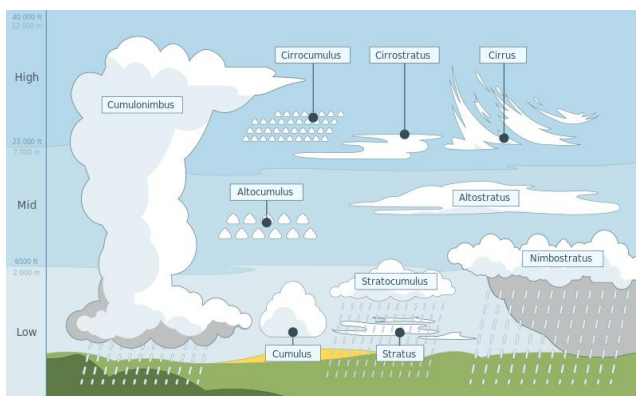
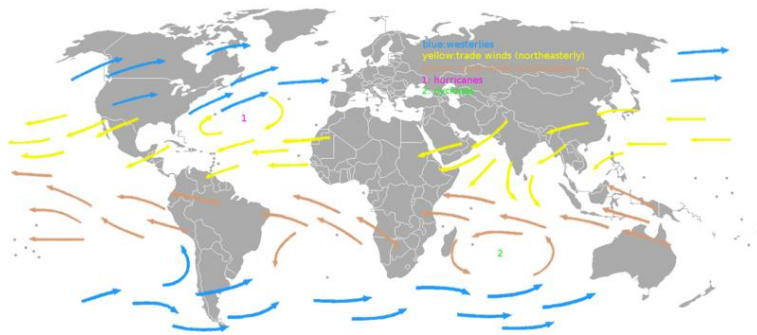
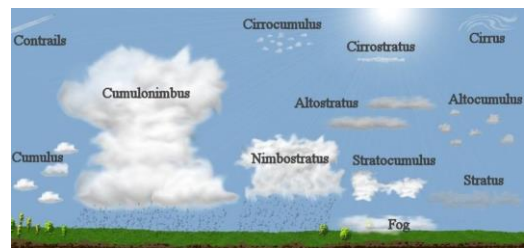
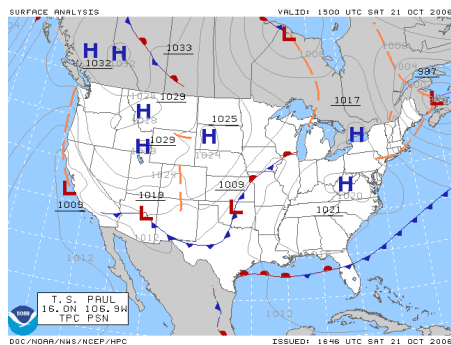


# Earth Science

# WEATHER PACKET

Made By Liesl at [homeschoolden.com](http://homeschoolden.com)





# Weather Unit

The study of the Earth's atmosphere is \_\_\_\_\_.

Scientists study the \_\_\_\_\_ to predict the weather.

To track the current weather, meteorologists use

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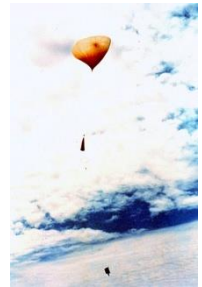
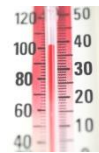
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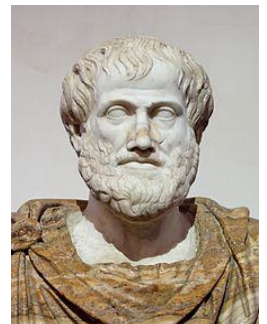


The first time that weather reports were published in a newspaper was in \_\_\_\_\_ in England.

People have studied the weather for thousands of years. In 3,000 BCE, people in \_\_\_\_\_ studied the skies and kept records of cloud formations.

Ancient \_\_\_\_\_ planned their lives around the seasonal flooding of the Nile.

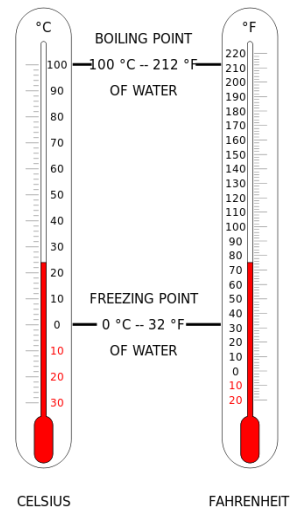
In 350 BCE the Greek philosopher \_\_\_\_\_ wrote that water evaporated from the \_\_\_\_\_ and other bodies of water and returned as rain.





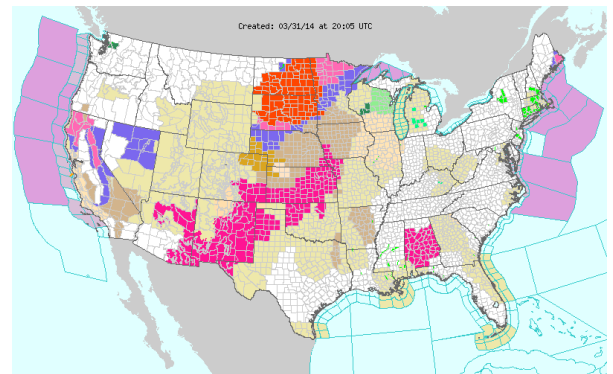
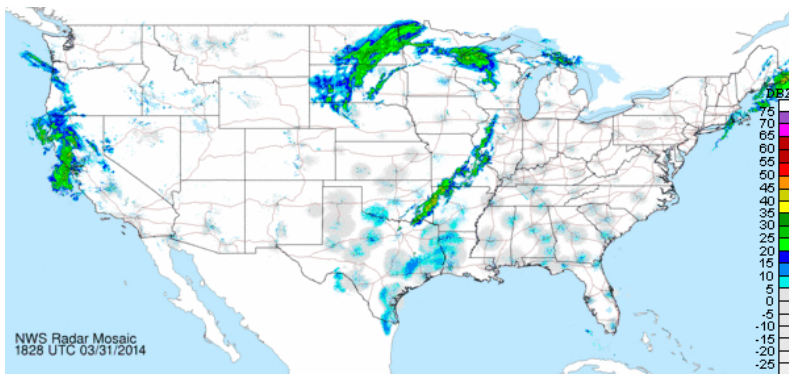
In 1643, an Italian mathematician filled glass tubes with mercury and turned them upside down. He realized that the height of the mercury in the tube responded to pressure changes in the atmosphere. When the mercury dropped, a storm approached. This led to the invention of the \_\_\_\_\_.

In 1714, Daniel \_\_\_\_\_ worked with thermometers and created a scale that set the freezing point at \_\_\_\_\_ degrees and the boiling point of water at \_\_\_\_\_ degrees.



In 1742, Anders \_\_\_\_\_ developed a scale that used \_\_\_\_\_ as the freezing point and \_\_\_\_\_ as the boiling point.

In 1870, President Ulysses S. Grant (former general in the Civil War) signed a bill that created the \_\_\_\_\_ Bureau. In 1970, it was renamed the National Weather \_\_\_\_\_ . Visit <http://www.weather.gov/Radar>



# Weather Unit Answers (pp. 2-3)

meteorology, atmosphere

radar, satellites, thermometers and other devices, ocean buoys, weather balloons, reports from airline pilots

1692

India, Egyptians

Aristotle, oceans

barometer

Fahrenheit, 32, 212

Celsius, 0, 100

Weather, Service

## WHERE WEATHER OCCURS ANSWERS (p. 6)

All weather occurs in the lowest layer of air in the atmosphere, the troposphere. This layer is about 9 miles thick (15 km).

# COOL Weather Facts



70% of all rain occurs over the oceans.

The most rainfall ever recorded in 24 hours is 182.5 centimeters (71.9 inches) in Foc-Foc, La Réunion, (an island in the Indian Ocean) during tropical cyclone Denise on January 8, 1966.

Each raindrop contains 1.7 sextillion molecules. That's 17 followed by 20 zeroes.

60% of the earth's fresh water is frozen in the polar ice caps.

The center or eye of a hurricane is always calm.



The highest snowfall ever recorded in a one year period was 31.1 meters (1224 inches) in Mount Rainier, Washington State, United States, between February 19, 1971 and February 18, 1972.



No two snowflakes are the same. (A scientist photographed over 400,000 snowflakes to prove that fact!)

Most snowflakes are six-sided. Sometimes the six sides are flat, and sometimes six decorative spokes radiate from the centre.

The heaviest hailstone ever recorded weighed 1.0 kg (2.25 lb) and landed in Gopalganj District, Bangladesh on April 14, 1986.



The Earth experiences millions of lightning storms every year. They are incredible discharges of electricity from the atmosphere that can reach temperatures close to 54,000 °F (30,000 °C) and speeds of 60,000 m/s (130,000 mph).

