

# 5.E.1.2

Weather



**Weather Tools, Clouds & Precipitation**

# meteorology

- ❑ Definition: the science that deals with the phenomena of the atmosphere, especially weather and weather conditions
- ❑ Translation: the study of weather



## Sentence

**Meteorologists** study temperature, humidity, air pressure, and winds to predict the weather..



## Example

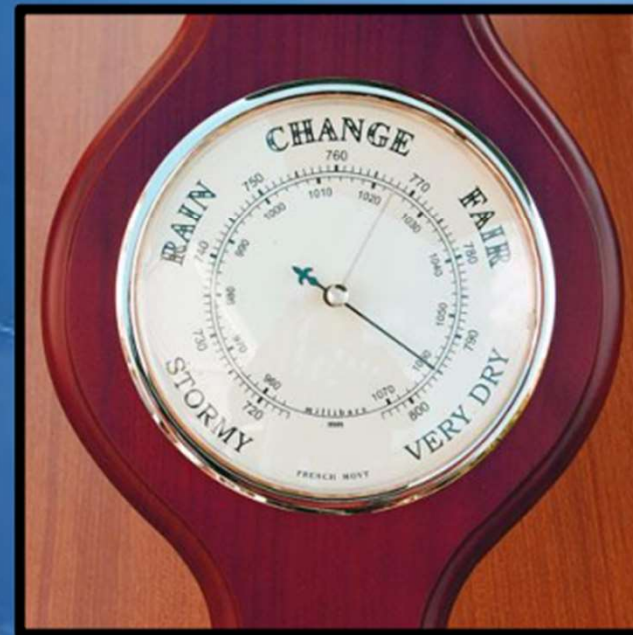
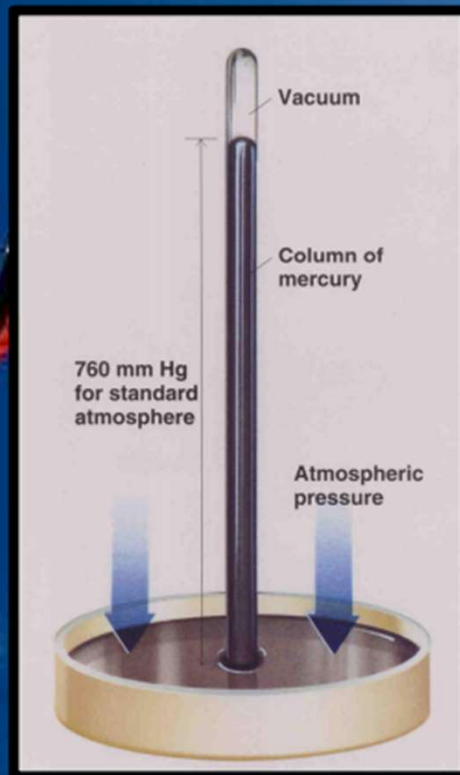
Weather reporters on the news study this subject in school!



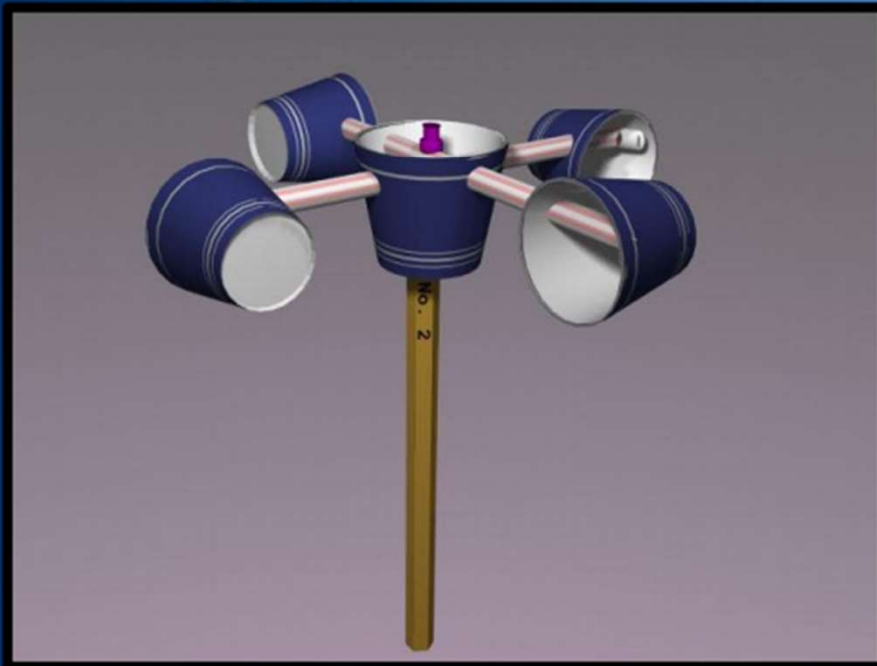
## Chat

If I were an expert in **meteorology**, I could tell you all about \_\_\_\_\_ .

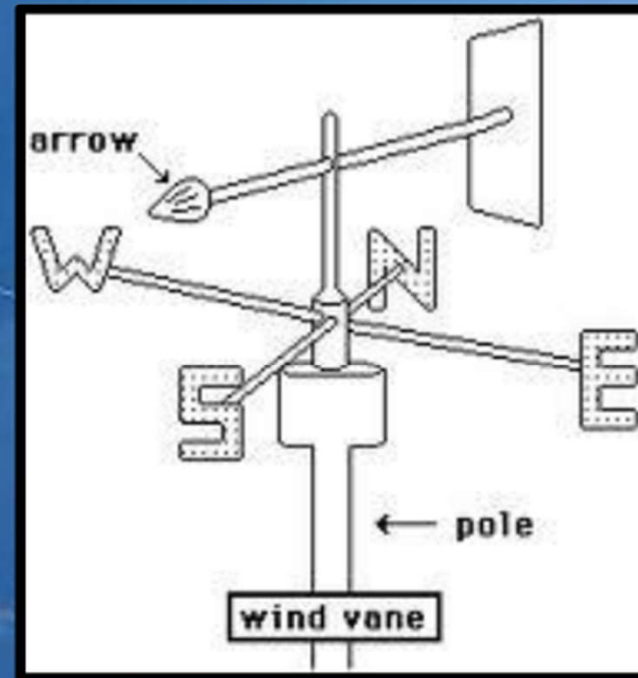
barometer - an instrument that measures air pressure



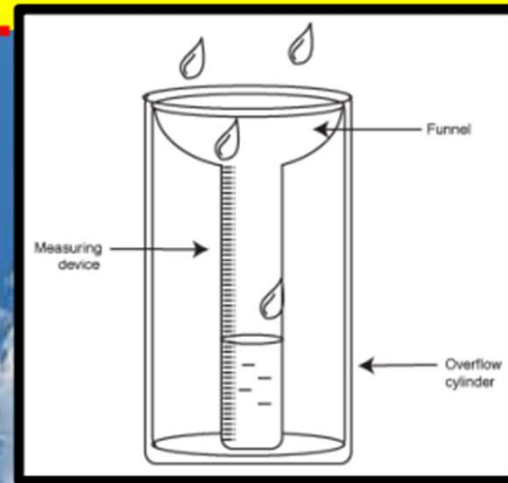
anemometer - an instrument that  
measures wind SPEED



weather vane- an instrument that  
wind direction

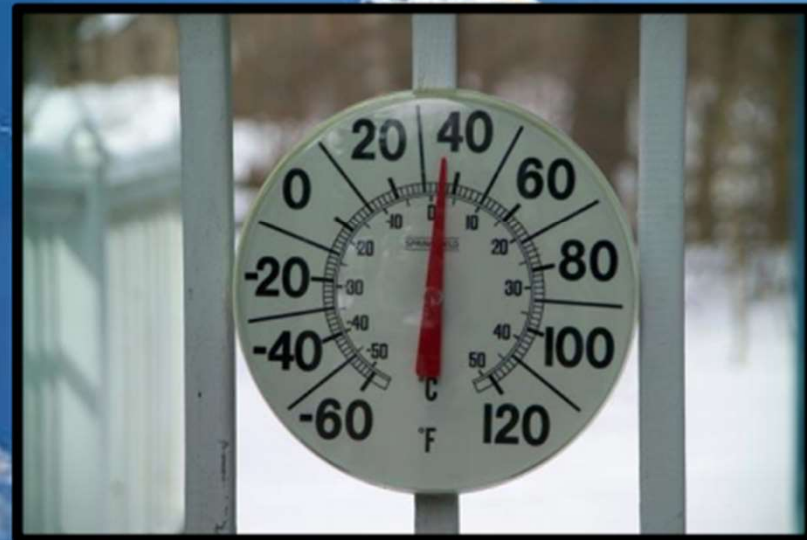
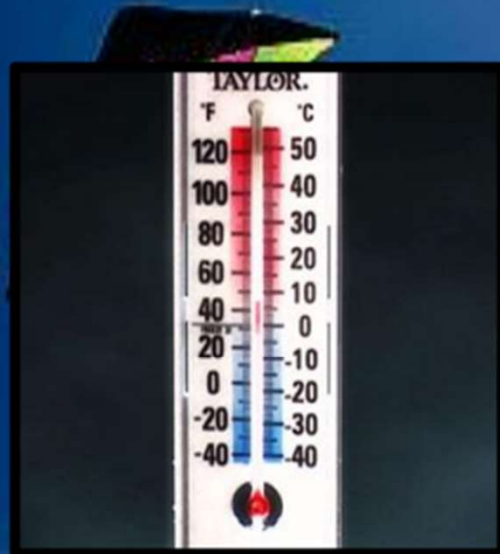


# rain gauge - an instrument that measures precipitation





thermometer - an instrument that measures temperature



hygrometer - an instrument that measures relative humidity.





# How do clouds form?

Water vapor **Rises** → Water vapor **Cools** → **Condenses** into  
water droplets

→ There are many different **types** of clouds!

# Types of Clouds

**Stratus:** Low altitude, Blanket-like white to gray clouds that can sometimes bring light rain or snow.

When it is “overcast”, the sky is covered in stratus clouds.



