

# Relating Air Circulation to the Earth System

## Objectives:

Explore how winds affect energy flowing and matter cycling within the atmosphere, hydrosphere, geosphere, and biosphere.

# Activity

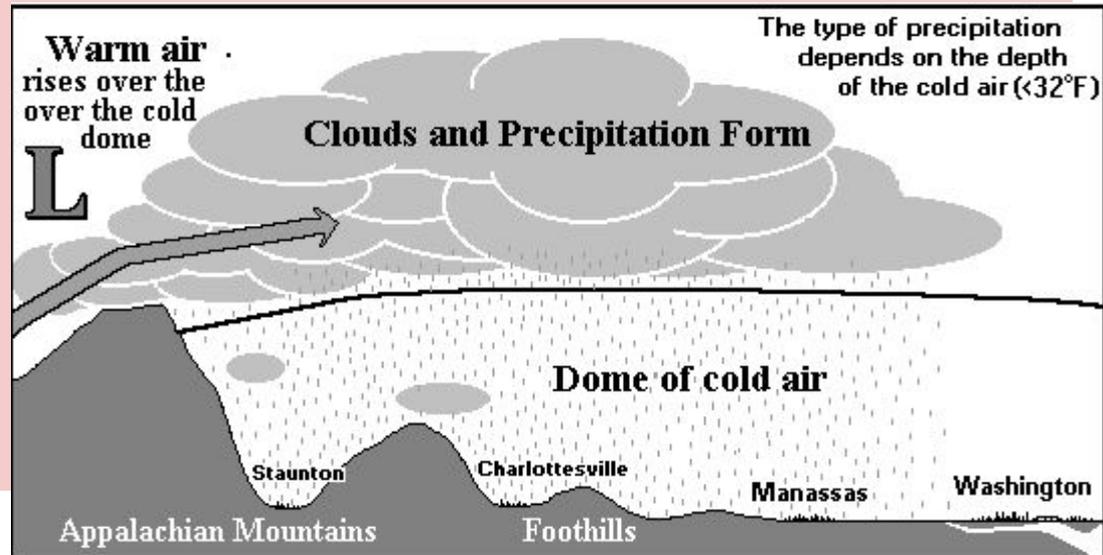
With a partner, identify and explain any evidence for the movement of matter and transfer of energy you see in the photo on page 15 of your workbooks

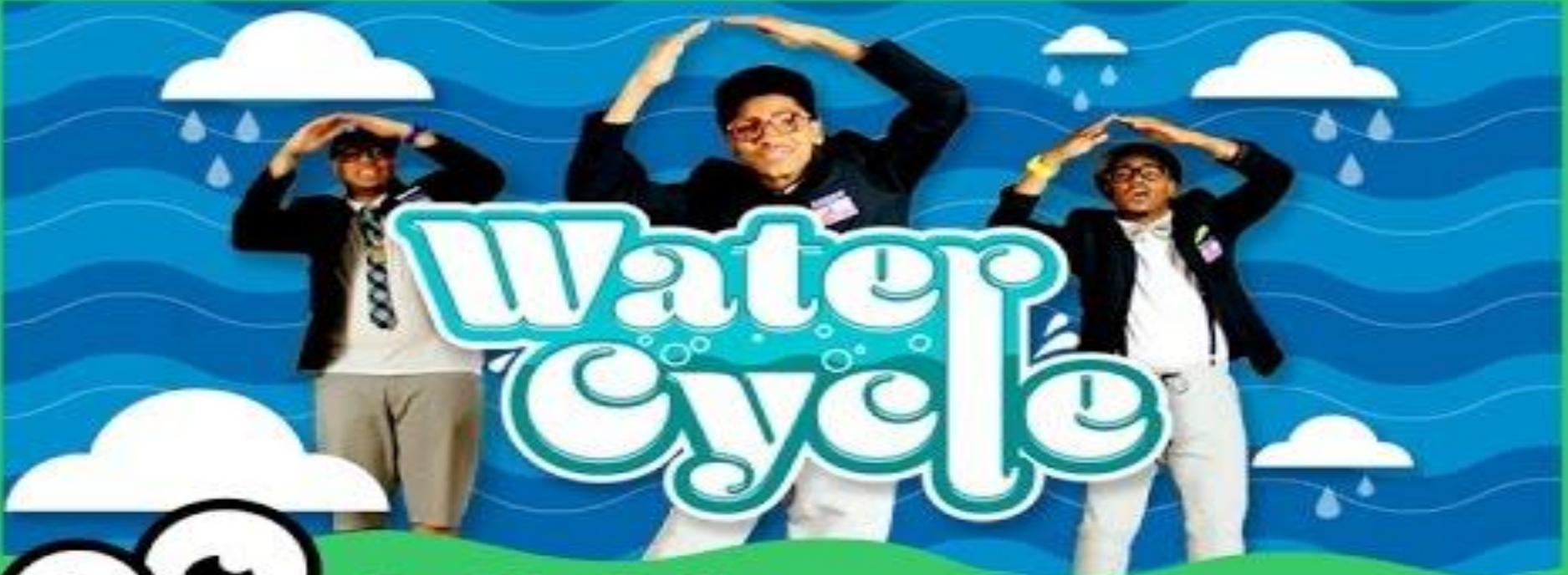


# I. The Cycling of Matter in the Atmosphere

When warm air moves over an area where the land or water is cooler, energy is transferred from the warmer air to the cooler water or land. The transfer of energy by wind is an important factor in Earth's weather.