The Empire State Building in New York is sometimes struck by lightning hundreds of times each because it doesn't have a lightning conductor.

The USA has more tornadoes than any other country in the world, averaging around 1200 a year. This is due largely to its unique geography which forms an area in central USA called "Tornado Alley" which is frequently hit by tornadoes.



A tornado in the United States picked up a 9 month old baby called Joshua Walls and carried him for 270 meters (885 feet or more than 1/10 of a mile) before putting him down unharmed.



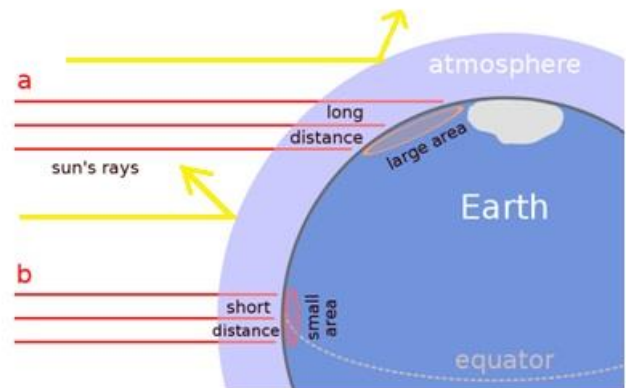
# WHERE WEATHER OCCURS

All weather occurs in the lowest layer of air in the atmosphere, the \_\_\_\_\_. This layer is about \_\_\_\_\_ miles thick (15 km).

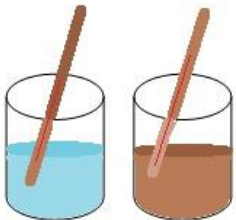
## SUN'S ENERGY HEATS UNEVENLY

**Sun's Energy:** Most of the sun's energy is lost in space. Of the energy that does reach Earth, about 3/10s is reflected out into space. Some of the energy of the sun is absorbed in the atmosphere. For example 25% is absorbed and reflected by clouds while 20% is absorbed and reflected by air.

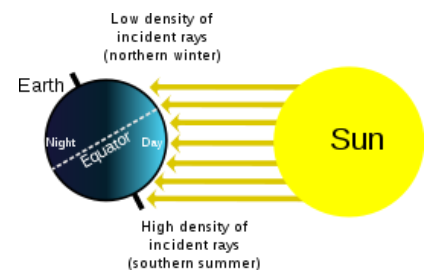
The remaining energy warms the land and oceans. The amount of sun that reaches Earth is not the same everywhere. Sunlight is spread over a greater area in the polar areas. That makes it more difficult for the sun's rays to heat the polar regions.



### Land and Water Absorb Heat Differently:



Fill two cans, one with water and one with soil. Place a thermometer in each of the cans. Place the cans in the shade, wait 10 minutes and record the temperature. Then place the cans in the sun or under a lamp. See which can heats up faster. Then place the cans back in the shade and see which cans lose heat faster.



# AIR MASSES

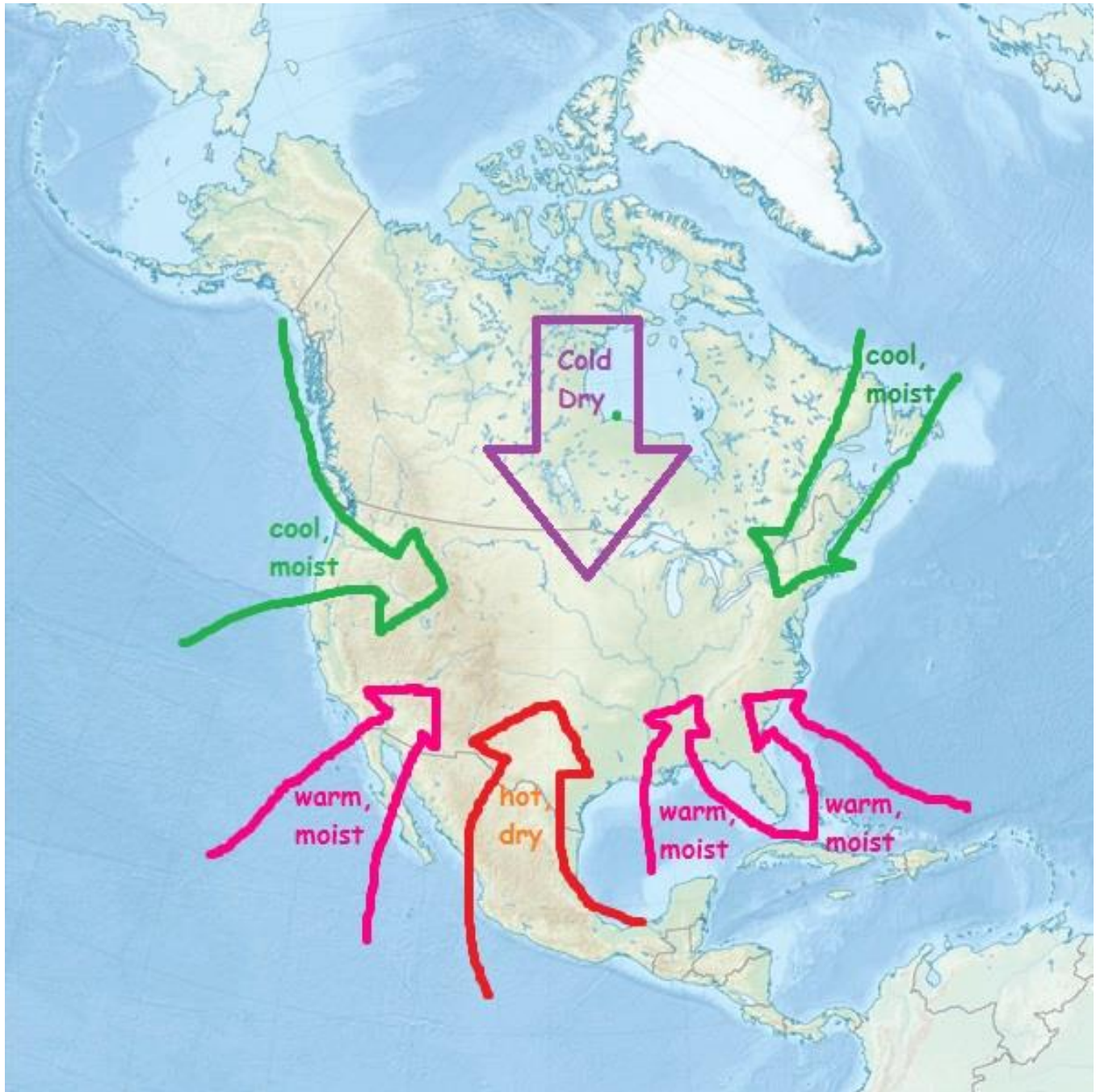
Huge bodies of air form and move over Earth's surface. These air masses have the same general properties as the land or water over which it forms. A large body of air that has the same characteristics throughout is called an air mass.

Moist air masses form over water. Air masses that form over land are generally dry. Air from the poles are cold and air from the tropics or areas near the equator are warm.

On the map below, draw in the air masses that form over North America:



# AIR MASSES

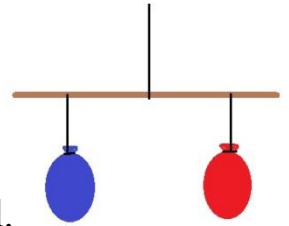






# THE EARTH'S ATMOSPHERE EXPERIMENTS

## Air Has Weight!



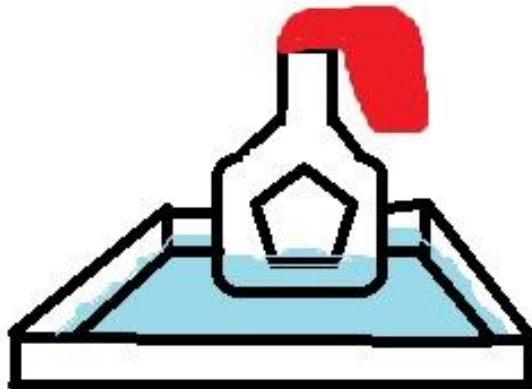
Place two inflated balloons suspended off a ruler so they are balanced.

Deflate one by putting a pin in it. Are they still balanced or is one side heavier?