# Types of Clouds

**Nimbostratus:** Gray, low altitude blanket-like clouds that often bring steady rain or snow.



# Types of Clouds

**Cumulus:** Puffy clouds that have flat bases and towering tops, cotton-ball like.

→ Low altitude

→ Bring FAIR WEATHER





# Types of Clouds

**Cumulonimbus:** A cloud with a flat base and towering top. They may bring thunderstorms, rain, hail and tornadoes.





# Types of Clouds

**Cirrus:** High-altitude clouds that are stretched from strong winds. They are sometimes described as “wispy”

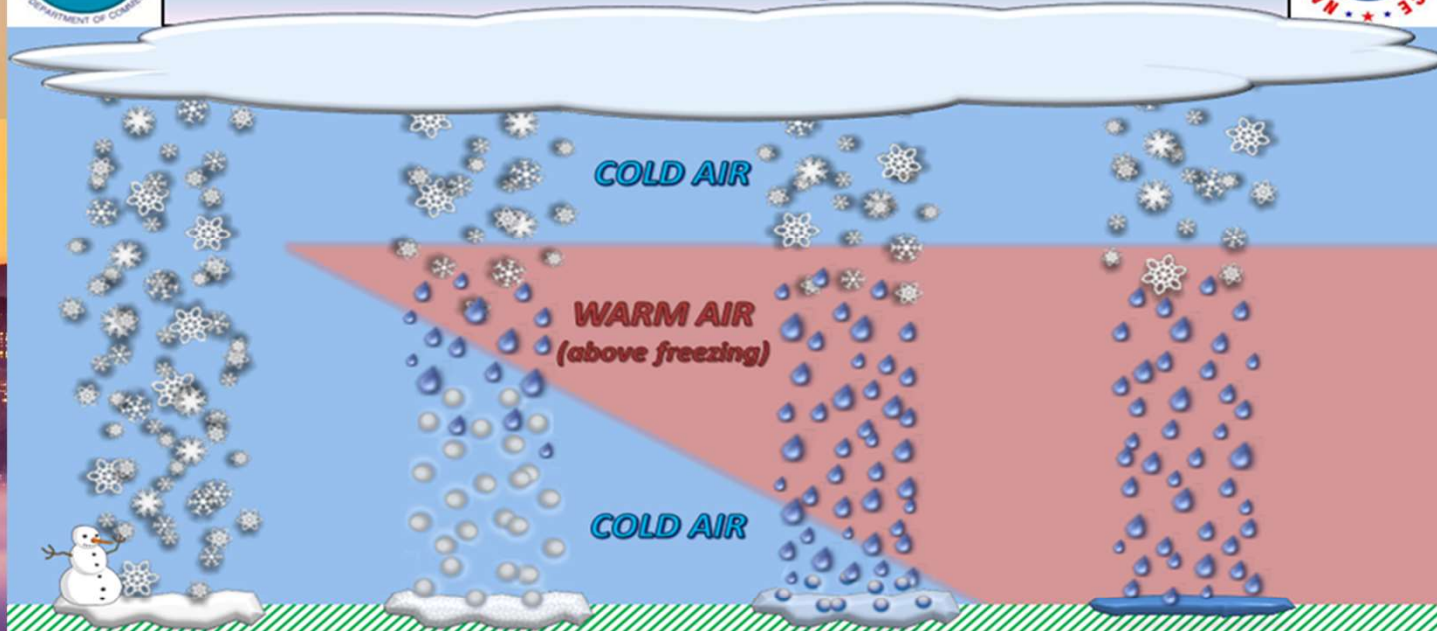
→ Change in weather is happening soon

-->Made of ice crystals





# Winter Precipitation



SNOW

SLEET

FREEZING RAIN

RAIN

No melting has occurred.

Snow melts and refreezes before reaching the surface.

Snow melts and refreezes on contact with the surface.

Snow melts and does not refreeze.



NWS Northern Indiana  
[www.weather.gov/iwx](http://www.weather.gov/iwx)



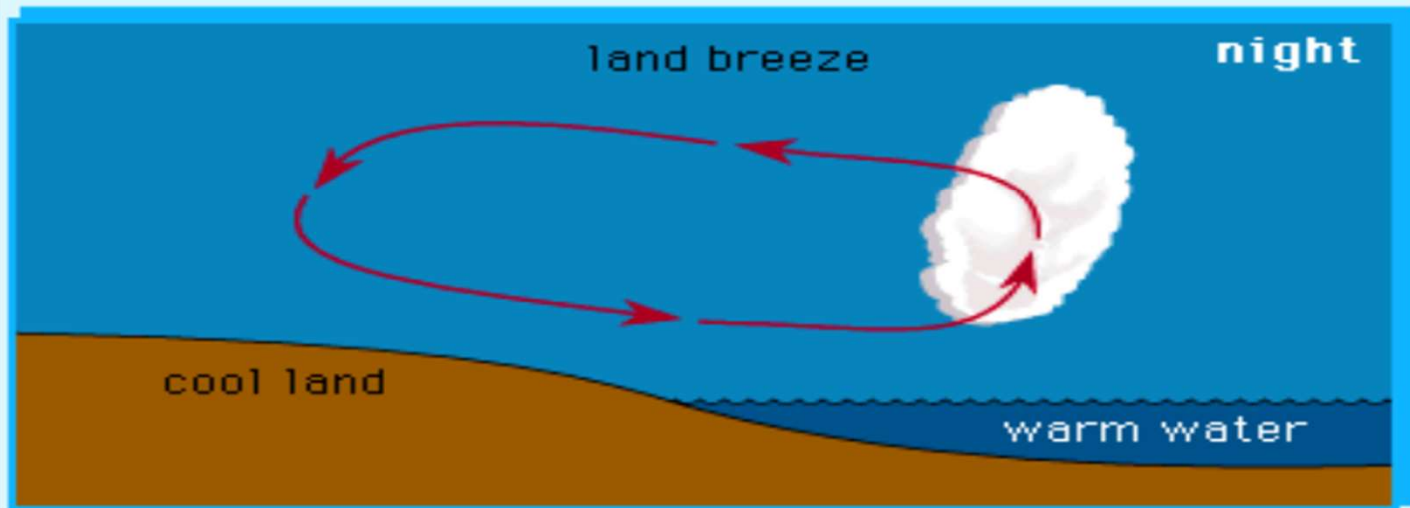
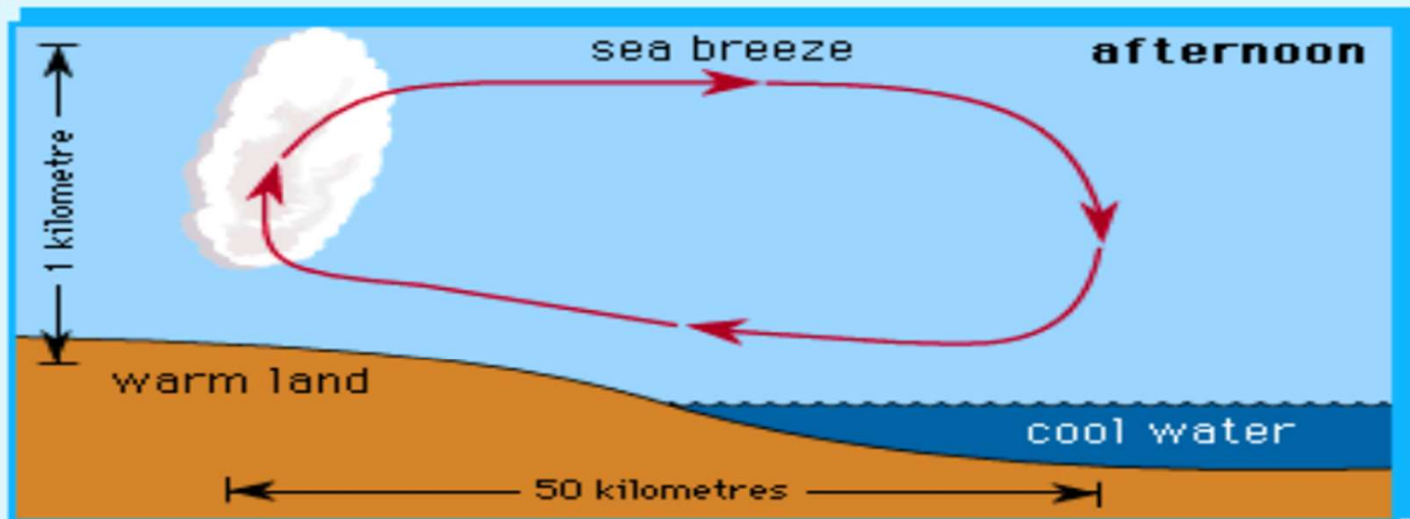
Facebook: [/US.NationalWeatherService.NorthernIN.gov](https://www.facebook.com/US.NationalWeatherService.NorthernIN.gov)  
 Twitter: [@NWSIWX](https://twitter.com/NWSIWX) YouTube: [/NWSNorthernIndiana](https://www.youtube.com/channel/UC...)

