

# Bell Ringer: Page 45

Write about your experience with extreme weather, such as hurricanes, tornadoes, and blizzards.

1. What did you observe, how did you feel, were you prepared?
2. What does extreme weather have in common?

# Learning Objectives: I will be able to...

list the stages of the water cycle.

describe the connection between wind and precipitation and how they can produce extreme weather.

explain how winds are produced.

Begin notes on page 45 and continue onto 47

# Water, Air and Climate

CC 3.3-3.4



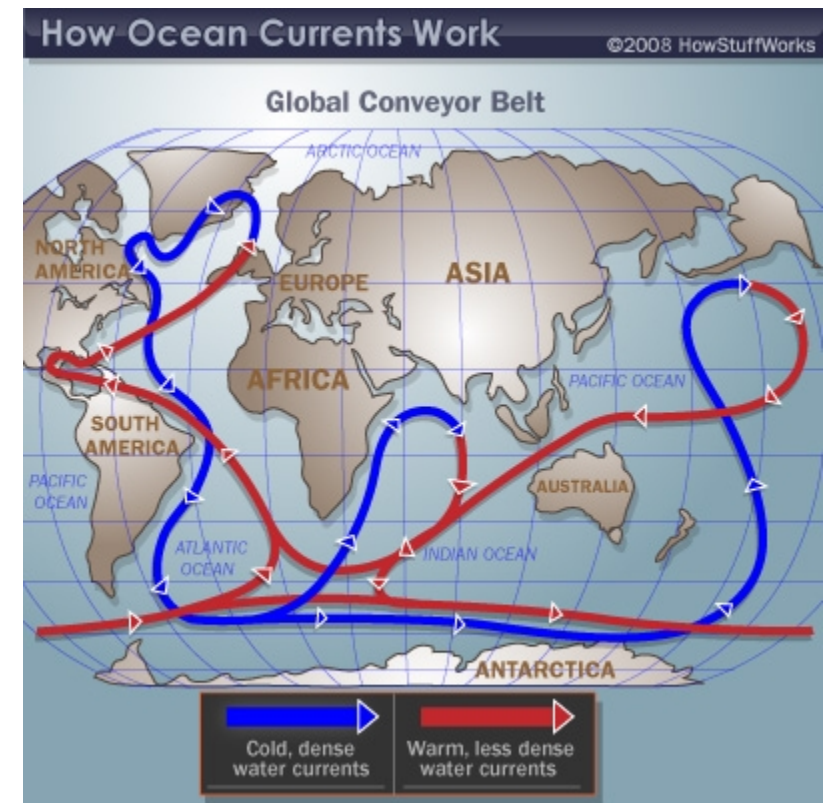
# Oceans and Climate

Ocean currents help spread heat energy around Earth, assisting in shaping Earth's climates.

Currents are created from wind patterns and temperature differences around the globe.

# Ocean Currents

- Move across GREAT distances
- Move WARM water from the tropics to the poles
- Move COLD water from the poles to the tropics