## Warm Air Rises

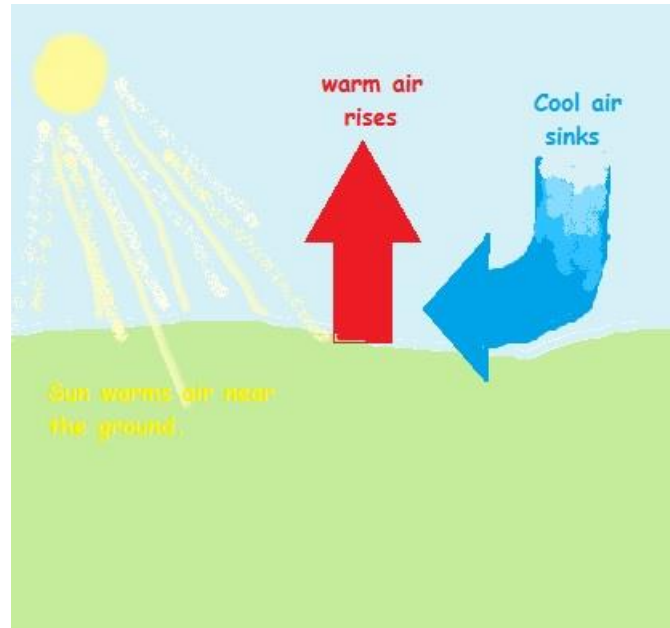
Heat causes air to expand and become less dense. The air then rises, leaving an area of low pressure. Cool air is denser and sinks and replaces the air that has risen. The replacement of warmed air by cooler air is called a convection current.

Place a balloon on the top of a bottle. Put a rubber band around the balloon to ensure that the fit is tight. Pour hot water in the pan. Place the bottle in the pan and observe what happens. Then place the bottle and balloon in the fridge or in a tub of ice and observe what happens.

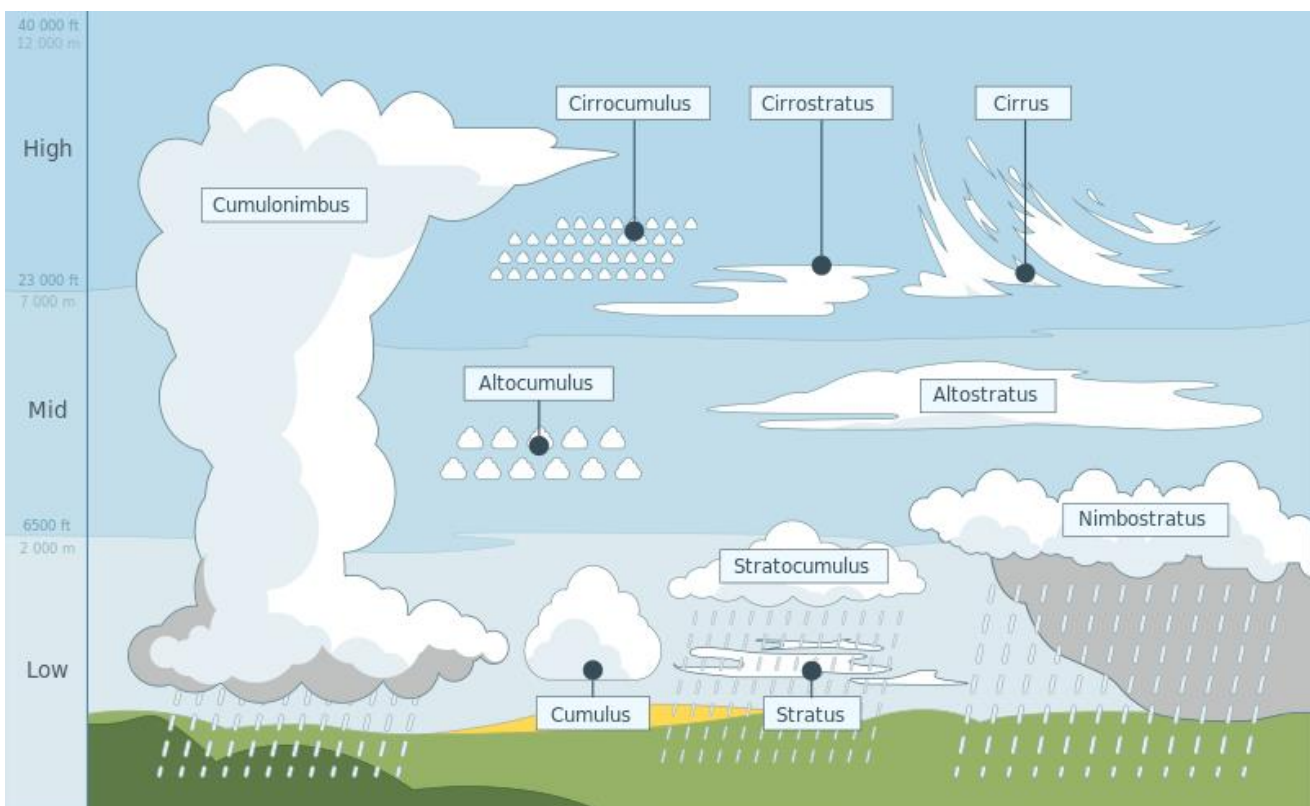


# WARM AIR RISES☁

The sun heats up the ground, which warms the air close to it. The warm air is lighter or less dense, so it rises. This creates an area of low pressure. Cool air moves in to take its place. The dense, cool air presses heavily on the ground so an area of high pressure or a high develops.



As warm air rises, it cools. Clouds form and often it rains. This is why low pressure usually means bad, unsettled weather with strong winds.



# AIR PRESSURE

Put hot tap water in a bucket. Place an empty water bottle into the bucket and leave it there for 2 minutes. Then put the lid on. Remove the bottle from the water. Pour the water out of the bucket and place very cold water in the bucket. Place the water bottle in the bucket without removing the cap. Does anything happen to the bottle? Listen as you remove the cap.

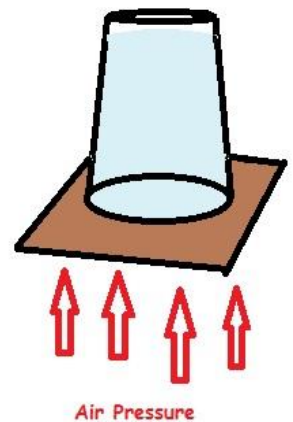
When air is warmed, it \_\_\_\_\_.

What happens when you take a water bottle from a high altitude to a low altitude? Why?



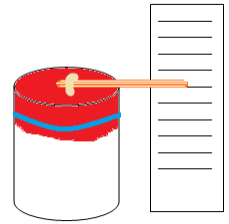
## AIR PRESSURE EXPERIMENT:

Another experiment to show that air pressure exists: Fill a glass with water, place a piece of cardboard over the top. Holding the cardboard, turn the glass upside down. You'll find that the air pressure up on the cardboard is enough to keep the water from falling out of the glass.




# CREATE A BAROMETER


Cut a piece from a balloon. Stretch it over the neck of a can or jar. Hold the balloon in place with a rubber band. Cut one end of a straw to make a pointer. Tape the other end of the straw to the middle of the balloon. Mark a scale on some cardboard and stand it beside your barometer. As the pressure inside and outside of the can/jar changes, the pointer will move up or down.



# WEATHER FRONTS

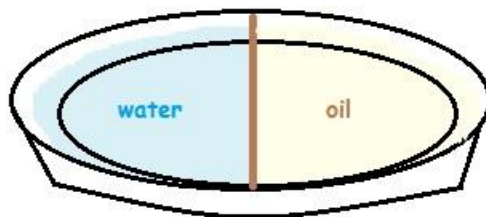
When two air masses meet, they usually don't mix. They form a border called a front. Most weather occurs along these fronts.

The symbol for a cold front looks like this:  The air behind the triangles is colder.

A line with half-circles is the symbol for a warm front.  The air behind the half-circles is warmer.

The circles or triangles point in the direction the front is moving.

# FRONTS ❄️ EXPERIMENT



Place a clay barrier down the middle of a pie plate. On one side add colored water. On the other place oil. Kneel and watch what happens to the water and oil when you gently remove the clay barrier. The water slowly moves under the layer of oil. Similarly, cold air masses are more dense than warm air and generally moves under and lifts the warmer, less dense air mass.



WARM FRONT:

COLD FRONT:

STATIONARY FRONT:

OCCULDED FRONT:

# WIND

Wind is the movement of air from area of high pressure to an area of low pressure. Wind carries an air mass from one region to another. Some winds form because of local differences in air pressure. Other winds occur on a larger scale and are more constant.

## AIR MOVEMENT IN YOUR HOME

Warm air molecules move around faster and tend to move away from each other. Cool air molecules are closer together and thus are heavier. Warm, lighter air rises while cool air sinks.



Try holding a pencil with a piece of paper attached to it with a thread. Hold an outside door open about two inches. What direction does the hanging paper blow? Can you explain why?

# WIND

Uneven heating of the Earth's surface produces air masses of different temperatures. Warm air rises. Cold air is heavier than warm air, so it sinks. The upward movement of warm air produces updrafts.

At the surface, two places can have differences in temperature and therefore differences in air pressure. These differences cause air to move from the area of high pressure to the area of low pressure. This horizontal movement is called wind.