# 5.E.1.3

Weather

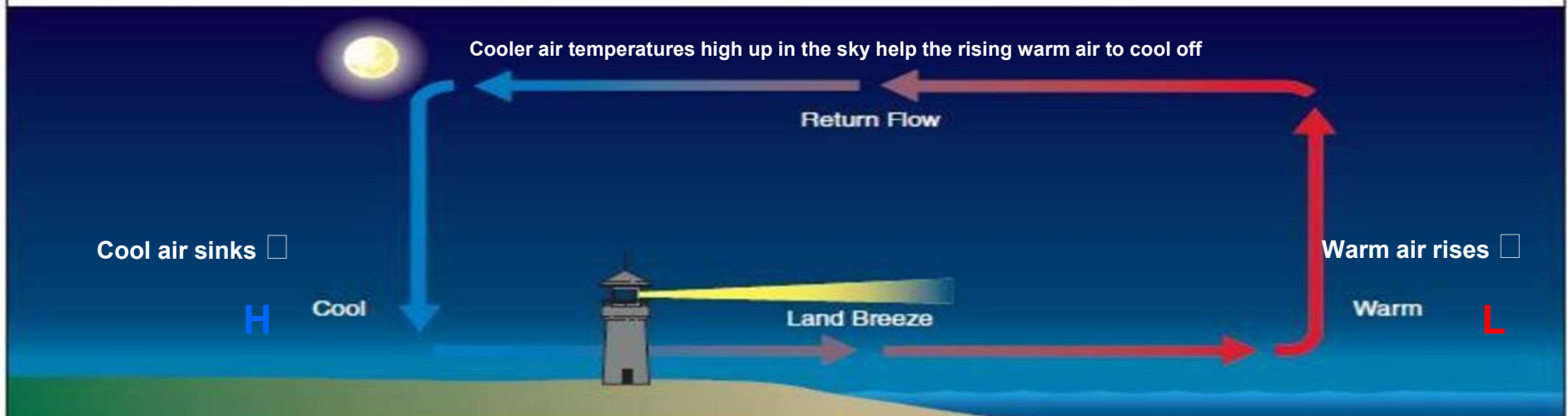
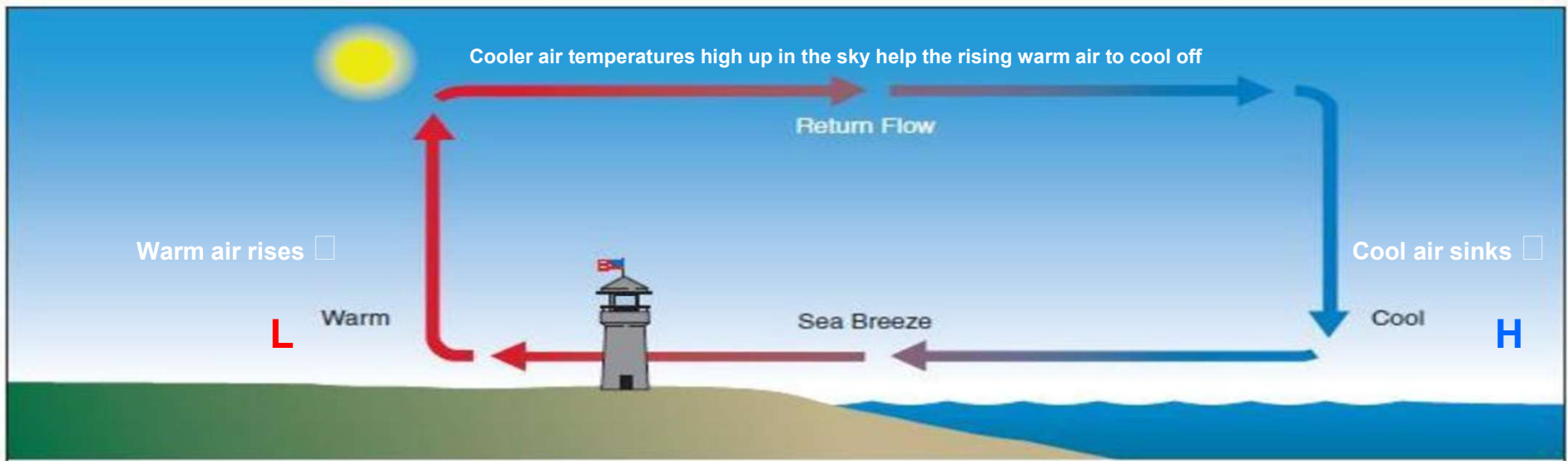


**Global Winds & Ocean Currents**



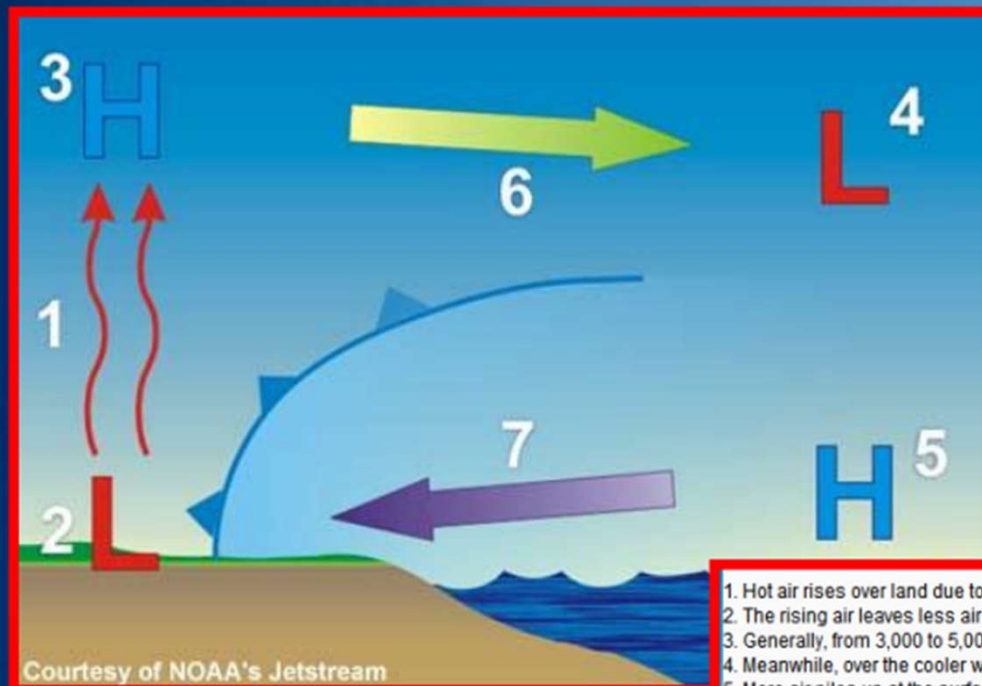
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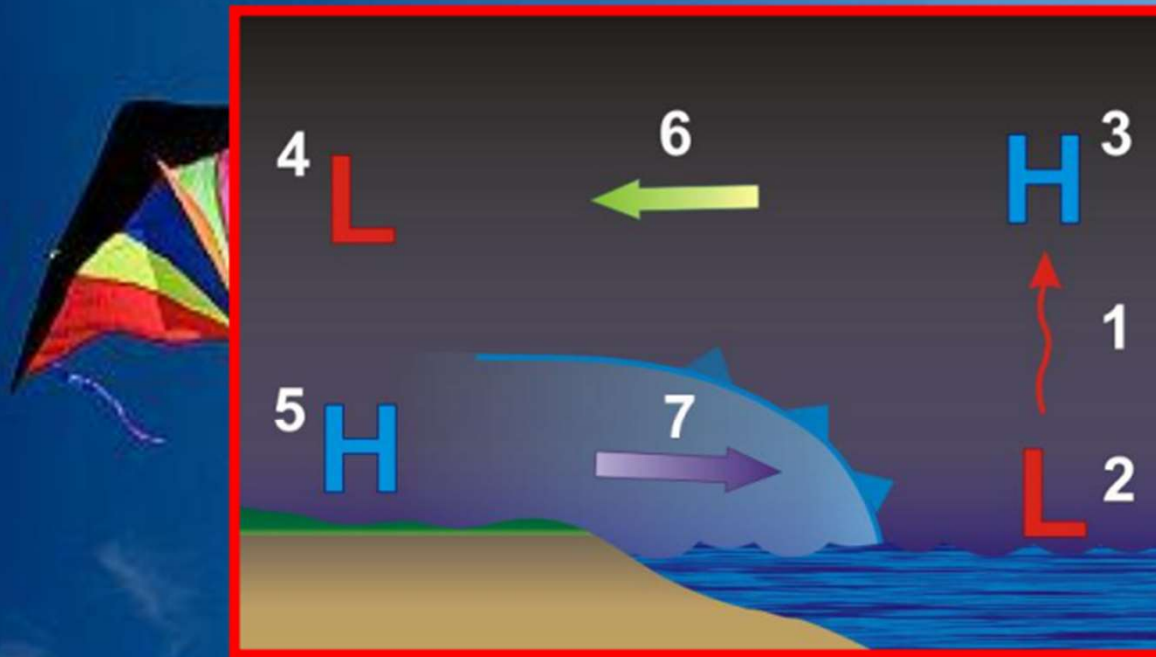
sea breeze – a wind that blows from the sea toward the land



Courtesy of NOAA's Jetstream

1. Hot air rises over land due to heating by the sun.
2. The rising air leaves less air in one spot, low pressure forms.
3. Generally, from 3,000 to 5,000 feet, the air cools, high pressure develops.
4. Meanwhile, over the cooler water, air sinks, leaving less air aloft.
5. More air piles up at the surface of the water, high pressure forms.
6. Air moves from high pressure to low pressure.
7. The sea breeze generally forms during the afternoon. This creates a mini cold front that helps lift air upward to create thunderstorms.

land breeze – a wind that blows from the land toward the sea



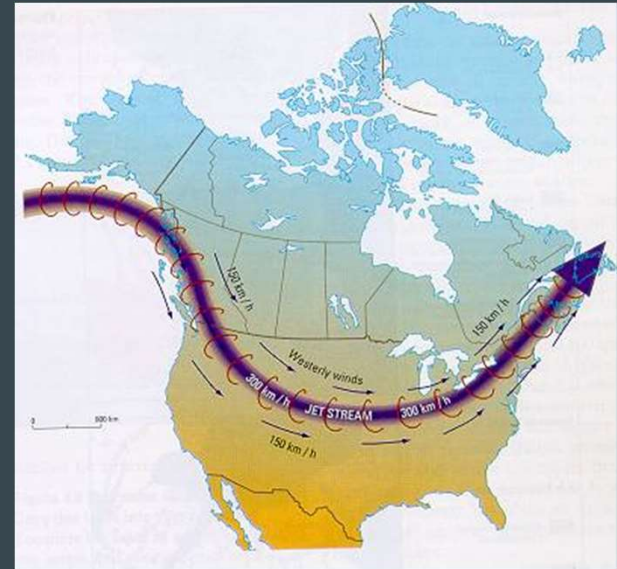
At night, the land temperature falls to below that of the ocean and becomes less dense. Therefore it begins to rise (1, above right). The rising air creates a weak low pressure area due to a decrease in air mass at the surface (2). As the air cools, it begins to collect resulting in an increase in pressure, creating a "high" (3).

# jet stream

What is the jet stream?