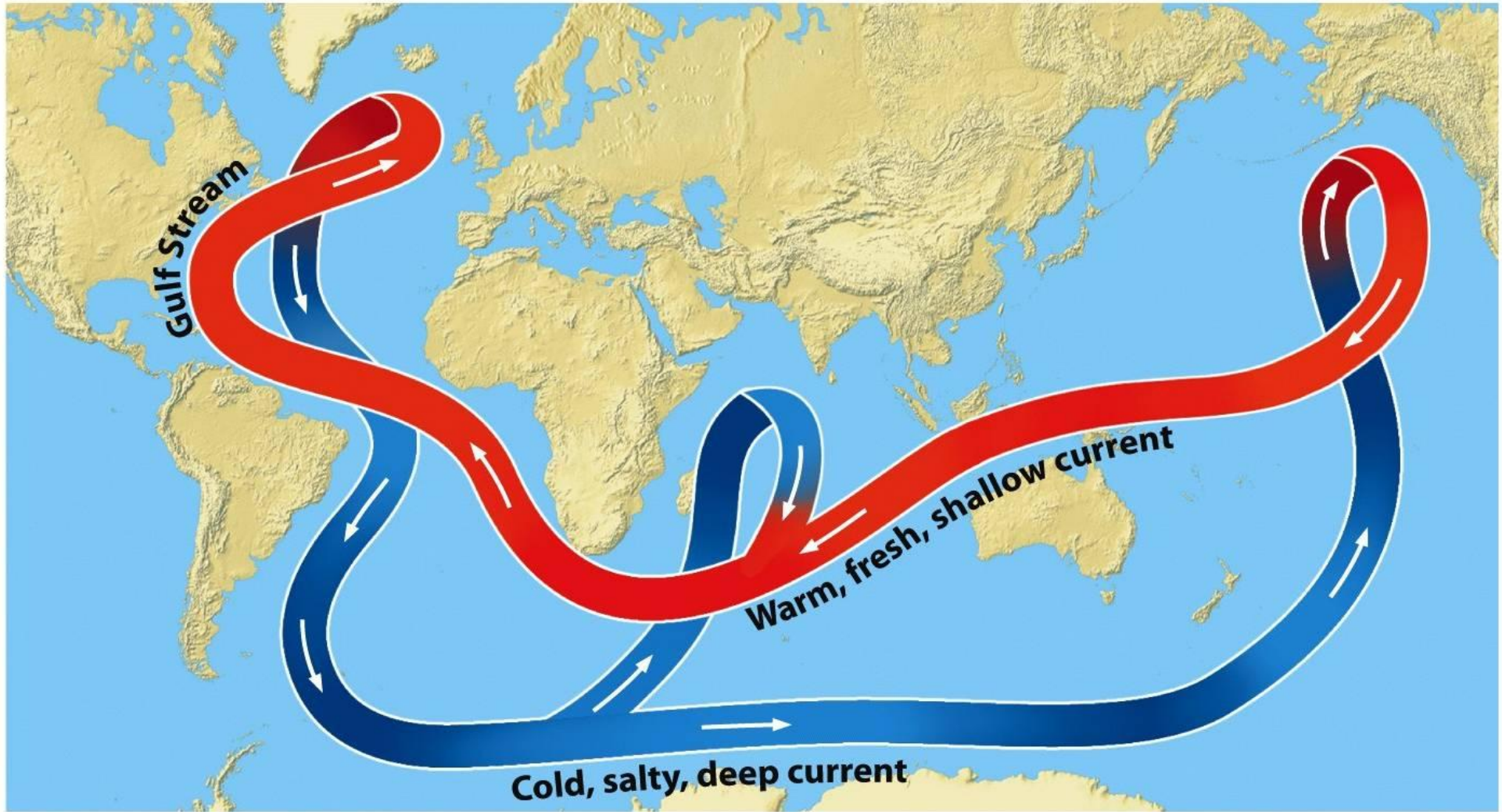


Figure 15.3b  
*Understanding Earth, Sixth Edition*  
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- Water's temperature affects the AIR temperature near it.
  - WARM water warms the air and COLD water cools the air.



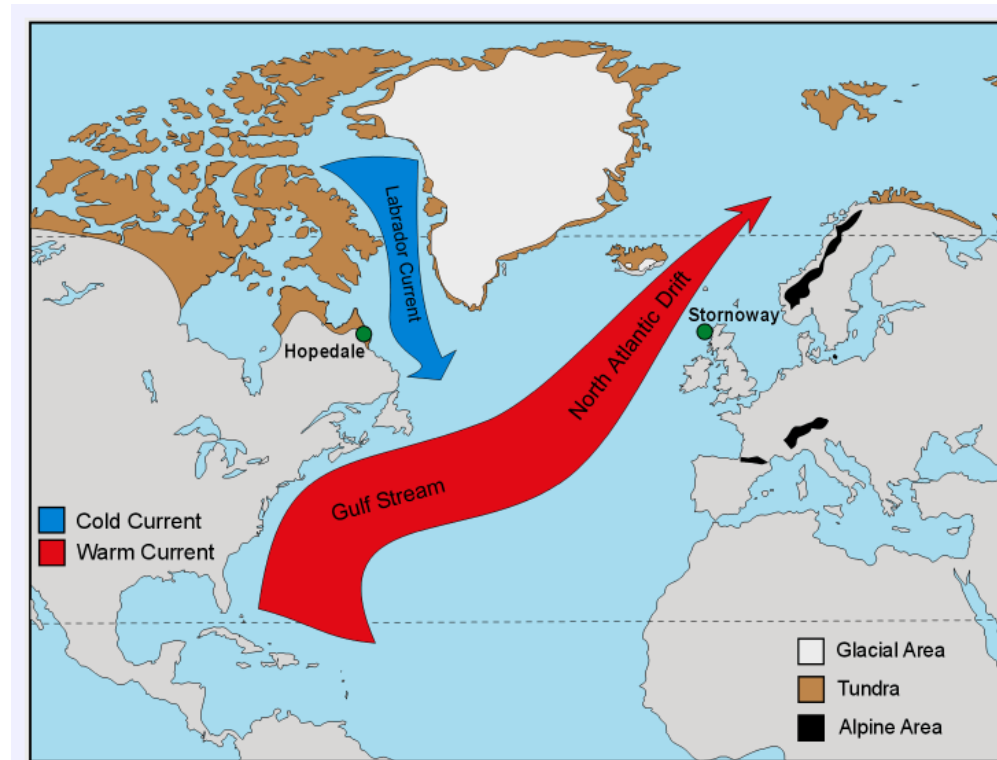
Water takes much longer to heat or cool compared to land.