Make a wind sock or go observe an outdoor flag and decide what the wind speed is according to the Beaufort Scale:

Beaufort Wind Scale	
Force 0	Calm
Force 1	Light Air
Force 2	Light Breeze
Force 3	Gentle Breeze
Force 4	Moderate Breeze
Force 5	Fresh Breeze
Force 6	Strong Breeze
Force 7	Near Gale
Force 8	Gale
Force 9	Strong Gale
Force 10	Storm
Force 11	Violent Storm
Force 12	Hurricane

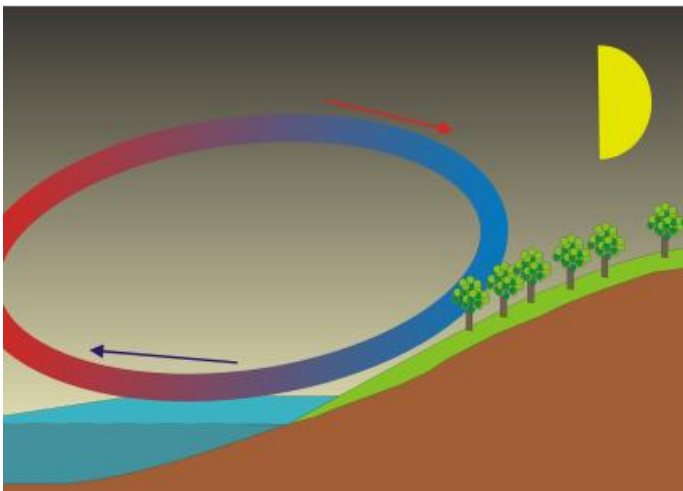
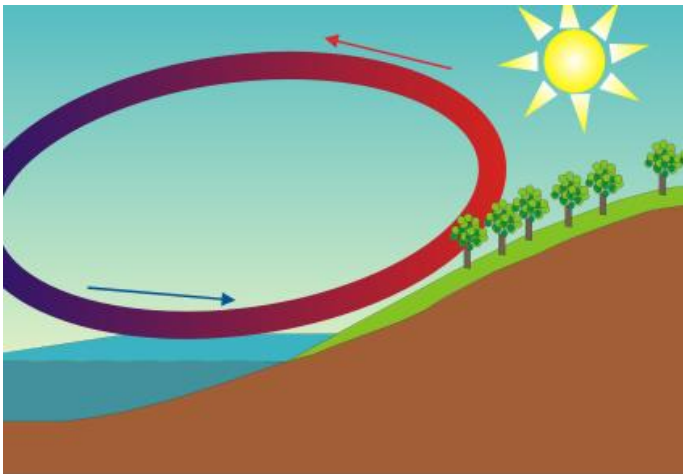
0: No movement of wind

2: Leaves rustle, wind vanes move, wind felt on face

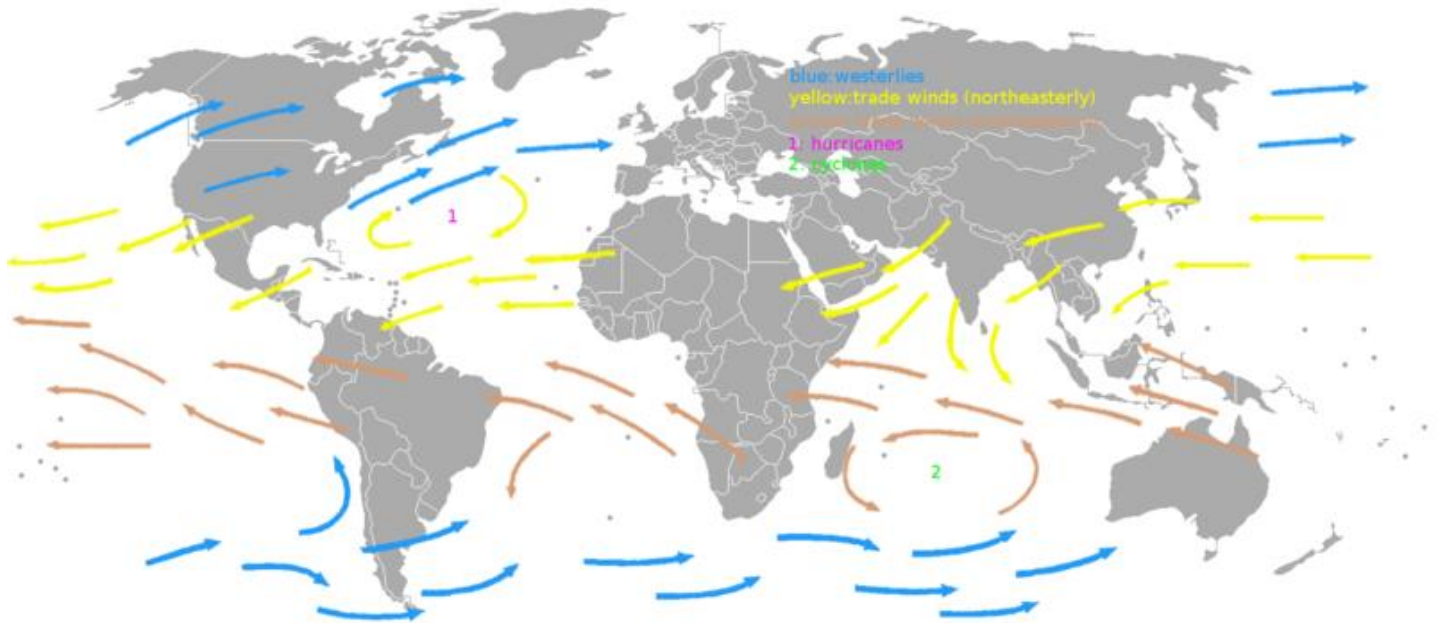
4: Dust and paper blow, small branches sway

6: Umbrellas are hard to open, large branches sway

Local Winds: Explain what is happening during the daytime and night at the sea:

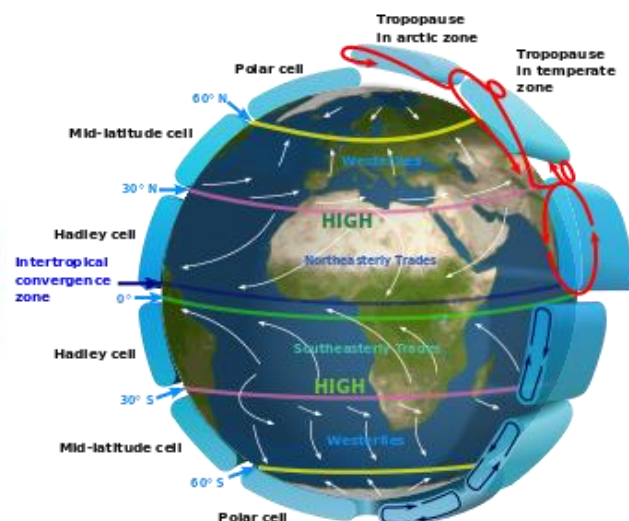
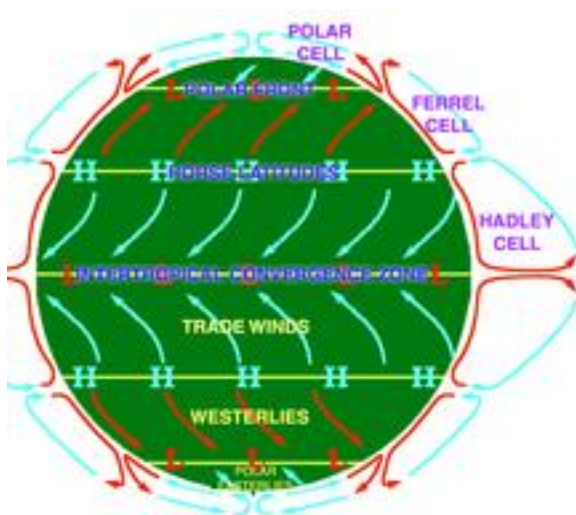


**Prevailing Winds:** Some winds occur on a large scale and are caused by the uneven heating of the Earth. They move the air masses that cause the weather. There are a number of wind belts that circle the globe. These winds always blow in the same direction.



Prevailing winds blow predominantly from a single general direction over a particular point on the Earth's surface.

In the age of sailing ships, sailors relied on prevailing winds to carry them across the oceans. These winds enabled a round-trip trade route for sailing ships crossing the Atlantic and Pacific Oceans.





Cumulus



Cumulonimbus



Alto cumulus Cloud

characterized by globular masses or rolls in layers or patches, the individual elements being larger and darker than those of cirrocumulus and smaller than those of stratocumulus



Contrail



## Stratus Cloud

flat, hazy, featureless clouds of low altitude varying in color from dark gray to nearly white. they exist something like a sheet across a large area identified by their fog-like appearance, lacking the distinguishing features of most clouds



## Nimbostratus

Nimbostratus is a major precipitation cloud - the true rain clouds- They often have very few visual features.