Air current high in the atmosphere

Like a "tube/river of air"

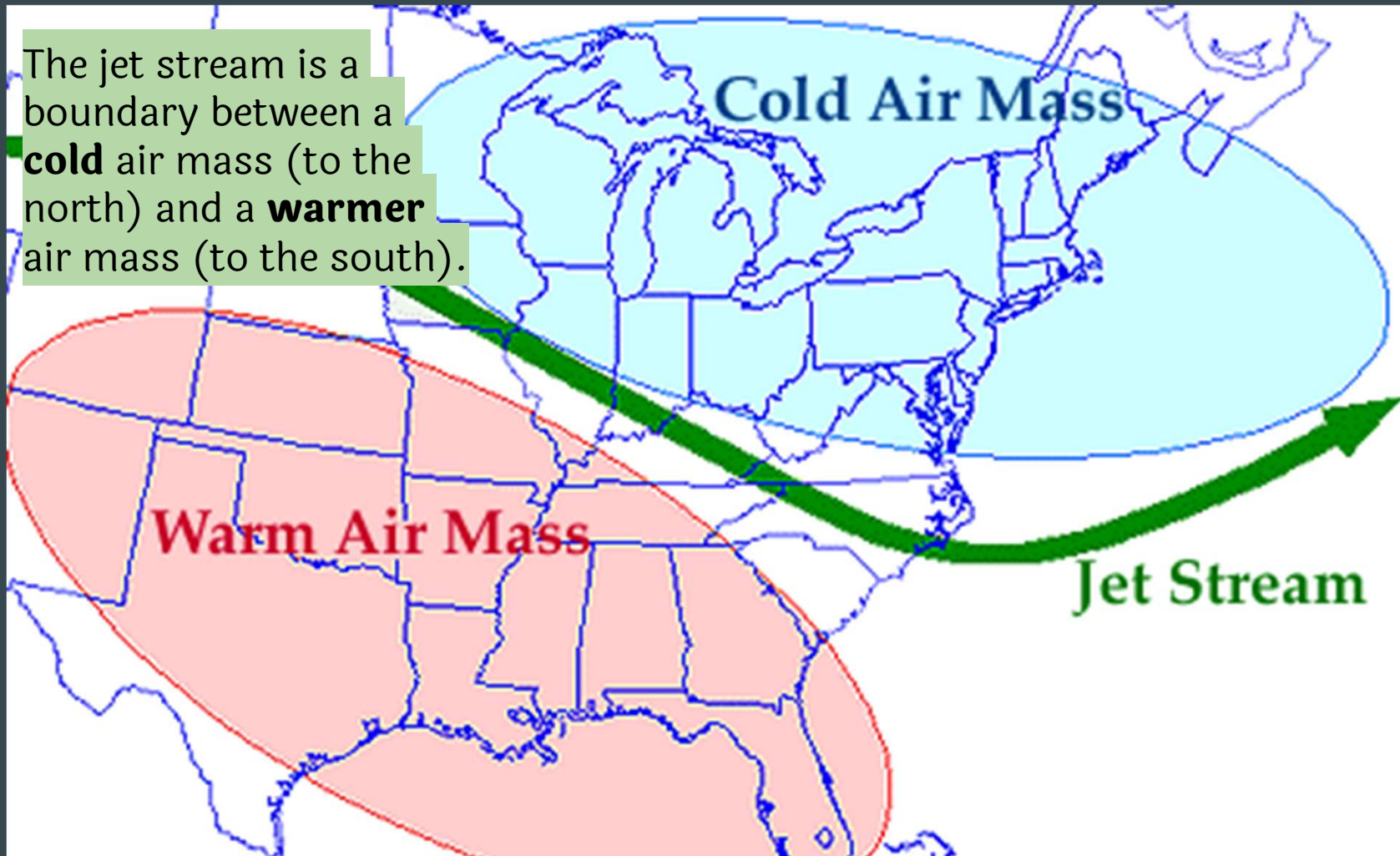


The jet stream flows from the WEST to the EAST

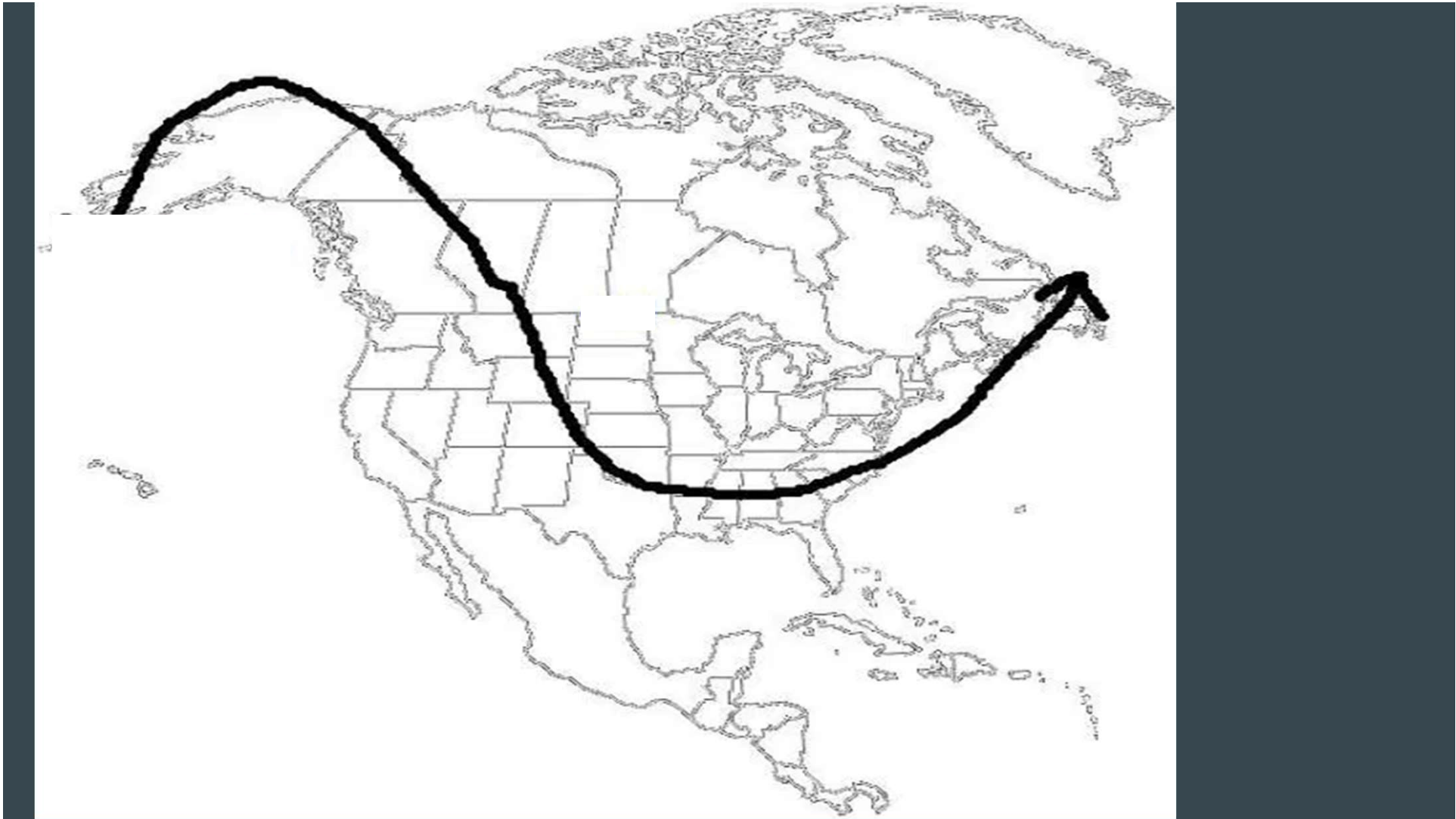
What effect does the jet stream have on weather in the United States?

areas ABOVE the jet stream have cold temperatures, and areas BELOW the jet stream have warm temperatures

The jet stream is a boundary between a **cold** air mass (to the north) and a **warmer** air mass (to the south).

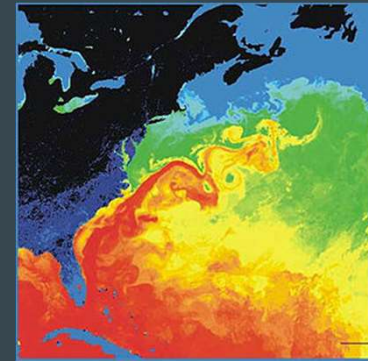








# Gulf stream



What is the Gulf stream?

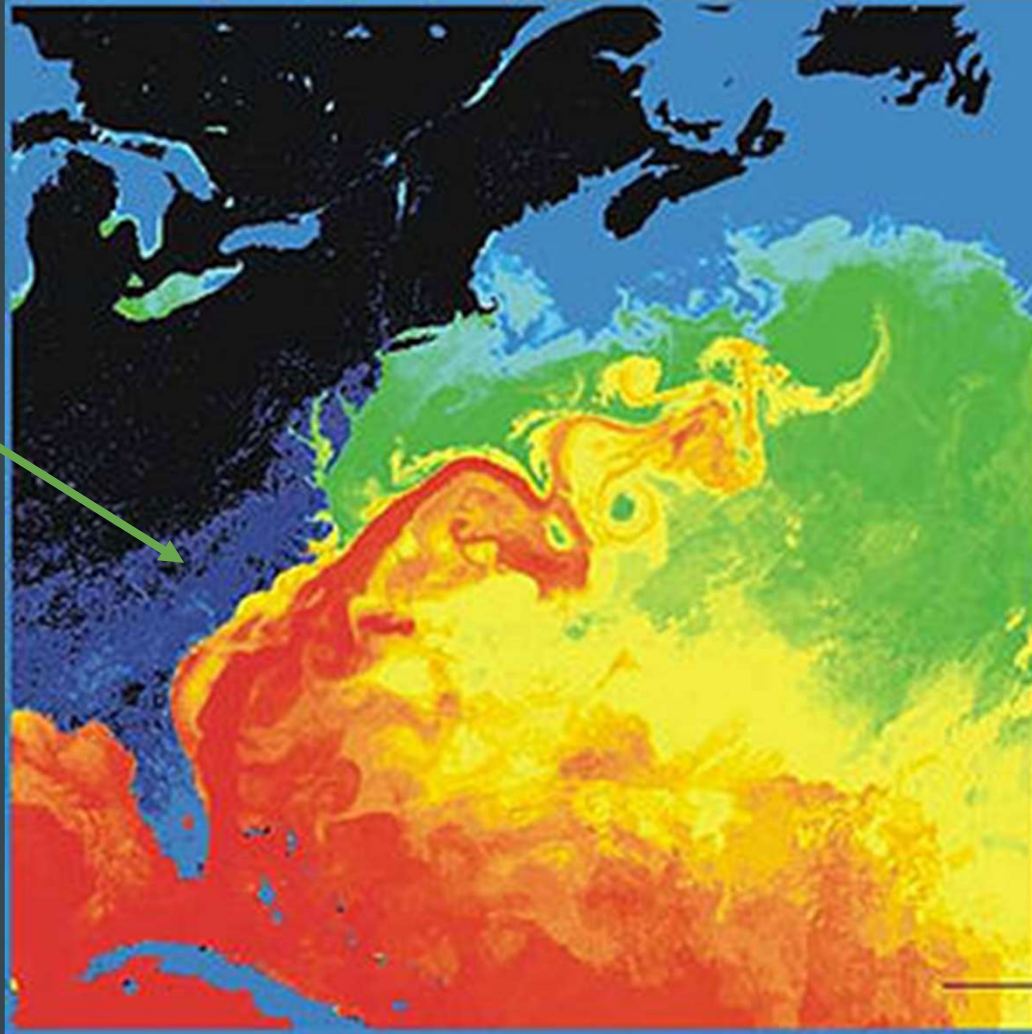
A warm OCEAN current in the Atlantic Ocean

The Gulf stream flows from the south of Florida, up the East coast, and then across the Atlantic towards Europe

What effect does the Gulf stream have on weather?