In **summer**, when the air and land heat up, water remains cooler. The wind blows over the ocean and cools the land nearby. This area remains cooler than inland areas.

In **winter**, water stays warmer so areas near the ocean stay warmer than inland areas.

# Example: Gulf Stream and North Atlantic Current

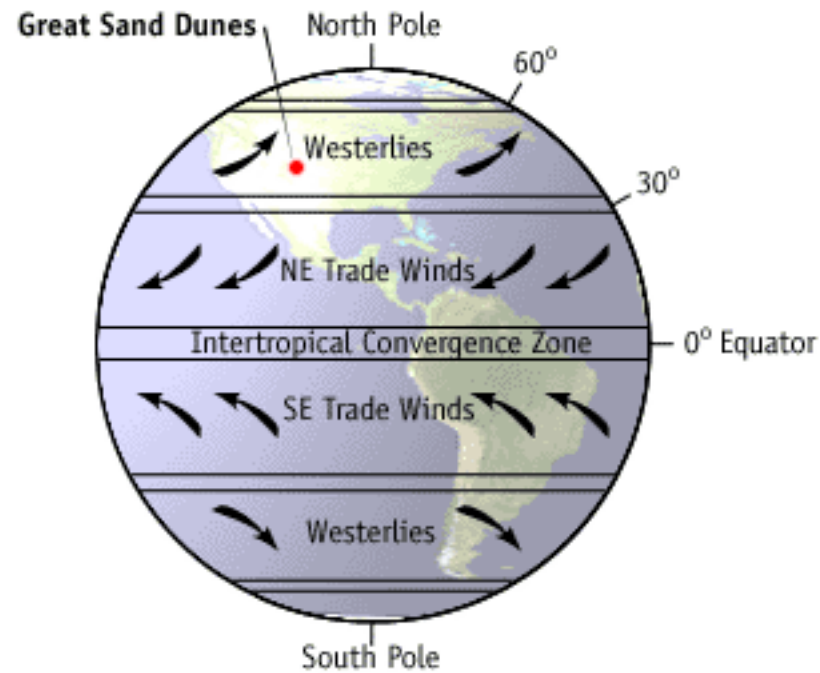
Warm water current travels NE from the tropics carrying warm water all the way to Western Europe. This creates a milder climate on the coast of Western Europe compared to other regions at the same latitude and altitude.



- <https://www.youtube.com/watch?v=UuGrBhK2c7U>

# Air Circulation and Precipitation

- Belts of rising and sinking air form wind patterns around Earth.
- Warm air rises near the Equator and sinks at the edge of the tropics where it is comparatively cooler.
- Warm air rises in the temperate zones and sinks over the poles.