## Altostratus

generally uniform gray to bluish-green and sheet or layer. It is lighter in color than nimbostratus and darker than high cirrostratus. The sun can be seen through thin altostratus, but thicker layers can be quite opaque.



## Stratocumulus

large dark, rounded masses, usually in groups, lines, or waves



## Cirrus

thin, wispy clouds

Cirrus clouds merging to cirrocumulus clouds



## Cirrostratus

high, very thin, generally uniform

stratiform genus-type of cloud, composed of ice-crystals



## Cirrocumulus

high, very thin, generally uniform stratiform genus-type of cloud, a great sheet of ice particles above the surface, may look like wind-blown gauze. The sun or moon is always visible through this thin layer of ice crystals.



## Cirrocumulus

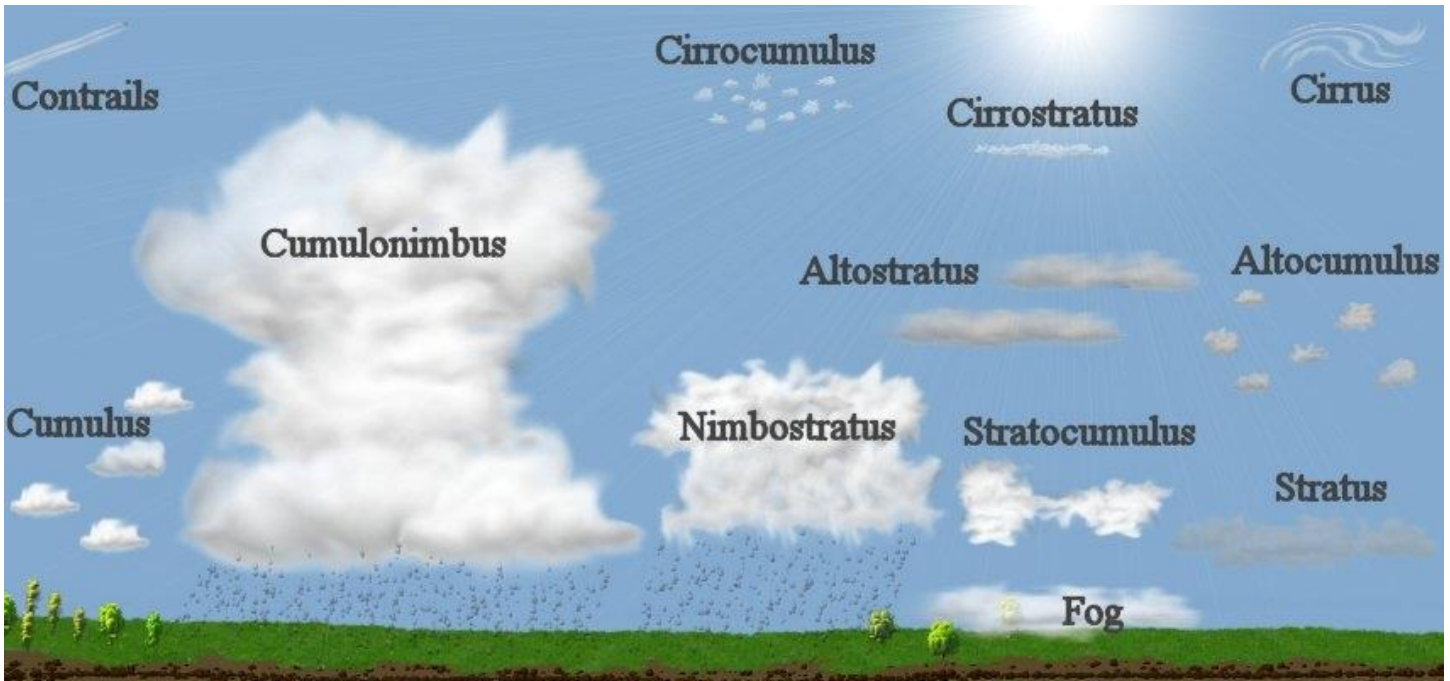
form in patches and cannot cast shadows. patchy clouds that often make patterns





# CLOUD LOG

Try to spot all the different types of clouds!



Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

What is the weather like?

Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

What is the weather like?

Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

What is the weather like?

Date: \_\_\_\_\_

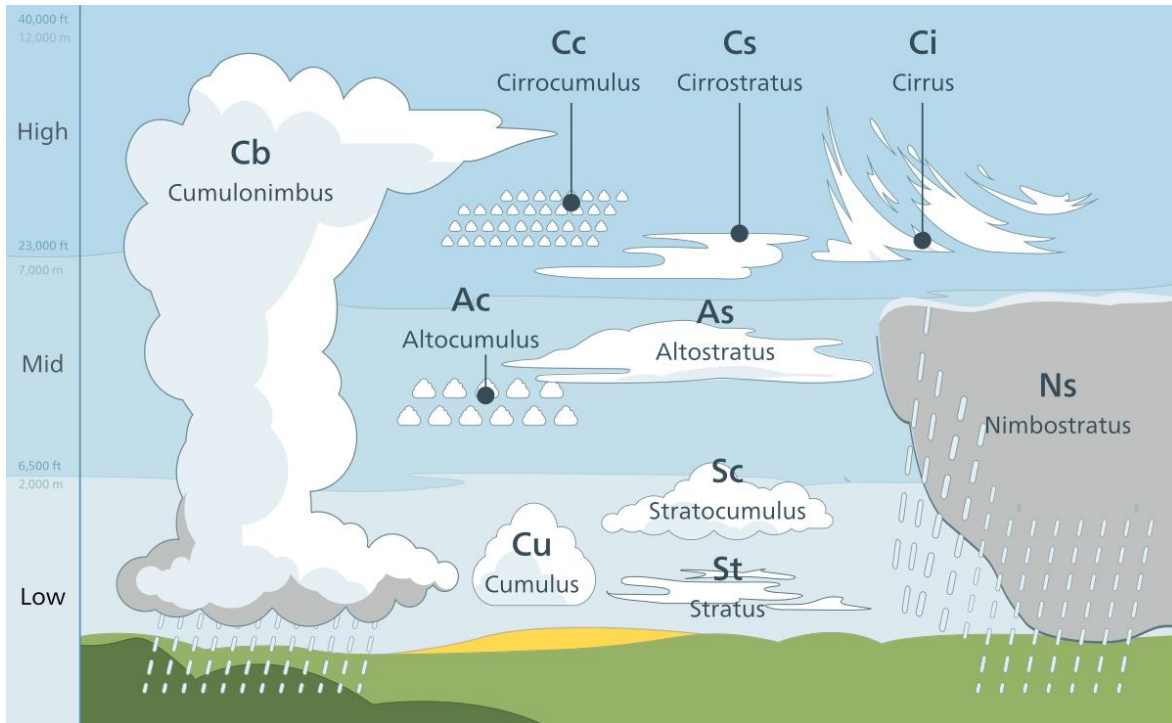
Cloud type: \_\_\_\_\_

What is the weather like?



# CLOUD LOG

Try to spot all the different types of clouds!



Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

What is the weather like?

Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

What is the weather like?

Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

What is the weather like?

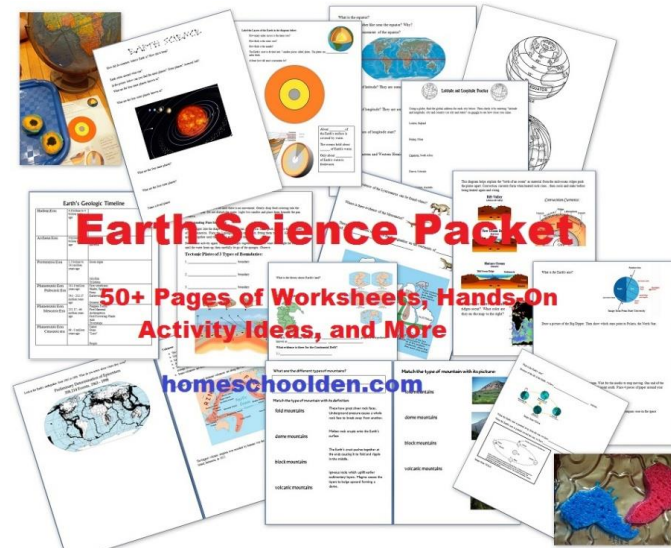
Date: \_\_\_\_\_

Cloud type: \_\_\_\_\_

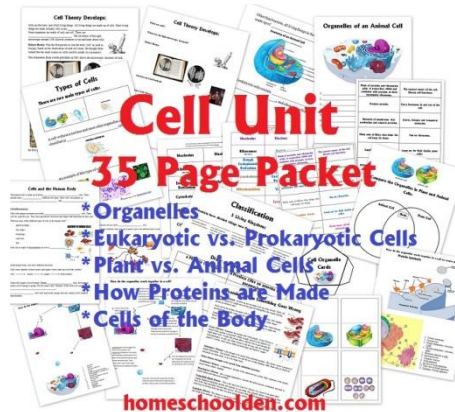
What is the weather like?