The Gulf Stream warms the air and land along the eastern coast of the US and brings warmer temperatures to Europe during the cooler months

Charlotte, NC



This is a thermal image of the Eastern coast of the United States and the Atlantic Ocean.

What do the colors represent?

Where is the Gulf stream?

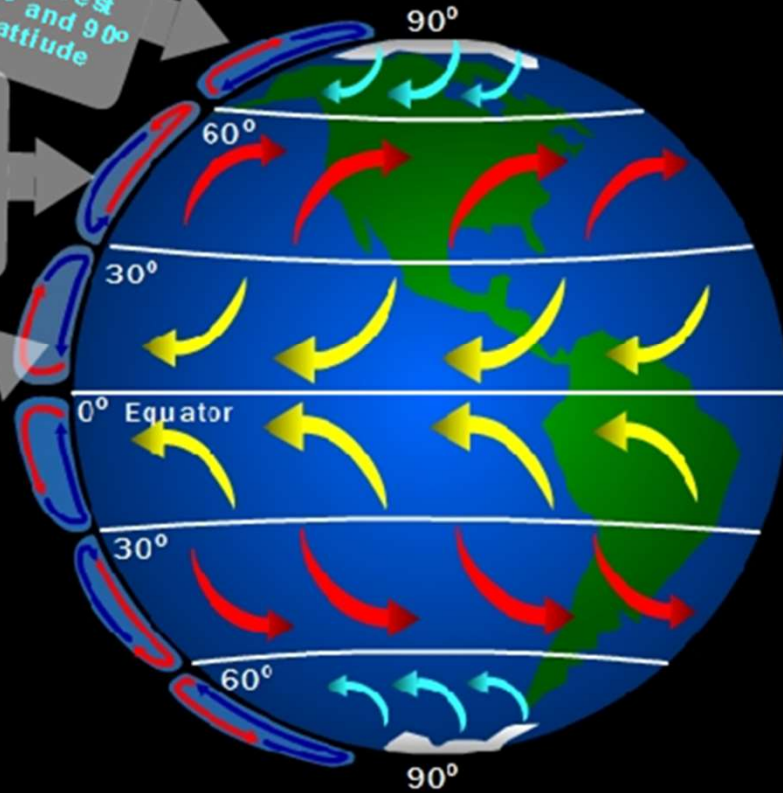
# GLOBAL WINDS

**EASTERLIES**  
Winds that blow from east to west between 60° and 90° degrees latitude

**WESTERLIES**  
Winds that blow from west to east between 30° and 60° degrees latitude

**TRADEWINDS**  
Winds that blow from east to west between 0° and 30° degrees latitude

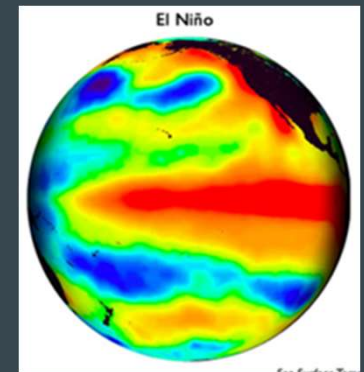
- = Warm Air
- = Cold Air
- ↶ = Tradewinds
- ↷ = Westerlies
- ↶ = Polar Easterlies



# El Niño

- Definition: *an unusual warming of the Pacific Ocean which is linked to impacts on weather and climate patterns around the world.*

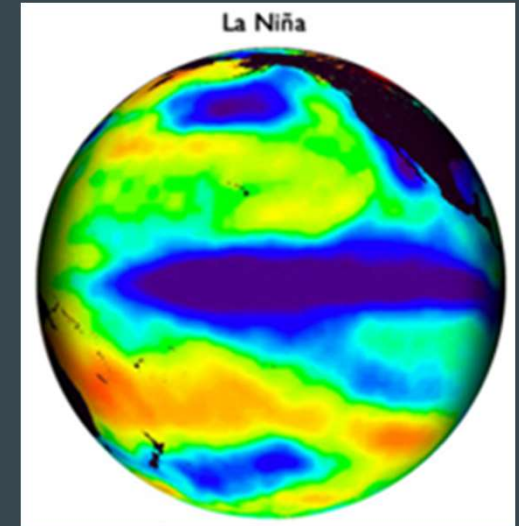
*Brings MORE RAIN/STORMS, and higher temps*



# La Nina

- Definition: *an unusual cooling of the Pacific Ocean which is linked to impacts on weather and climate patterns around the world.*

**GIRLS ARE COOLER THAN  
BOYS**





# 5.L.1.1

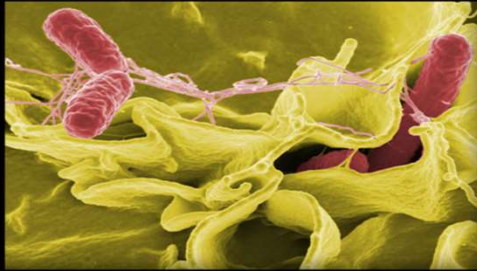
Living Organisms



**Unicellular vs. Multicellular Organisms,  
Levels of Organization**

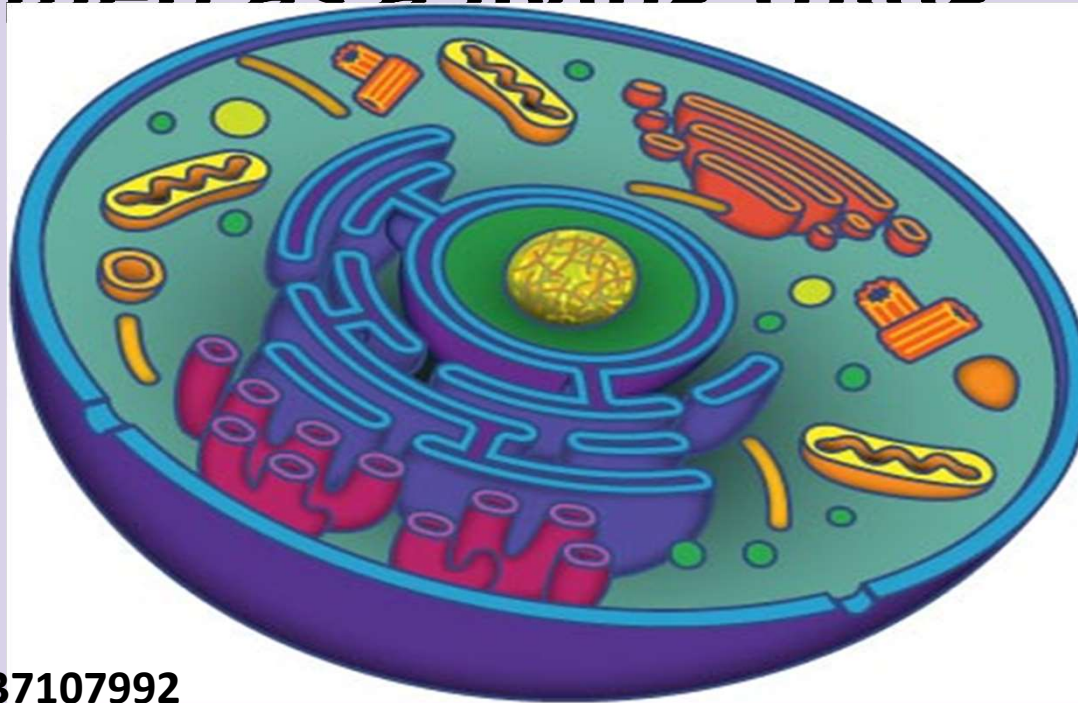
# Organism:

- An organism is something that is living.