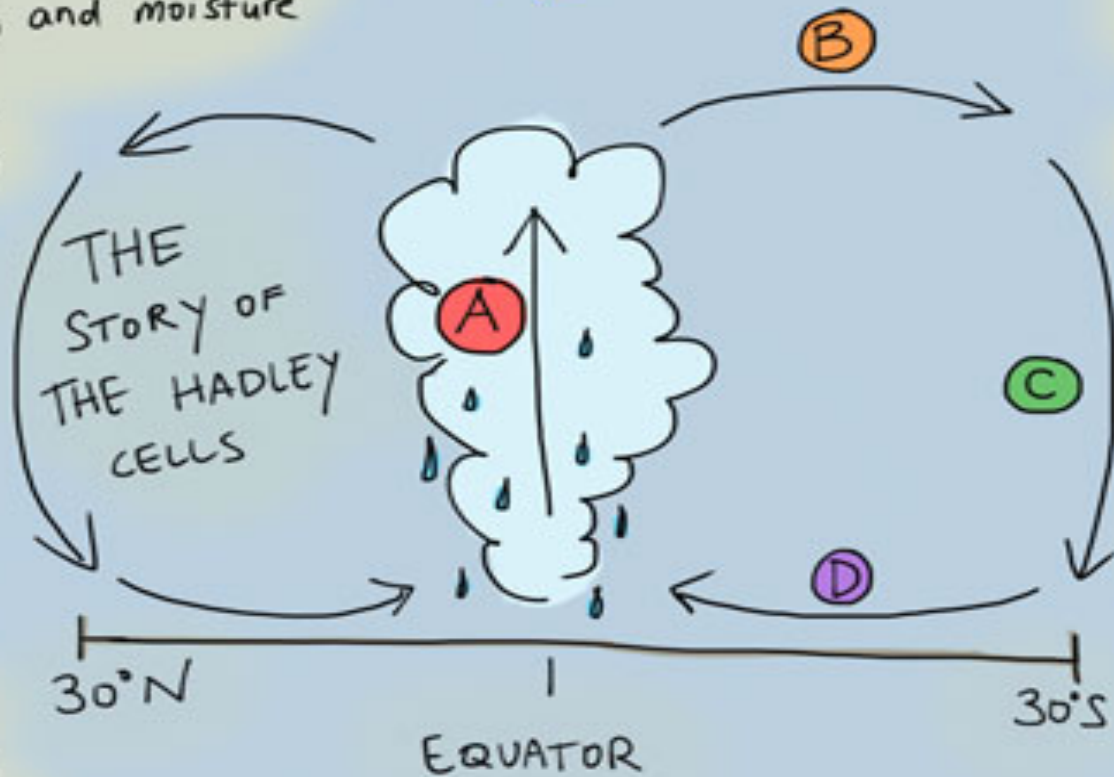
# Intertropical Convergence Zone

This is the area of rising air near the equator.

1. The sun warms the air and the warm air rises.
2. Any cold air in the way that has already dumped its moisture, is pushed away by the warm air **forming wind**.
3. When the cold air moves far enough away from the warm air it falls to the ground.
4. Cool air does not have much moisture, so not a lot of rain fall in these areas where the cool air falls to Earth.
5. As the air reaches the surface, it produces winds and picks up moisture.
6. The wind blows from the area of sinking (high pressure) to the areas of rising air (low pressure).

**A** The sun heats the air at the equator. The hot air rises, and moisture condenses.

Tons o' Rain!