- Water
- Carbon, Nitrogen and Phosphorus
- Organic Matter



The image features three men in business attire (jackets, shirts, ties) standing against a stylized blue background with white clouds and raindrops. They have their hands on their heads, suggesting a state of surprise or realization. The background also includes white wavy lines representing water. The text 'Water Cycle' is prominently displayed in the center in a bubbly, teal font with a white outline.

# Water Cycle



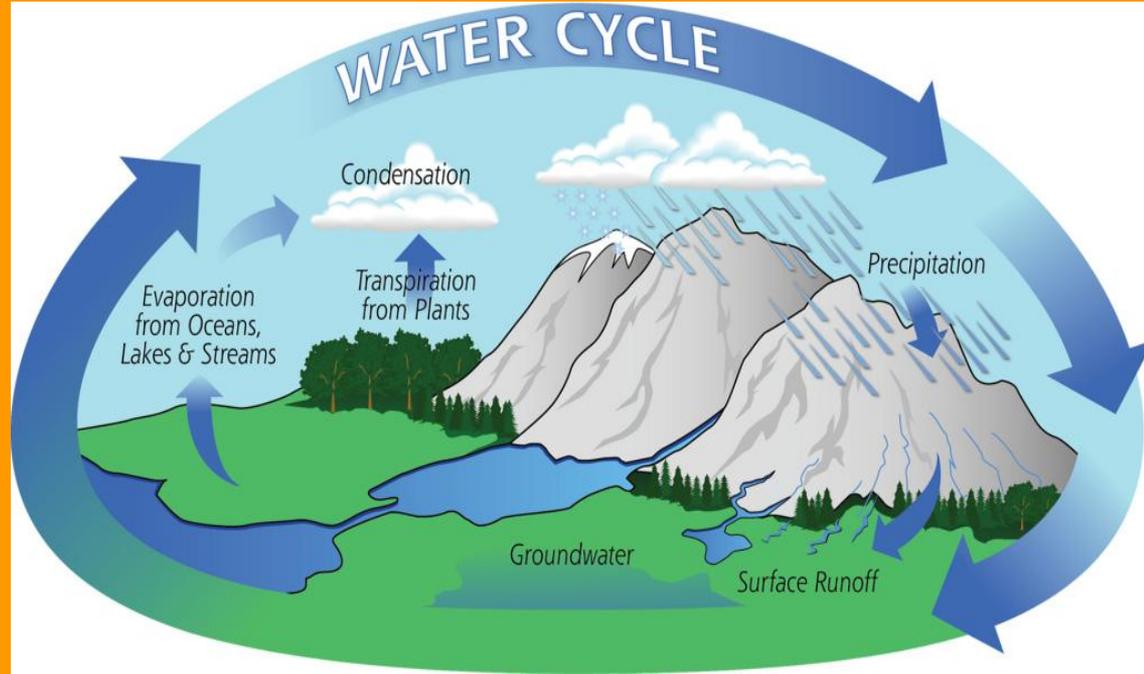
GoNoOodle

# A. Water

Water - a material needed by every living organism.

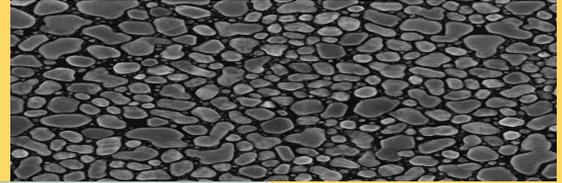
Water continually cycles in the Earth system (water cycle)