# Cells:

- A cell is the smallest unit of life that is classified as a living thing

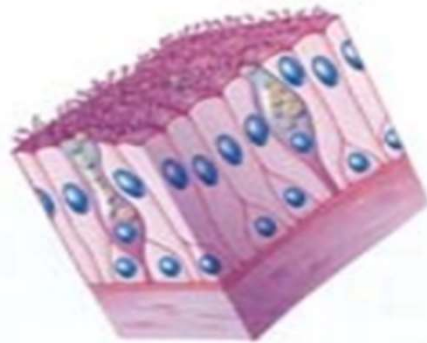


<http://vimeo.com/37107992>

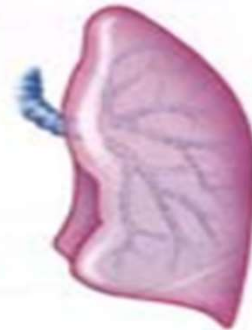
## Levels of Organization



Cell

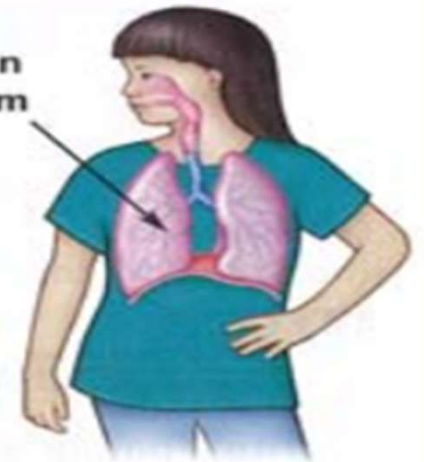


Tissue



Organ

Organ system



Organism

# Structure

## Unicellular Organism

- Body is made up of a single cell

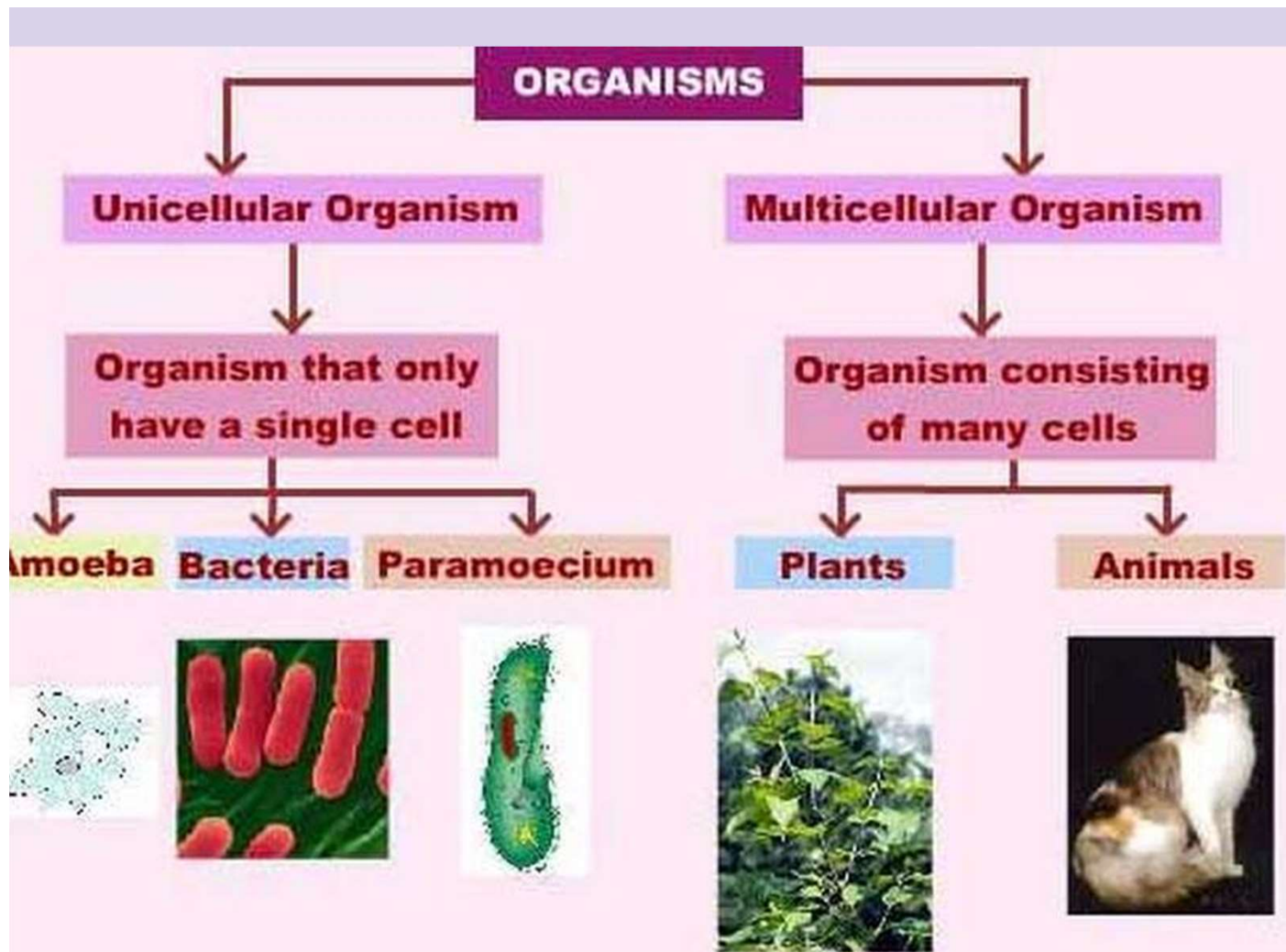


## Multicellular Organism

- Body is made up of numerous cells







All organisms perform the following

## **LIFE FUNCTIONS:**

1. growth
2. movement
3. reproduction (make more of themselves)
4. respiration (breathing/ gas exchange)
5. nutrition (finding food for energy)
6. excretion (getting rid of wastes)

### Unicellular Organisms

- made of one cell
- can survive as a single cell
- each organism performs all life functions within it
- take in materials directly from surroundings
- materials move freely around the cell

### Both

- are made of cells
- **PERFORM ALL 6 LIFE FUNCTIONS**
- move
- grow
- reproduce
- excretion (get rid of wastes)
- get nutrients (energy)
- gas exchange (breathing)

### Multicellular Organisms

- made of more than one cell
- cannot survive as a single cell
- each cell is specialized to perform life functions
- have transport systems to move different materials throughout the body

# 5.L.1.2

Living Organisms



**Human Body Systems**

# The Skeletal System

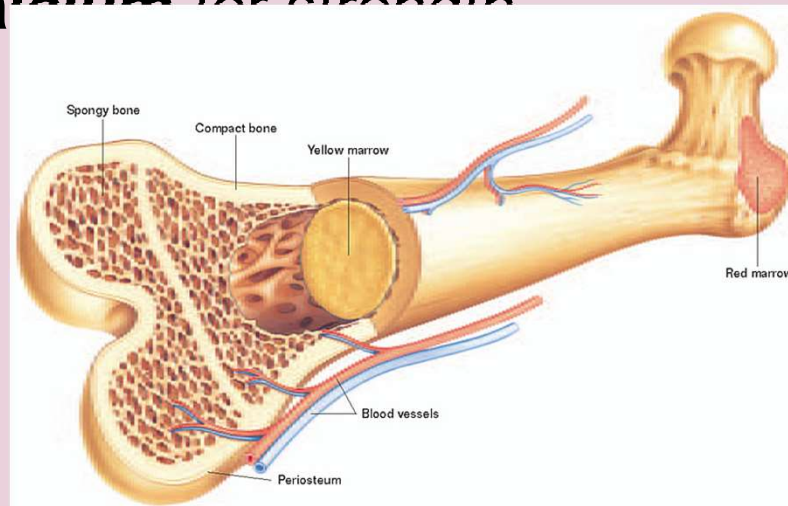
**Purpose:** to provide structure and support to the human body

**Bone marrow** is a soft tissue inside of the bone where new blood cells are generated.

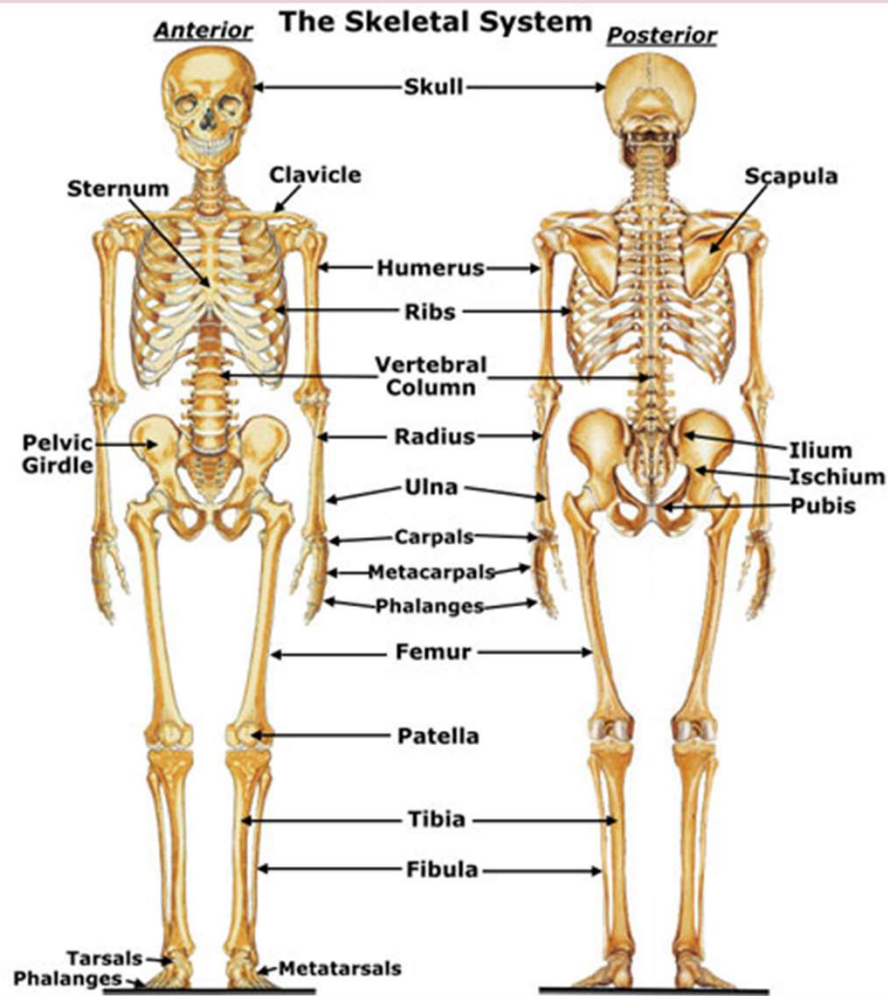
Bones store the mineral **calcium** for strength

## **Major Bones of the Human Body**

- femur (thigh bone)
- humerus (upper arm)
- radius and ulna (lower arm)
- cranium (skull)
- sternum (breastbone)
- clavicle (shoulder blade)
- fibula and tibia (calf)







# The Muscular System

**Purpose:** works with the skeletal and nervous system to produce *movement*, also helps to circulate blood through the human body

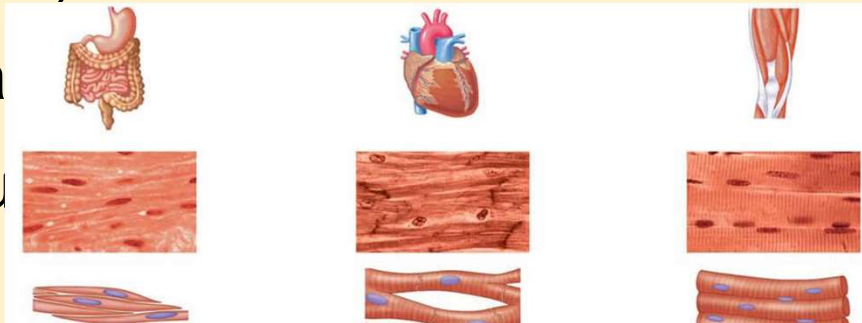
- muscle cells are fibrous
- muscle contractions can be **voluntary** or **involuntary**