**B** Air is transported poleward at high altitude (both north and south)

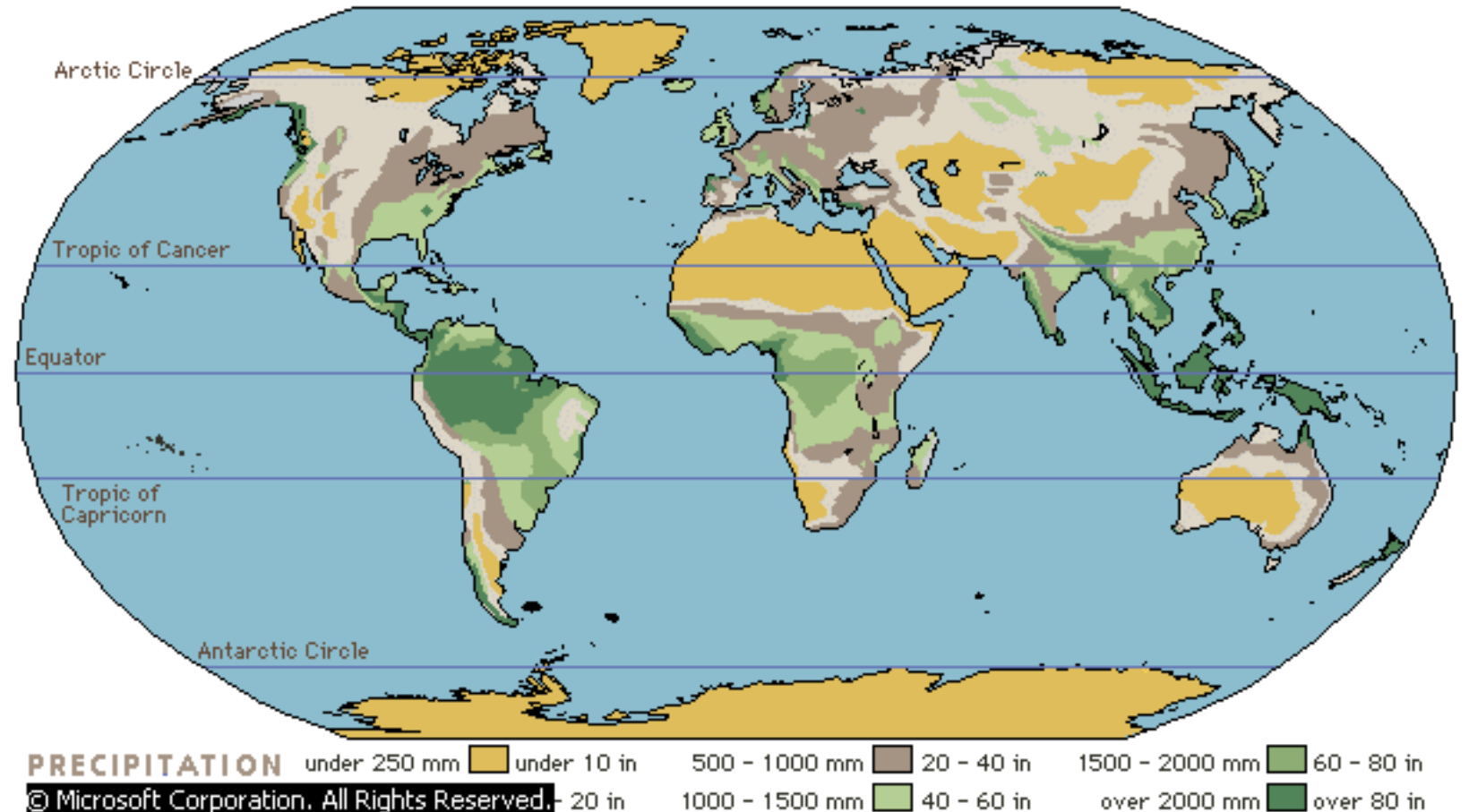
**C** It eventually sinks around 30° latitude. It's very dry by now.

**D** The dry air moves back to the equator, picking up loads of moisture along the way.

... and the cycle continues...

