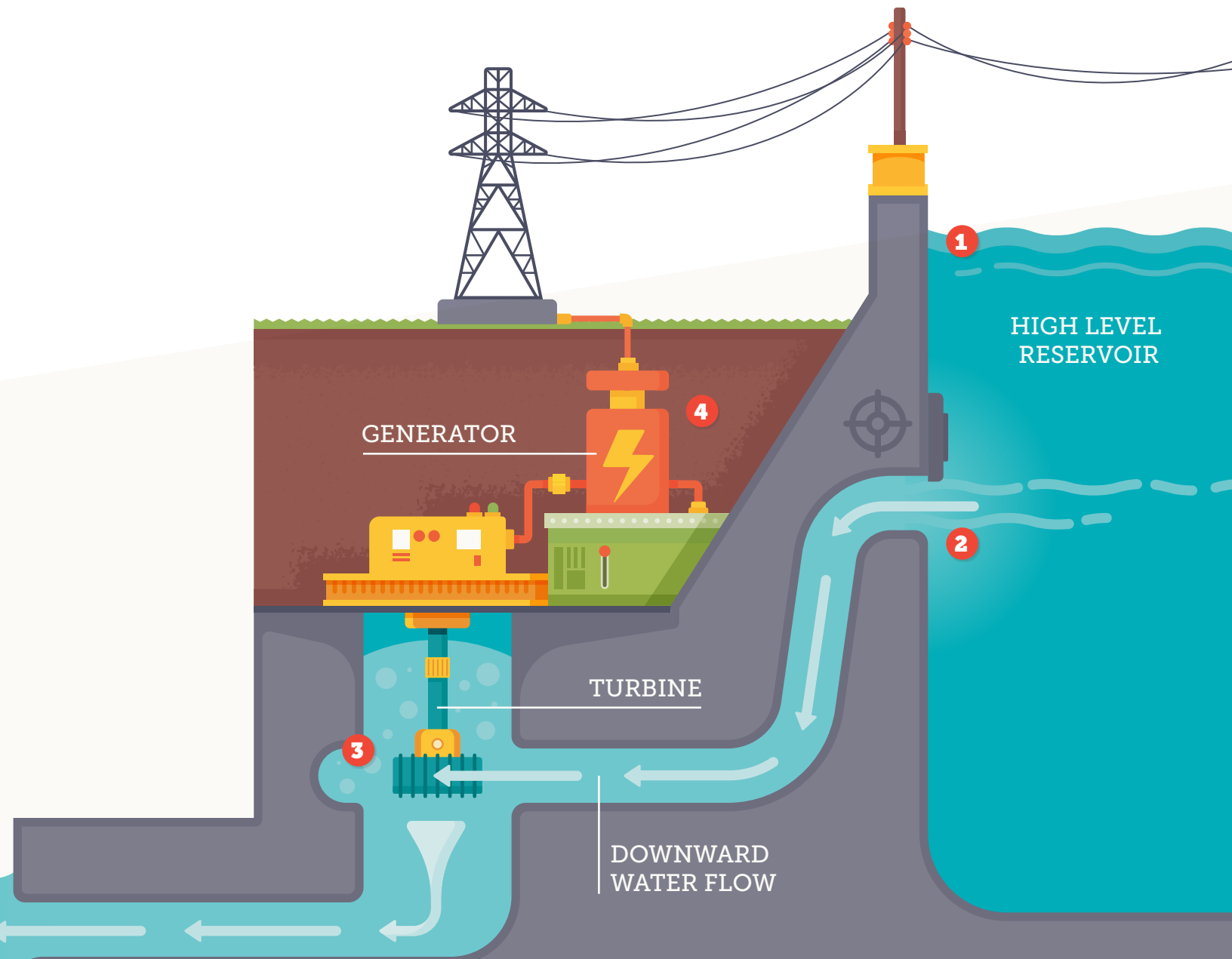
## **HYDROPOWER**

Hydroelectric power is possible because of the combination of gravity and water. **1** The rains of the summer monsoons fill basins, called reservoirs, with water. **2** That water is carefully released through dams. **3** After it is released, it flows over turbines. **4** The force of the spinning turbines activates generators that produce and store electricity. If the summer rains are adequate, there is enough water to generate electricity through the winter months.

## What About the Winter Monsoon Season?

When people hear the word monsoon, they usually think of the summer type. The winter monsoon season is very different, though. Instead of heat, humidity, and torrential rains, this season is cool and dry. It comes as a relief after all the months of heavy rains, high winds, and dangerous storms. In fact, droughts are a concern from November to April. The air is now coming from the northeast, over Mongolia and China, and into Vietnam. The land begins to cool down, and the air is much drier. Even so, winds can still be strong.

The water that was collected during the rainy season is used to produce electricity for the country throughout the year. This is known as *hydroelectric power*. As in other nations, electricity is a critical resource. A significant portion of the electrical power in Vietnam comes from hydroelectric power plants.







### **Monsoons: Past, Present, Future**

Monsoon cycles are usually predictable and reliable. They have been for a long time. Sometimes, however, changes in weather patterns affect the strength of the monsoons. A weak summer monsoon produces less rainfall. When the region receives less rain than expected, drought conditions occur that can make farming rice difficult. Sources of freshwater dry up and farmers are left with few options for maintaining their fields.