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**Earth Science Packet:** Plate Movement, Earthquakes  
Volcanoes and more!



**A Study of Cells Packet**

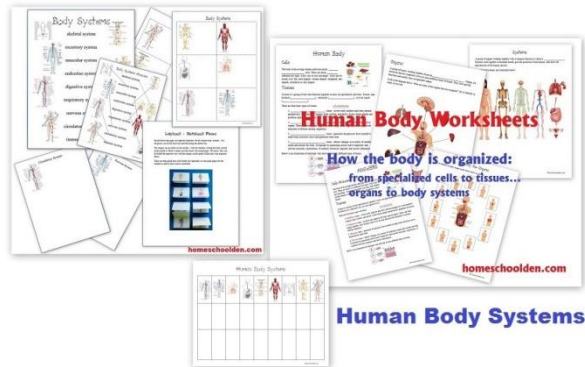


**Simple Machines Packet**

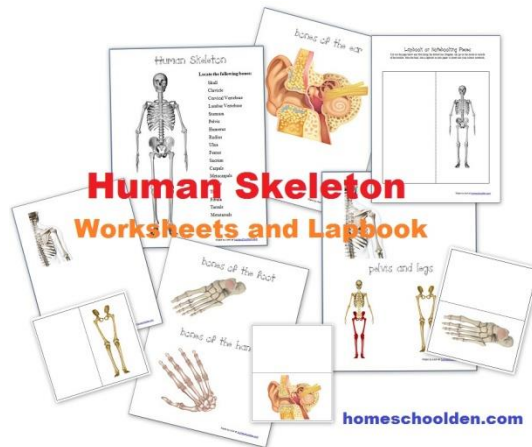


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**Human Body Systems**



**Skeleton Lapbook and Notebook Pages**

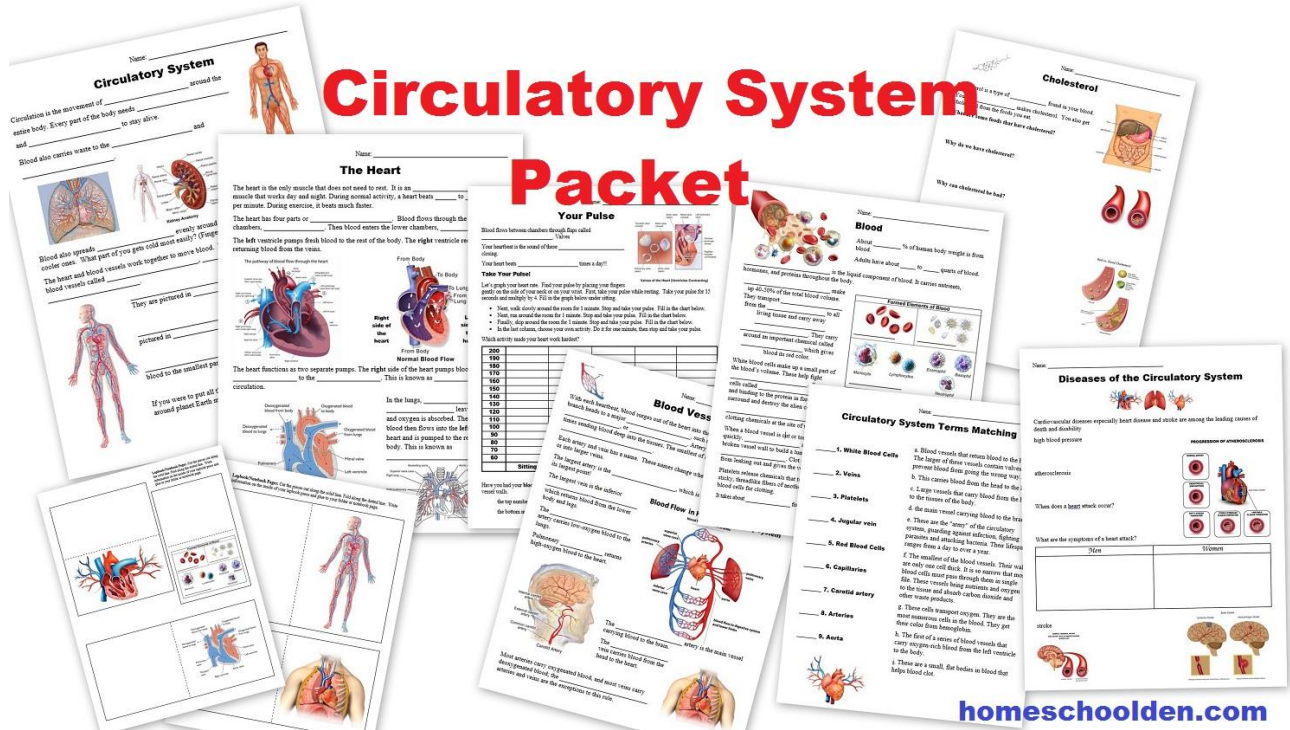


**Digestive System Pack**

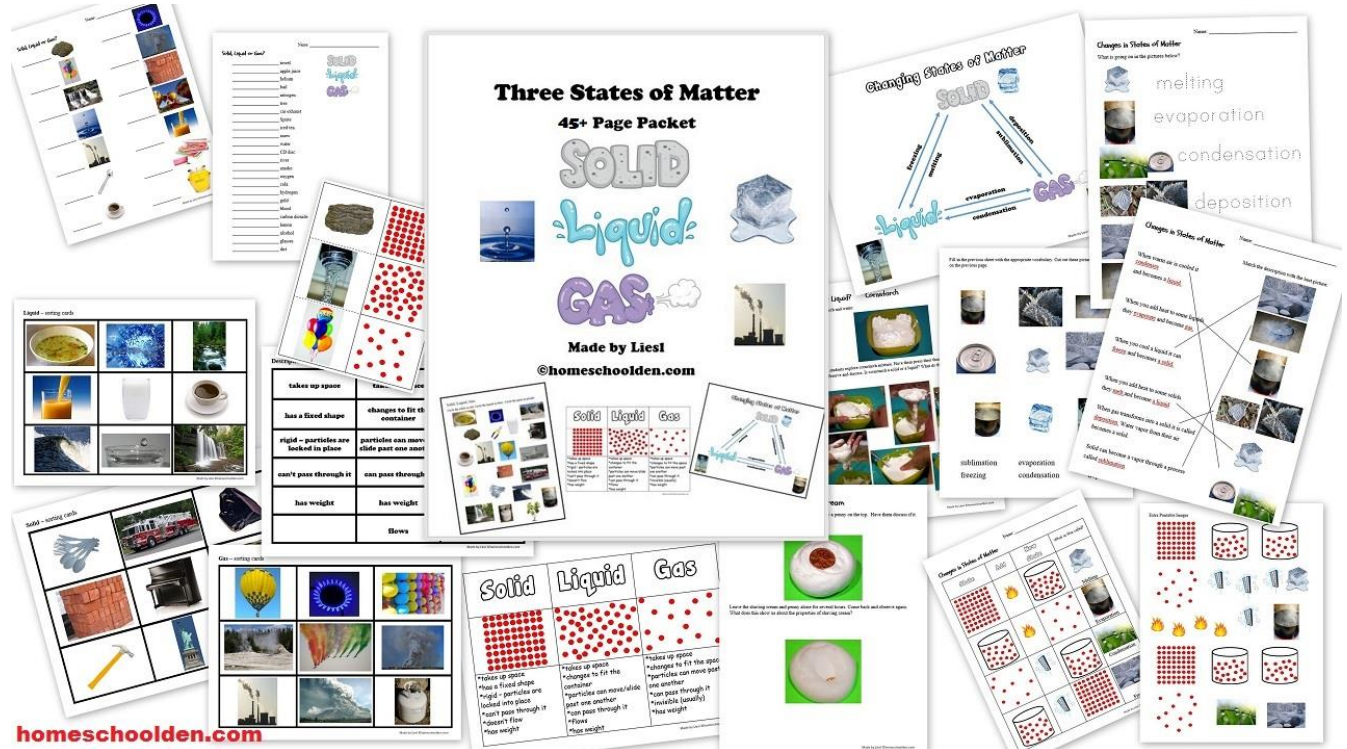




# Circulatory System Packet



# States of Matter Packet

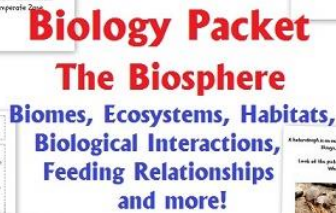




(5 vertebrate groups, characteristics of animals, invertebrate  
ack activities, domesticated vs. wild animals