# Compare Precipitation

1. What is precipitation like in the regions between the Indian and Pacific Oceans?



# Storms

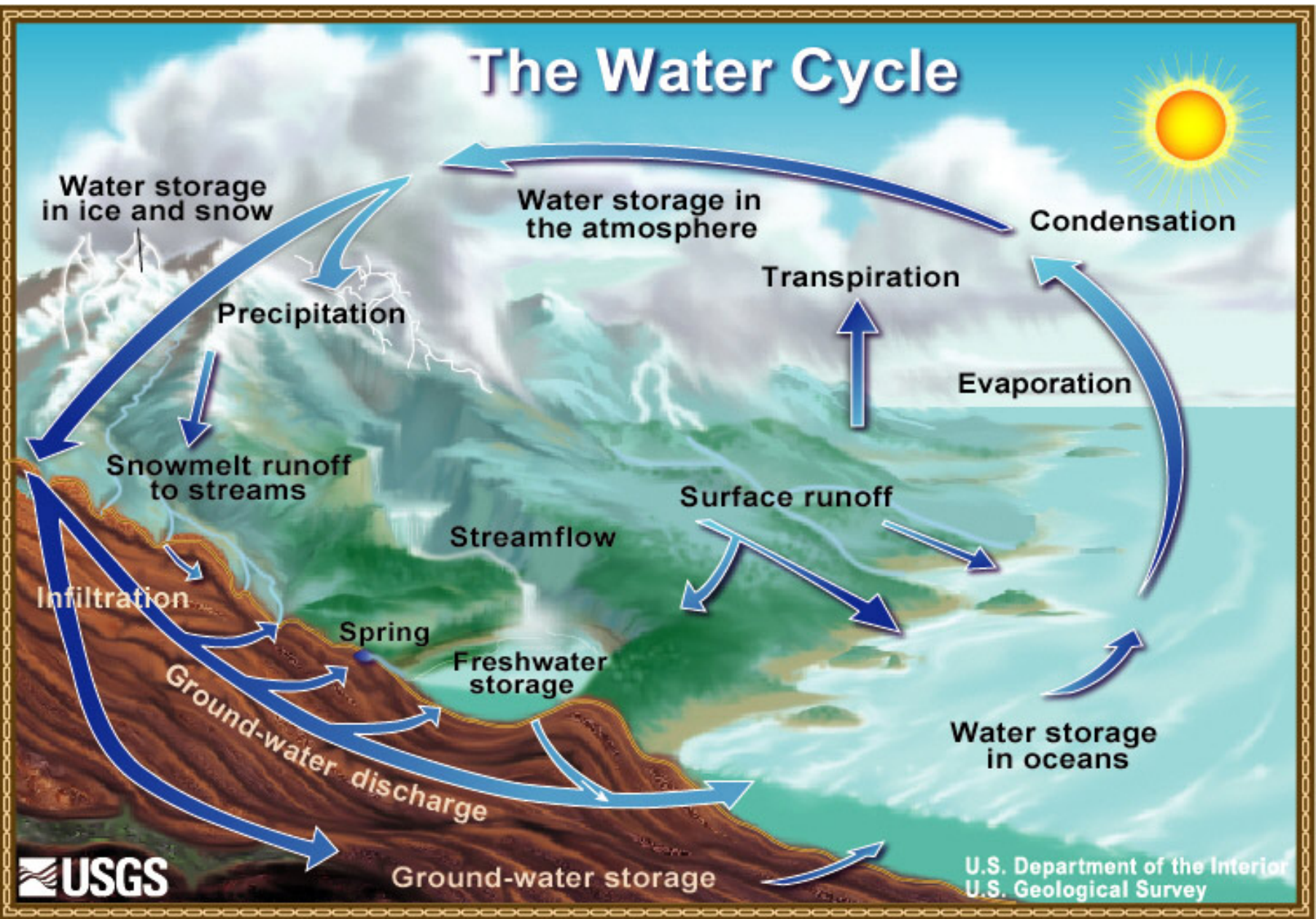
- When two air masses of different temperature and moisture contents come together a storm occurs.
  - **Tropical Cyclone:** intense rain with strong winds
  - **Hurricane:** Cyclone that forms over the Atlantic Ocean. Causes a lot of damage!
  - **Tornado:** Swirling funnel of wind that can reach 200 miles per hour. Very dangerous