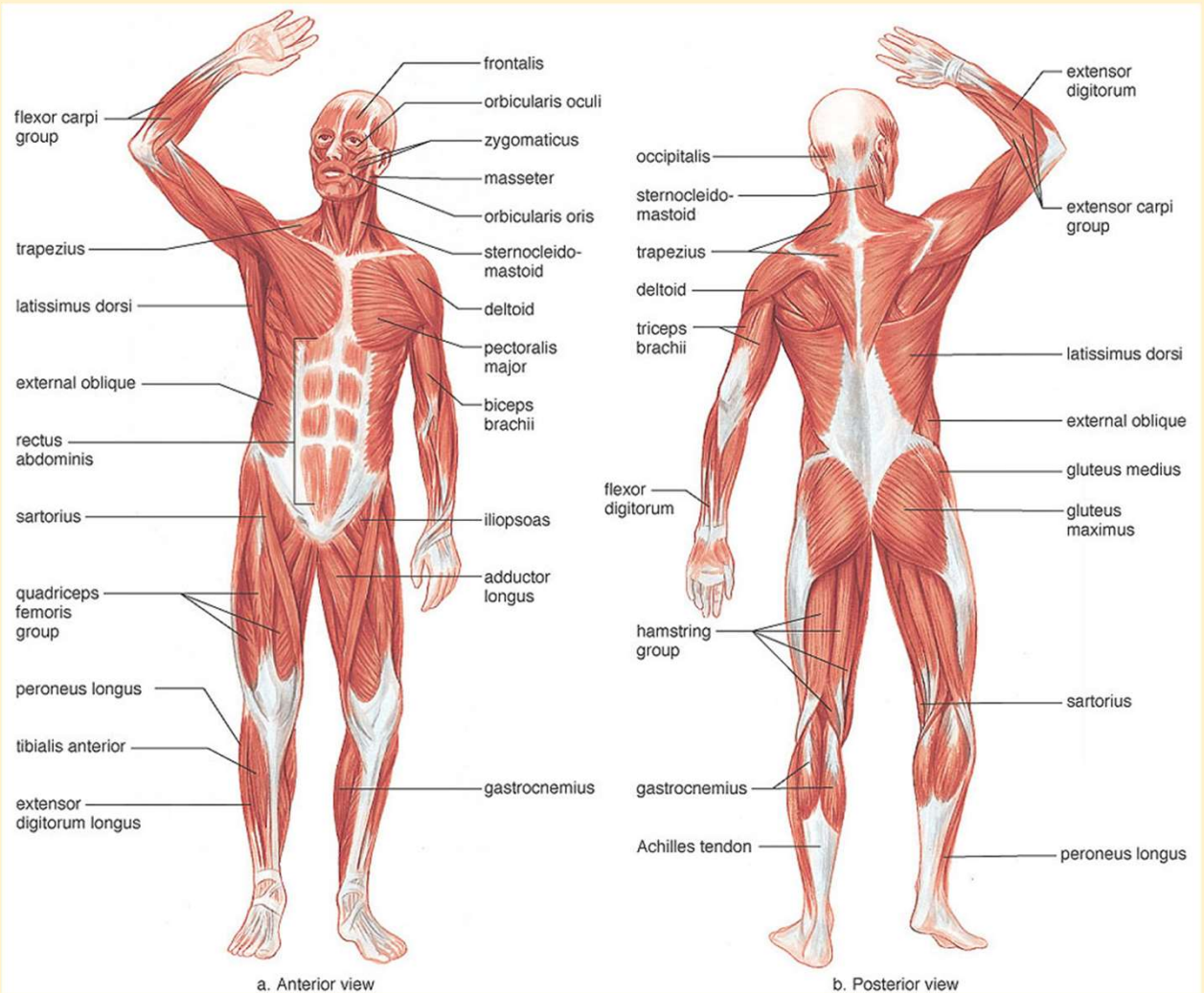
## **Major Types of Muscles in the Human Body**

-- **cardiac muscle** (heart)

-- **skeletal muscle** (attach to bones)

-- **smooth muscles** (found in internal organs)





a. Anterior view

b. Posterior view

# The Nervous System

**Purpose**: to coordinate the body's response to changes in its internal and external environment

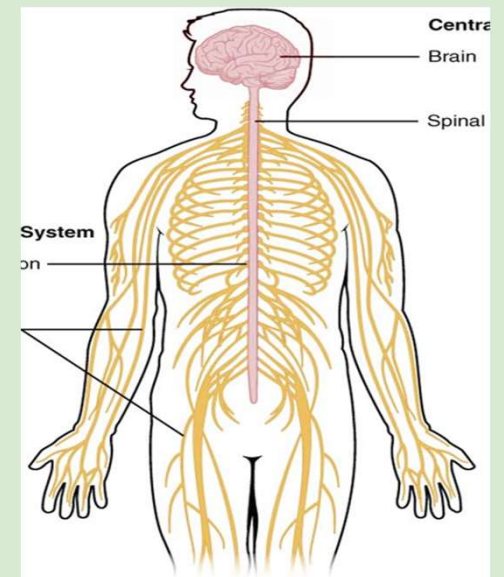
## **Major Organs and Their Functions**

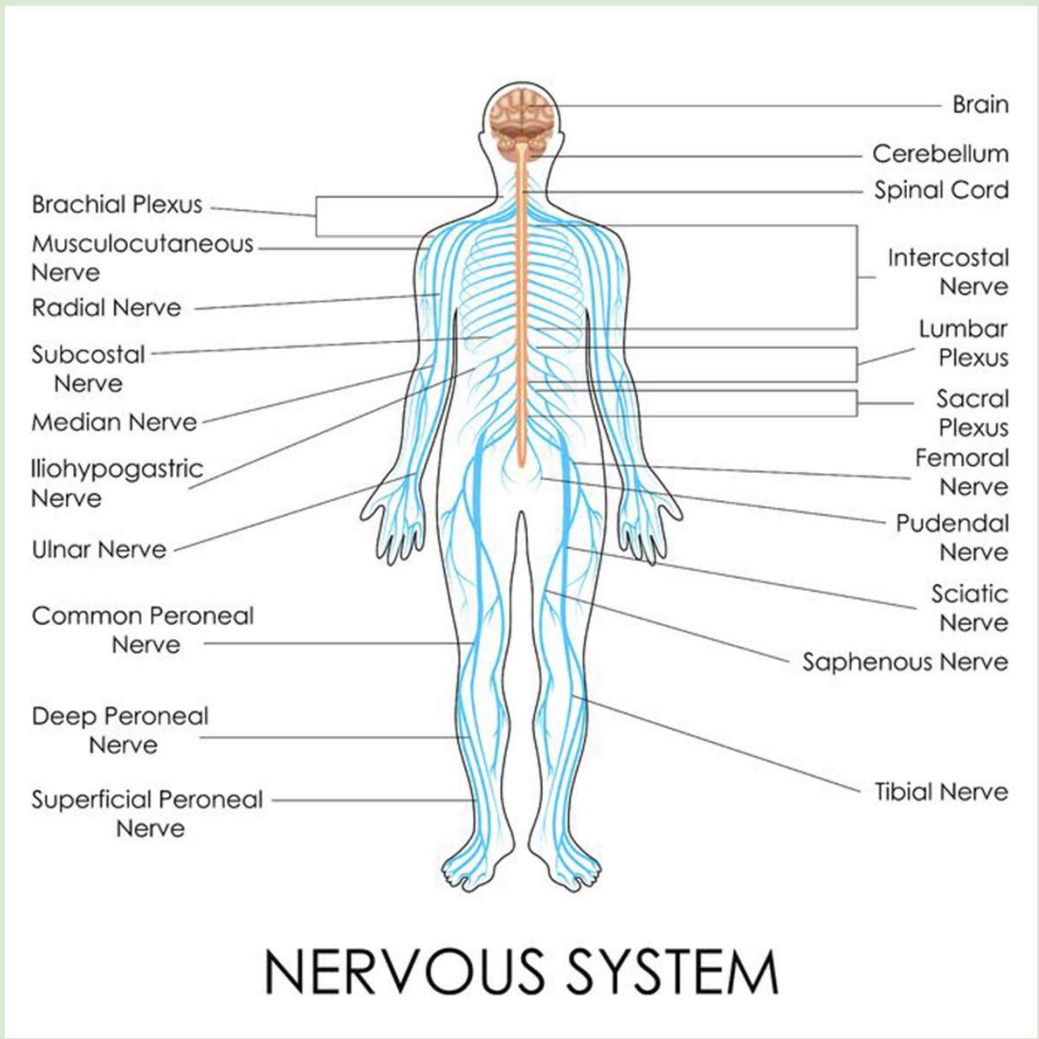
**Brain** – control center of the body, where all processes are relayed through

-- consists of cerebrum (controls thought and senses) and cerebellum (controls motor functions)

**Spinal Cord** – sends instructions from the brain to the rest of the body and vice versa

**Nerves** – conduct impulses to muscle cells







# The Digestive System

**Purpose:** to convert food particles into simpler molecules that can be absorbed into the bloodstream and used by the body for *energy*