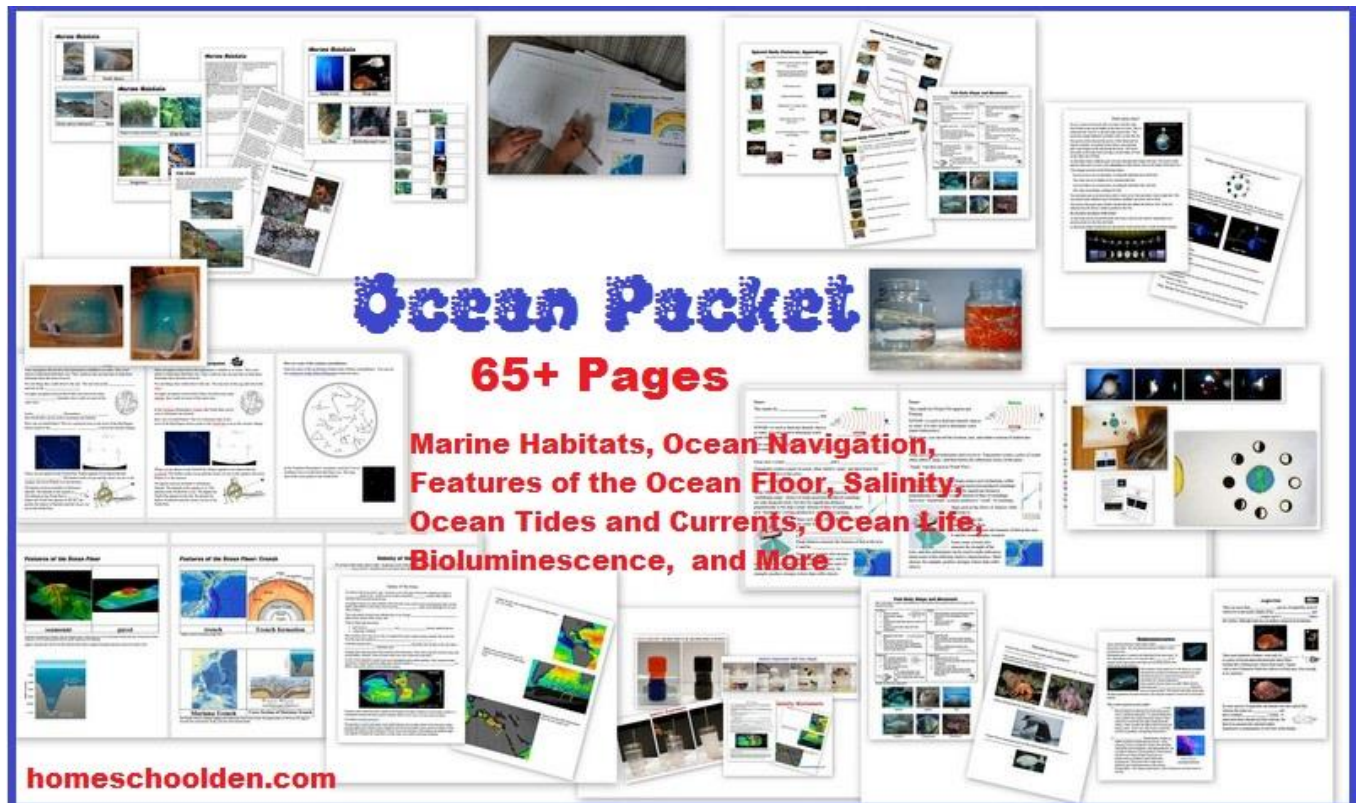


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# **Ocean Packet**



**Ocean Packet**

**65+ Pages**

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**Civics and Government Packet:**



**American Revolution Packet** (A Study of the causes of and events leading to the American Revolution such as the French & Indian War, Sugar & Molasses Acts, Stamp Act, Boston Massacre, Townshend Acts, Boston Tea Party, Lexington & Concord and more)

**Causes and Events Leading to the  
AMERICAN REVOLUTION**

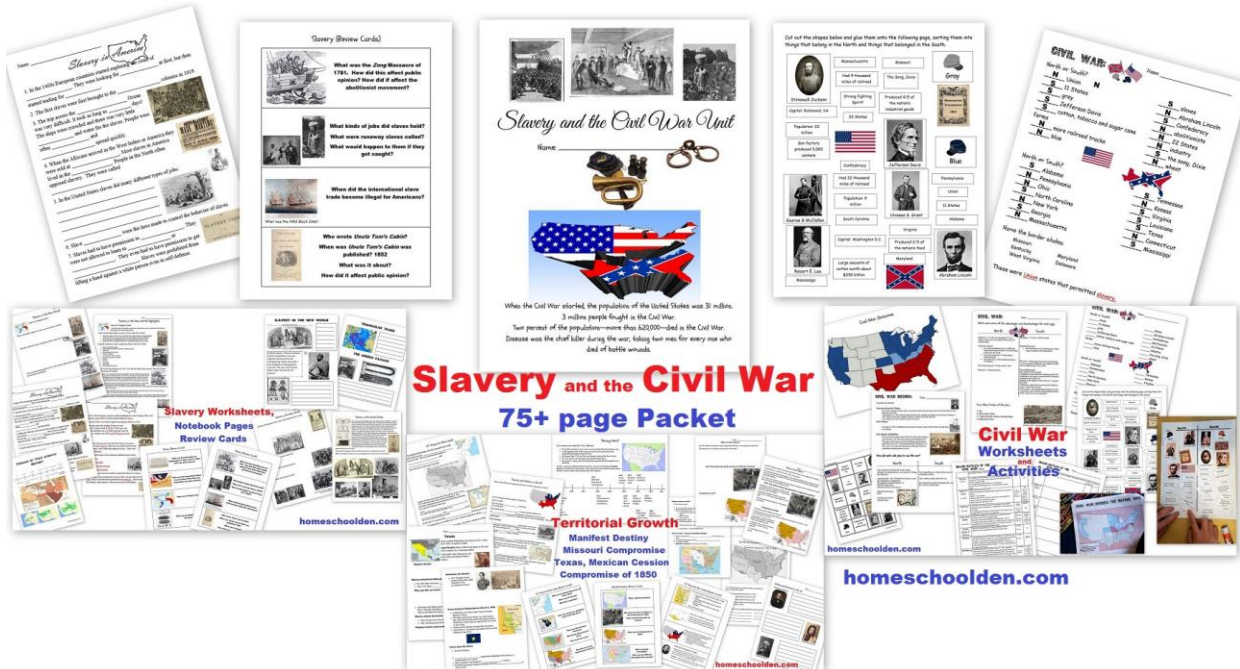
**Highlighting:**

**30-Page Packet**

**The French and Indian War  
Albany Plan  
Sugar and Molasses Acts  
Pontiac's Rebellion  
Proclamation of 1763  
Stamp Act  
Sons of Liberty  
No Noble Men of Boston  
Townshend Acts  
Tea Act  
Boston Tea Party  
Intolerable Acts  
First Continental Congress  
Battles of Lexington and Concord**

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# Slavery and the Civil War Packet



# World Facts Packet:

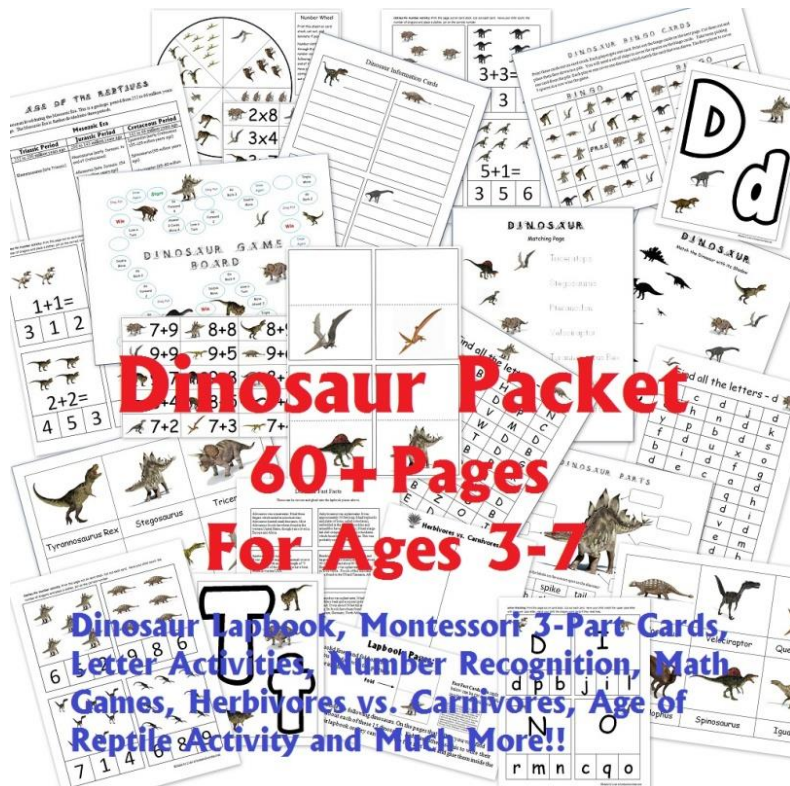
- \*Largest countries
- \*Population facts
- \*Major world religions
- \*Facts about the World: longest river, largest desert, wettest and driest places on Earth, tallest mountain, deepest spot in the ocean, etc.
- \*Facts about the US: largest/smallest state, capital, highest mountain, longest river, rivers & lakes sheet, largest cities, neighbors
- \*Blank fact sheet pages for: Canada, United Kingdom, Australia, South Africa
- \*Famous world landmarks