# Checks for Understanding

1. Besides temperature, what else helps create currents?
2. What happens to make wind form?

# The Water Cycle



U.S. Department of the Interior  
U.S. Geological Survey



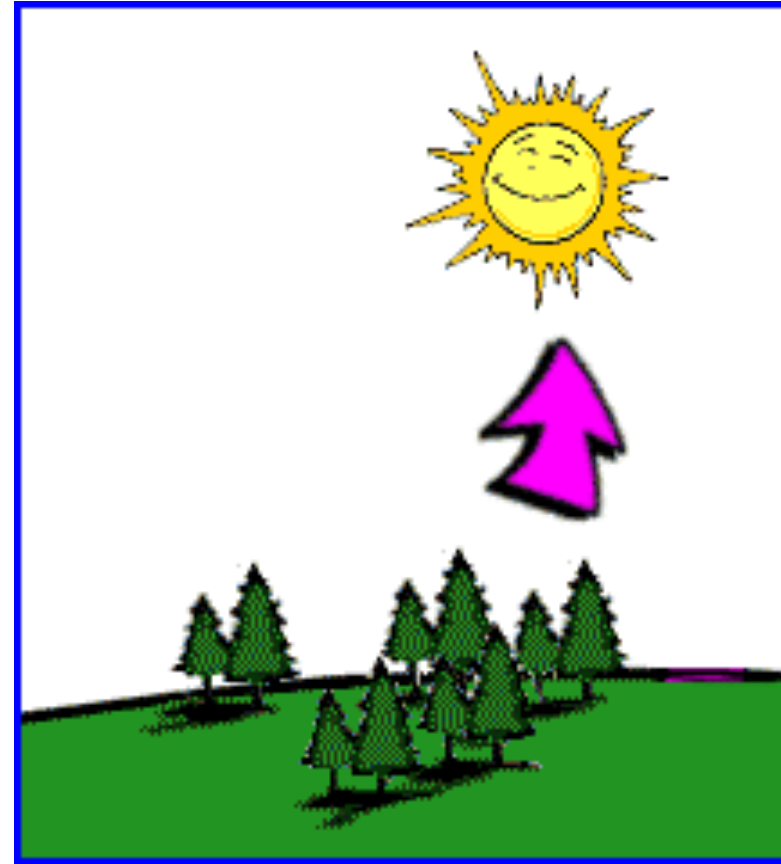
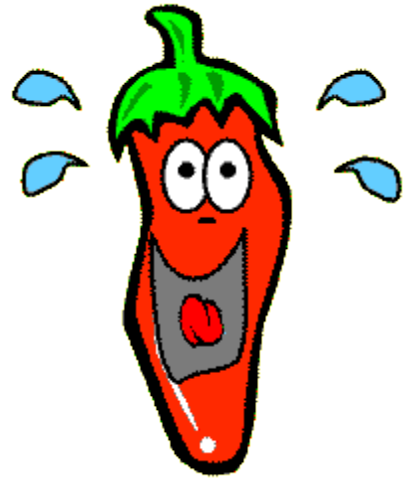
Water never leaves the Earth. It is constantly being cycled through the atmosphere, ocean, and land. This process, known as the **water cycle**, is driven by energy from the sun. The water cycle is crucial to the existence of life on our planet.



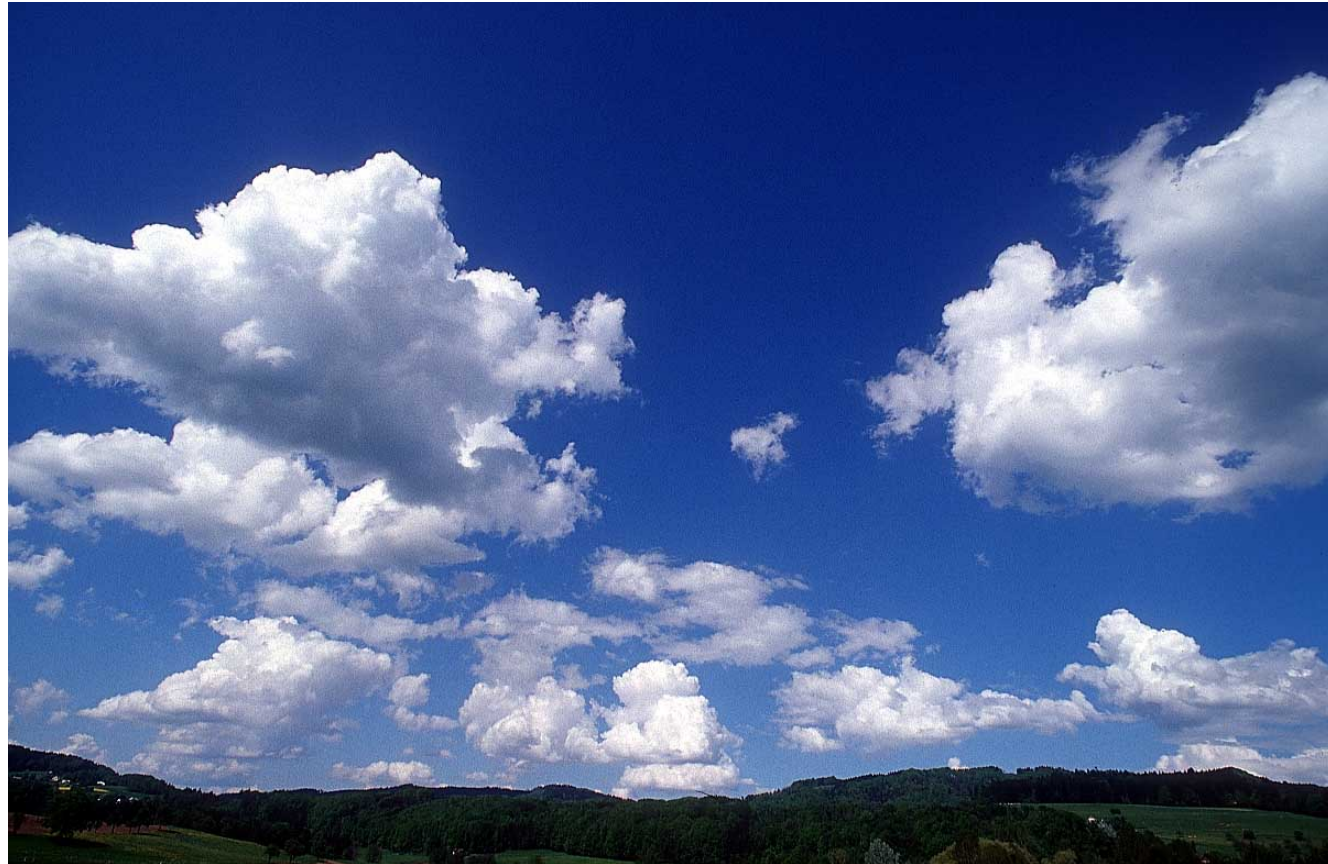
During part of the water cycle, the sun heats up liquid water and changes it to a gas by the process of **evaporation**. Water that evaporates from Earth's oceans, lakes, rivers, and moist soil rises up into the atmosphere.