- Flows across earth's surface
- Soaks into the ground
- Forms rivers and lakes



## B. Carbon, Nitrogen, and Phosphorus

**Carbon** used by plants during photosynthesis forms carbon dioxide.



**Nitrogen** released when fossil fuels are burn

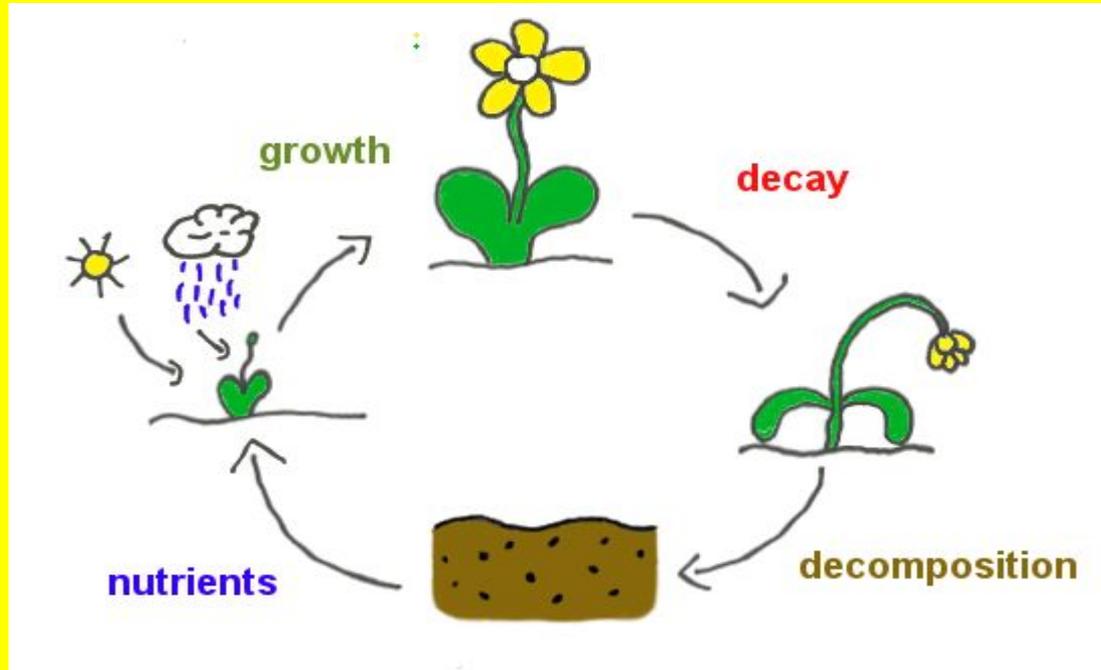


**Phosphorus** - when a plant or organism dies phosphorus is released in the water and soil



## C. Organic Matter

The remains of once-living organisms can be carried by winds and water.



Complete  
number 18  
on page 16  
of your  
workbook

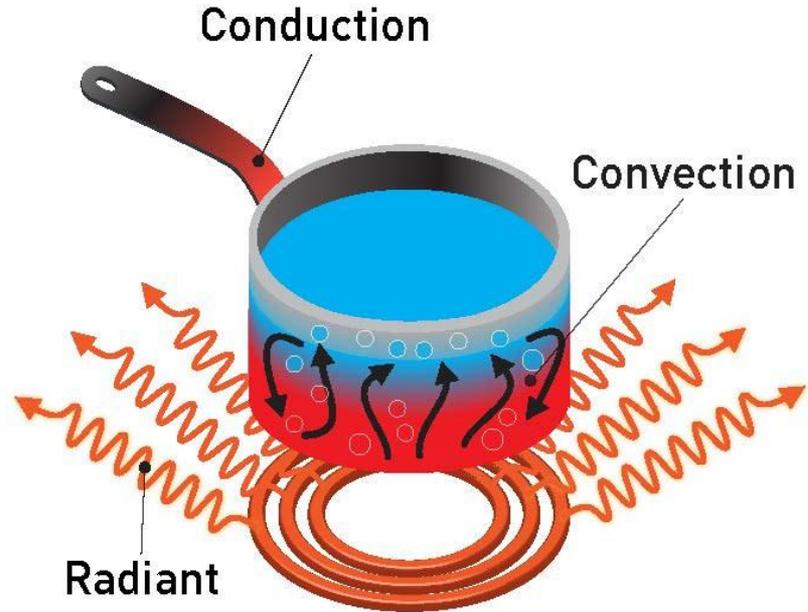


Complete  
number 19  
on page 17  
of your  
workbook



## II. The Flow of Energy in the Atmosphere

Energy flows through Earth's atmosphere and into and out of Earth's subsystems.



No matter how the heat  
Different temperatures meet  
No matter where heat's from  
Hot to cold how it's done

Radiation heat  
It goes through the skies  
Convection fluids rise  
It's where the heat's applied  
Don't get too close  
You touch the fire  
Conduction heat goes by  
Three ways heat is supplied

### Heat Transfer

Conduction, Convection and Radiation



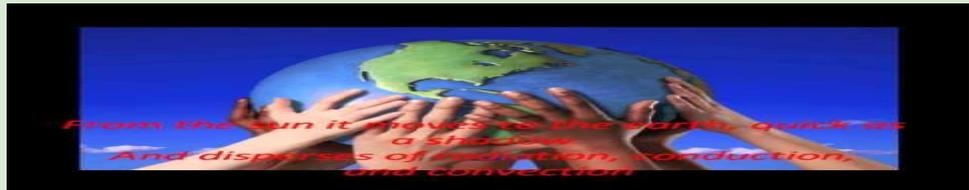
# A. The transfer of Thermal Energy

Thermal energy is the energy a substance has because of the motion of the particles in the substance.

**Radiation** - solar energy from the sun

**Conduction** - the transfer that happens when particles touch and transfer energy

**Convection** - the flow of air due to differences in density. The transfer of energy due to the movement of matter.



A globe of the Earth is shown, held up by several hands of different skin tones (white, brown, and black). The globe is centered on the Americas. The background is a clear blue sky with some white clouds. The text is overlaid on the lower half of the image.

*From the sun it moves to the earth, quick as  
a shadow  
And disperses of radiation, conduction,  
and convection*

RADIATION



## B. The Transfer of Kinetic Energy

- Energy in motion
- The kinetic energy of wind is transferred to ocean water and powers waves and surface currents.