- PAGES INCLUDE:**
- \*Largest countries
  - \*Population facts
  - \*Major world religions
  - \*Facts about the US: largest/smallest state, capital, highest mountain, longest river, rivers & lakes sheet, largest cities, neighbors
  - \*Blank fact sheet pages for: Canada, United Kingdom, Australia, South Africa
  - \*Famous world landmarks

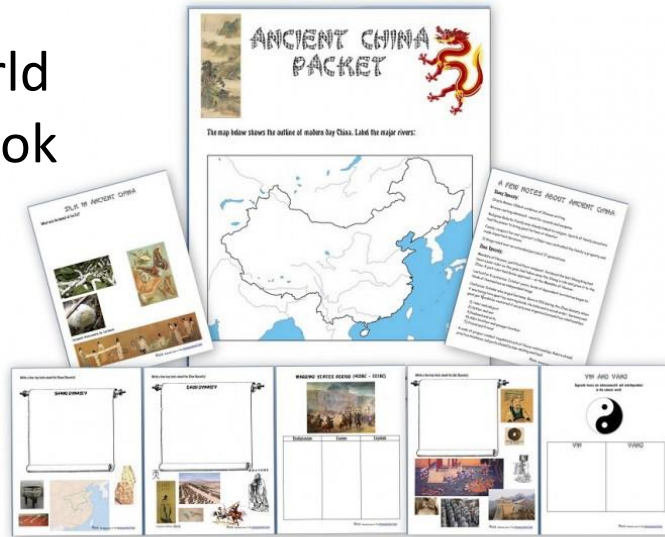


## **Rocks and Mineral Packet**



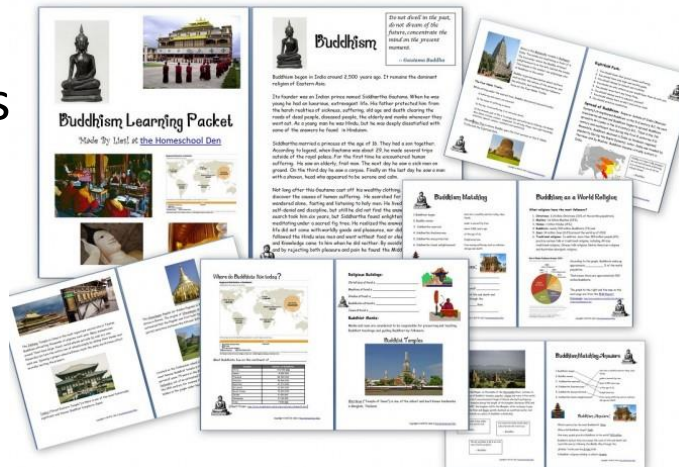
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## History and World Cultures Notebook Pages

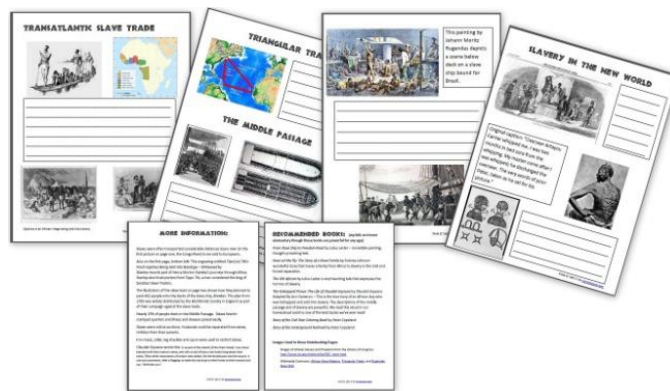


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## World Religions

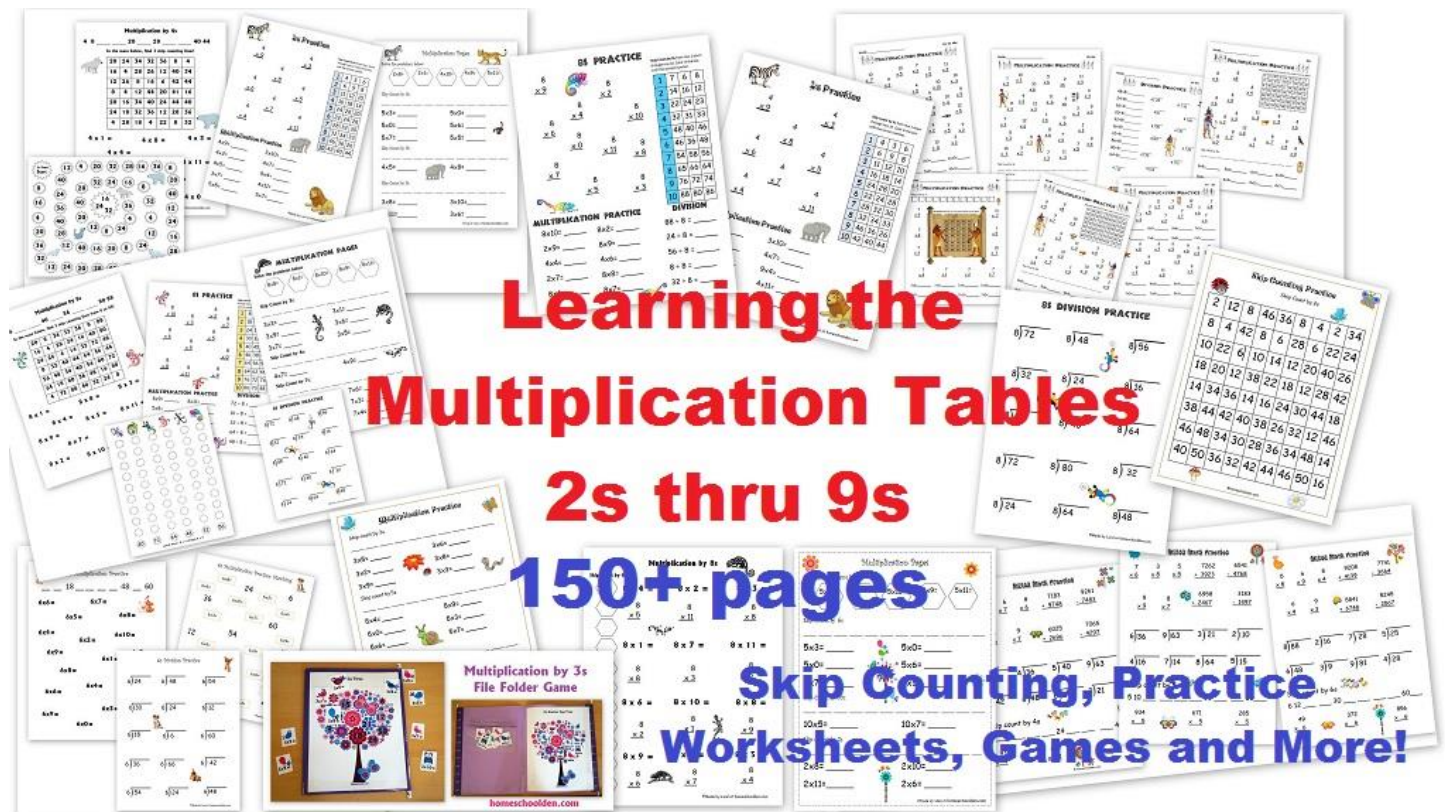


## Slave Trade



Plus we have packets on the Civil Rights Movement, Africa, India, Genghis Khan, Marco Polo and much more!!

**Learning the Multiplication Facts:** As my daughter moved into learning her multiplication facts I looked around for the kind of multiplication practice that would help her. The math book she was using went through the math facts a bit too quickly for her. She needed quite a bit of repetition and wanted bright, colorful worksheets. I wound up making my own sets of practice pages and games. She loved that! Be sure to check out our Multiplication Bundle here: [Learning the Multiplication Tables 2s thru 9s.](#)





**Beginner's Music Curriculum:** Learning Notes, Rhythm, Music Notation and More! This is FREE!

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