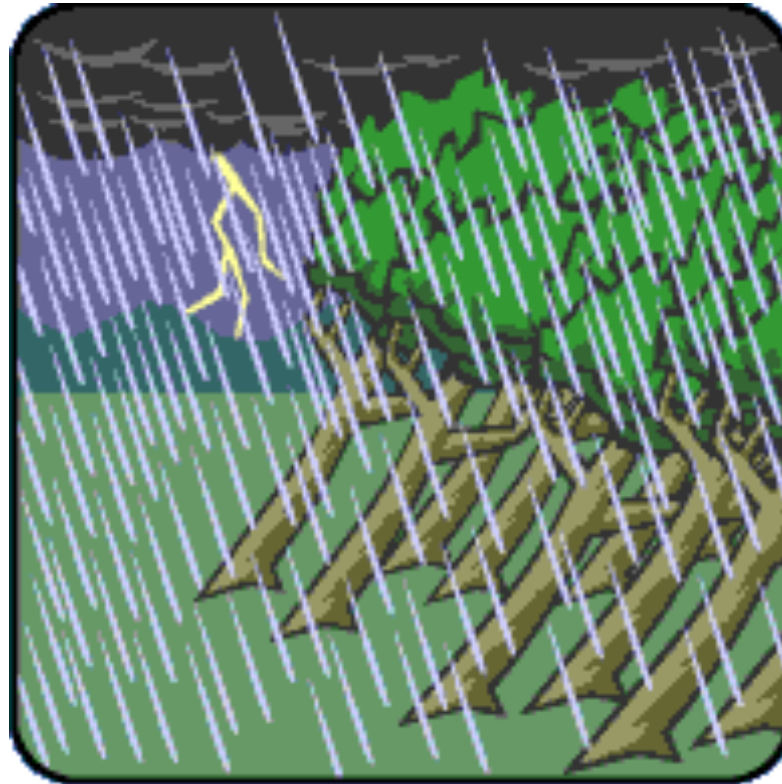
The process of evaporation from plants is called **transpiration**. (In other words, it's like plants sweating.)



As water (in the form of gas) rises higher in the atmosphere, it starts to cool and become a liquid again. This process is called **condensation**. When a large amount of water vapor condenses, it results in the formation of clouds.



When the water in the clouds gets too heavy, the water falls back to the earth. This is called precipitation.



# Checks for Understanding:

1. Knowing what you know about evaporation, why do you think most lakes never dry up?
2. What two roles does temperature play in the water cycle?



# Output Activity: “How Winds Blow” page 44

On page 44 of ISN, cut out each box from the “How Winds Blow” activity sheet. Follow the directions. Cut out the boxes and place them in order on page 44. Draw a diagram that illustrates what is describe in the boxes.