In Vietnam, some farmers can pump water for their crops from the Mekong Delta. The Mekong Delta is a wet region through which the Mekong River and other water sources flow into the ocean. However, by pumping water from this source, farmers also risk killing their crops. Without the fresh water that comes with a monsoon, water in the Mekong Delta has increased salinity. Salinity is a measure of how much salt is dissolved in water. Water with high salinity, such as ocean water, has too much salt for plants like rice. It kills rice.

Farmers in countries outside Vietnam can have an even more difficult time dealing with a weak monsoon season. Without adequate rainfall, some farmers have to drill deep into the earth to collect groundwater. However, this can be expensive. If a farmer's crops have already suffered from a lack of water, they may not have the money to drill. The water might be too deep beneath the surface, too.



Meteorologists, people who study weather and its patterns, are watching for changes that could impact monsoon cycles. Recent years have brought some extremes to some regions: dangerous flooding and severe droughts. With concerns over climate change, scientists monitor temperature, rainfall, carbon dioxide levels, and other indicators. No one knows for sure how—or if—these changes will affect the monsoon cycle.

To study monsoons, some scientists fly planes over the ocean to measure how monsoons develop. With enough data, scientists hope they can accurately predict if a monsoon season will be weak or strong. If their predictions are true, it can give farmers enough time to adequately prepare for the conditions. They can plan ahead to minimize the impact of a weak monsoon.

The people of Vietnam live with and understand the monsoons. They tell the story of Sơn Tinh and Thủy Tinh to their children. They welcome the rains each year and hope for good crops. This is a cycle of life for them.





You will answer the comprehension questions on these pages as a class.

### Text Connections

1. In the myth at the beginning of “Monsoons,” what is the conflict in the narrative, and what does it cause?
2. How does the map on page 125 help you better understand the monsoon cycles in Vietnam?
3. Which regions of Vietnam are most affected by monsoons?
4. Identify personification of forces of nature in both “Monsoons” and the Read Aloud “Chinook!”
5. Explain why you would or would not like to live in southern Vietnam, based on the weather patterns described in “Monsoons.”
6. How do you think the invention of modern meteorology has changed the way people think about monsoons?

### Did You Know?

The word *monsoon* comes from the Arabic word *mawsim*, which means “season.” Ancient sailors in the Indian Ocean used this word to refer to the winds that allowed them to sail in particular ways during various times of year.



## Write

Write your own myth explaining a weather pattern in your area of the United States.

## Look Closer

### Keys to Comprehension

1. Infer why the author chooses to include a myth in this informational text. Quote text details that support your inference.
2. Summarize the reasons Vietnam is dependent on summer monsoons.
3. Infer how the weather in Vietnam could affect its tourist industry. Quote text details to support your inference.

### Writer's Craft

4. Explain what a monsoon is, and how it is an example of a cycle.
5. Contrast the ways "Monsoons" and "Chinook!" educate the reader about certain types of weather events.

### Concept Development

6. Compare and contrast how "Monsoons" and "Chinook!" describe weather patterns.







Read this Science Connection. You will answer the questions as a class.

### Text Feature

A **caption** is a sentence or phrase that gives more information about a photograph or visual.

## Monsoons and El Niño

The monsoons in Vietnam are an important part of the Vietnamese economy. However, in 2016, parts of Vietnam suffered from the worst drought in almost one hundred years. What caused this drought? One major factor was something called an El Niño. An El Niño is a climate event that shows how interconnected the ocean, winds, rain, and land can be.

To understand an El Niño, you have to first understand what a year is like without an El Niño. During a normal year, strong winds push warm water west across the tropical Pacific Ocean. These strong winds usher in monsoon rains in Indonesia. At the same time, as the warm waters move west, cooler waters rise to the surface in the eastern Pacific Ocean. These cooler waters bring nutrients that feed many types of marine life.

During an El Niño, however, air pressure rises over the western Pacific and drops over the eastern Pacific. This makes the strong winds weaken. No cooler water surfaces in the eastern Pacific. As the water gets warmer, the prevailing winds grow even weaker, and a thick layer of warm water covers the Pacific. Marine life in the eastern Pacific suffers without the nutrients in rising cool water. Heavy rains may pound South America. Indonesia, however, is hit with a drought. Without winds, the monsoons do not come. Some strong El Niños can damage climates around the entire Earth. They can change the way the atmosphere moves around our planet.

El Niño events tend to happen every three to seven years, but this is not a very predictable cycle. Scientists are working to combine observational data and reliable computer models in order to better predict El Niños. An El Niño can affect the weather around the world, and people want to be prepared for it when it comes.



The 2016 drought partially caused by El Niño affected Southeast Asia's rice industry.

1. How does El Niño affect winds over the Pacific Ocean? What effect does this have on Asia?
2. How could a couple years' advance notice of an El Niño help people in Vietnam?
3. A concept map shows concepts in boxes that are connected with arrows. They show relationships or sequence. Create a concept map that models ways the atmosphere and oceans interact during an El Niño.



## Go Digital

Research La Niña events. How are they different from El Niño events?