## Major Organs and their Functions:

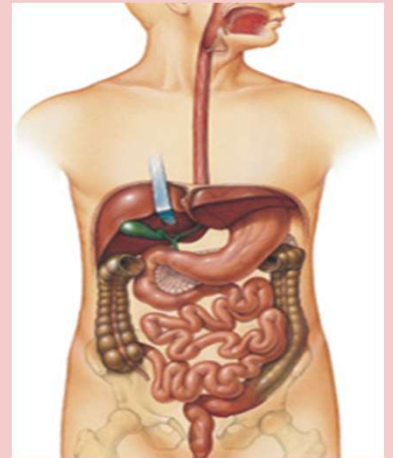
**Mouth** – to chew and grind up food

-- saliva also begins the chemical breakdown

**Esophagus** – pipe connecting mouth to stomach

**Stomach** – secretes an extraordinarily strong acid that leads to breakdown of food

-- once the food is broken down in the stomach and



**Pancreas** – produces the hormone **insulin** that regulates blood sugar levels

-- also help neutralize stomach acid

**Liver** – produces bile, which breaks down fats in foods

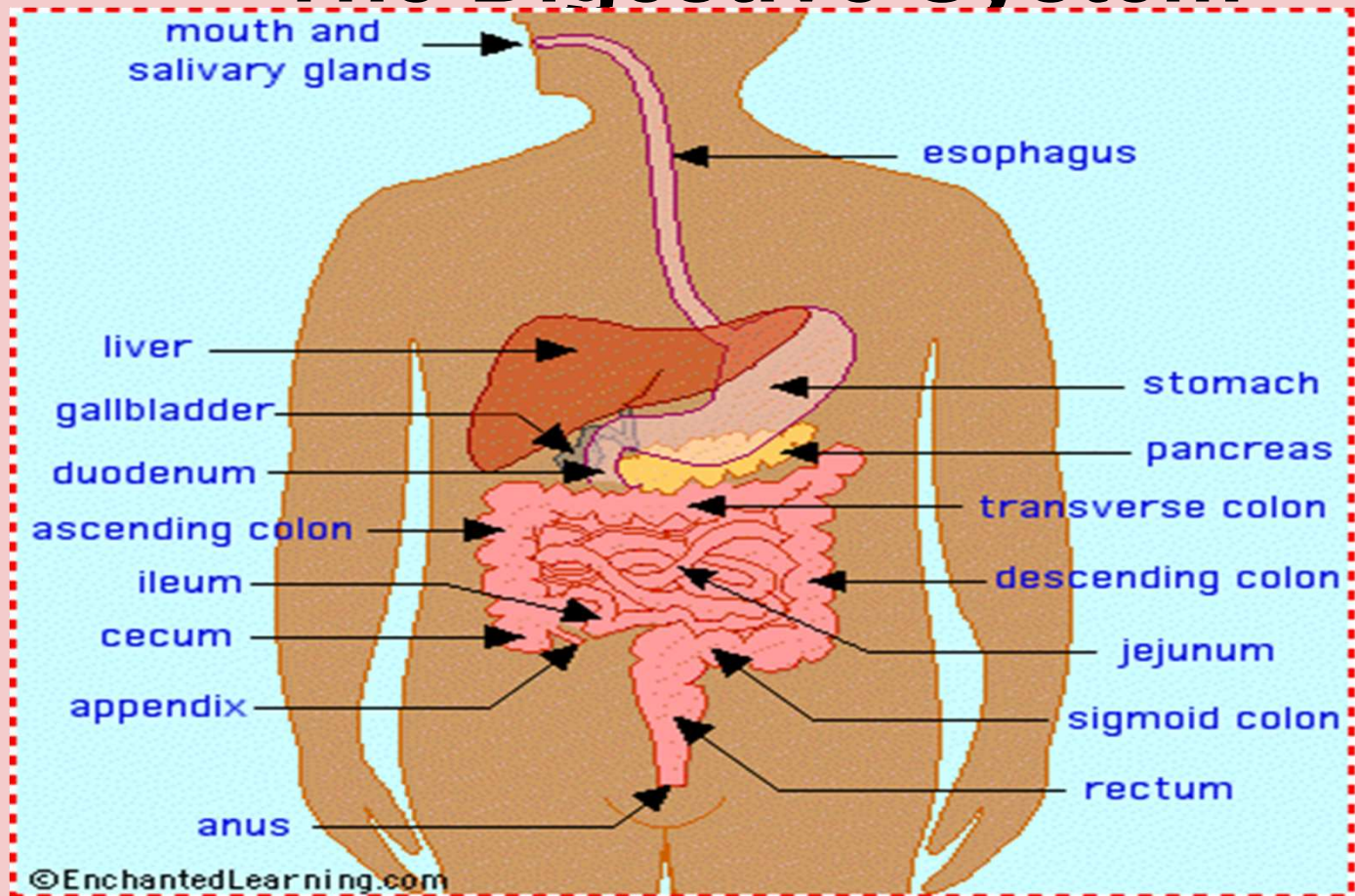
**Gallbladder** – pouch-like organ that stores **bile** for future use

**Small Intestine** – after digestion is complete, the chyme enters the small intestine where it is absorbed into the bloodstream

-- the chyme is propelled along by folded fingerlike surfaces called **villi**, on the intestine

**Large Intestine** – removes water from the chyme and gets the

# The Digestive System



# The Respiratory System

**Purpose:** to provide the body with a fresh supply of oxygen for cellular respiration and remove the waste product carbon dioxide

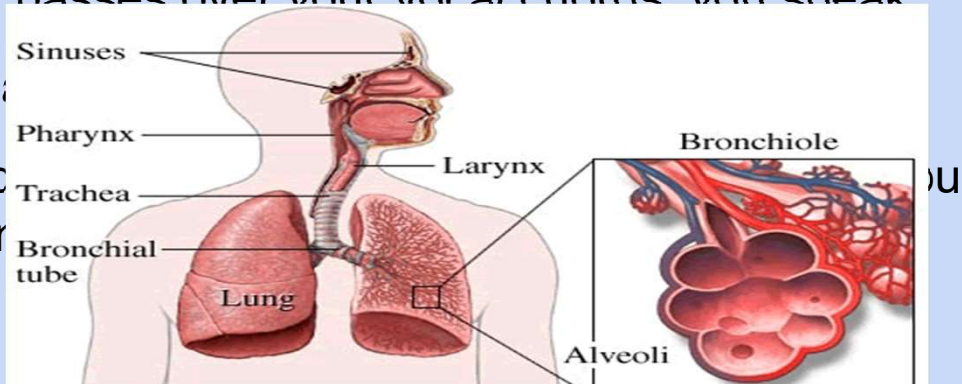
## **Major Organs and Their Functions**

**Nose** – internal entry and exit point for air

**Pharynx** – serves as a passageway for both air and food at the back of the throat

**Larynx** – your “voicebox”, as air passes over your vocal chords, you speak

**Trachea** – the “windpipe”, or what you use to  
-- a piece of skin, called the epiglottis, that  
swallow, preventing food from entering the lungs



**Bronchi** – the two large passageways that lead from the trachea to your lungs (one for each lung)

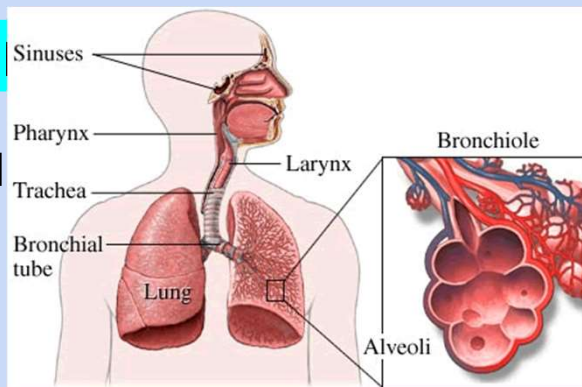
-- the bronchi are further subdivided into bronchioles

-- eventually, the further subdivisions lead to tiny air sacs called **alveoli** in clusters, like grapes

-- capillaries surrounding each alveolus is where the exchange of gases with the blood occurs

The **diaphragm**

-- hiccupping  
diaphragm

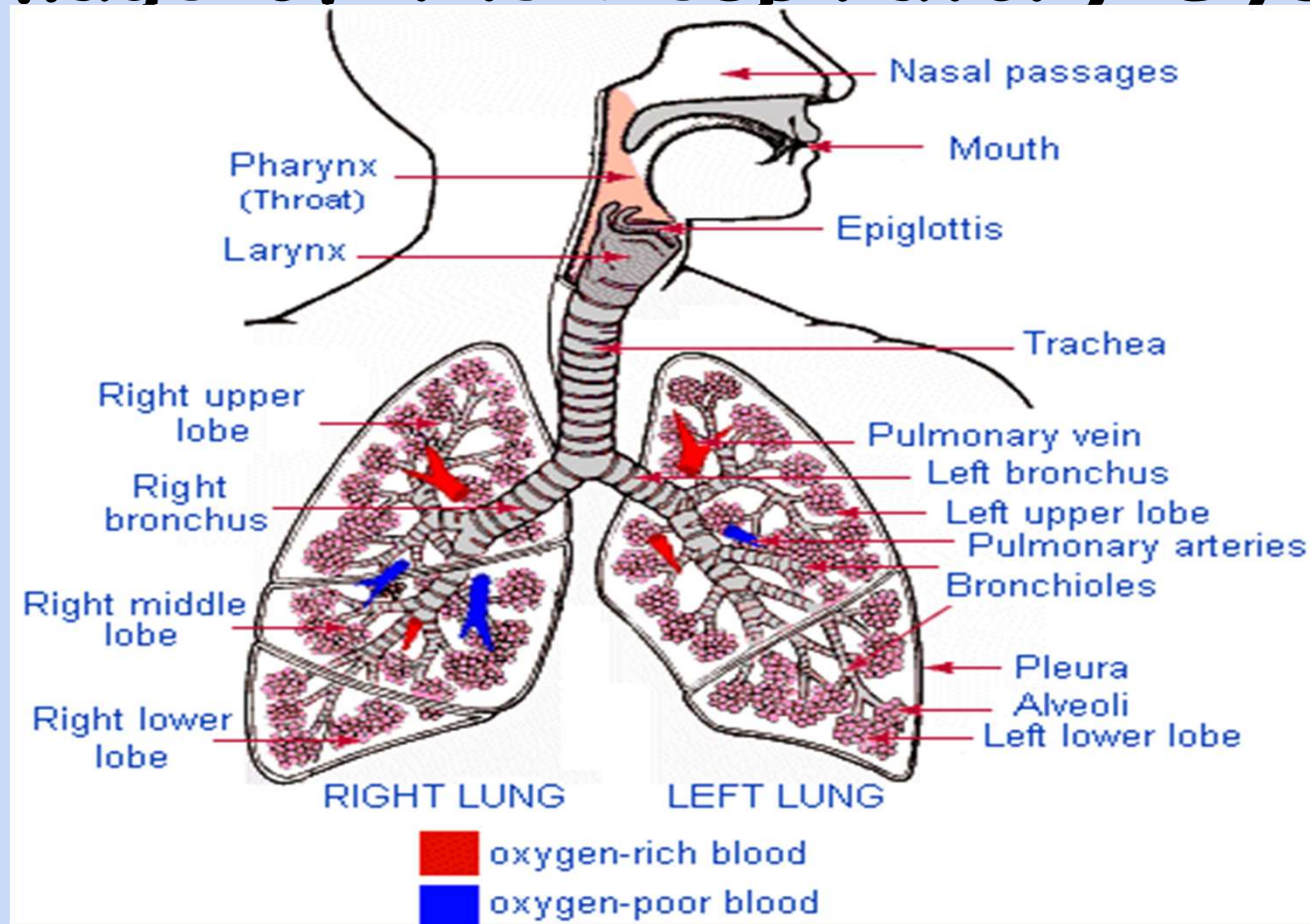


causes you to breathe

contractions of the



# Image of the Respiratory System



# The Circulatory (Cardiovascular) System

**Purpose:** to deliver oxygenated blood to the various cells and organ systems in your body so they can undergo cellular respiration

## **Major Organs and Their Functions**

**Heart** – the major muscle of the circulatory system

- pumps blood through its four chambers (two ventricles and two atria)

- pumps deoxygenated blood into the lungs, where it gets oxygenated, returned to the heart, and then pumped out through the aorta to the rest of the body

**Arteries** – carry blood away from the heart and to the major organs of the body

**Veins** – carry blood back to the heart away from the major organs of the body

**Capillaries** – tiny blood vessels where gas exchange occurs

**Blood** – the cells that flow through the circulatory system

-- red blood cells contain hemoglobin, an iron-rich protein that carries oxygen

-- white blood cells function in the immune system

-- platelets help in blood clotting

# Image of the Circulatory System

