Name Key Date: Block:

Air Masses + Fronts

Studying Air Masses Over North America

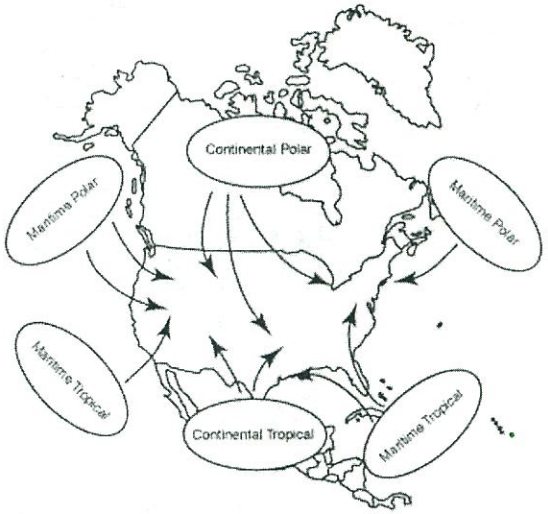


Figure A

The map (Figure A) shows the air masses that bring weather to North America. Study the map carefully. Then answer the questions.

1. Name the four air masses shown in map:
   continental polar, continental tropical, maritime polar, maritime tropical
2. Which of these air masses move in from:
   a. the north? polar
   b. the south? tropical
   c. the land? continental
   d. the ocean? maritime
3. Which air mass brings:
   a. cold + dry air? continental polar
   b. warm + dry air? continental tropical
4. Which air masses bring:
   a. cold + moist air? maritime polar
   b. warm + moist air? maritime tropical

A Warm Front on a Weather Map

Figure B

The symbol for a warm front is  . Figure B shows what it looks like on a map. The warm front on this map is moving towards Dallas. Its speed is about 24 kilometers (15 miles) per hour. Dallas is 240 kilometers away.

In how many hours will the warm front reach Dallas? $t = \frac{d}{s} = \frac{240\text{km}}{24\text{km/hr}} = 10\text{ hours}$

Fill in the Blank

Complete each statement using a term from the list below. Write your answers in the spaces provided.

darker	boundary	"battle each other"
weather changes	lower	clearer and warmer
front passes	warm front	clouds
rain	maps	

1. A front is the boundary between two air masses.
2. When warm air and cold air meet, they battle each other.
3. A front brings about weather changes.
4. A warm air mass that pushes a cold air mass is called a warm front.
5. A warm front forms many clouds.
6. The clouds along a warm front slowly become darker and lower.

Find the Parts

Figure C shows a warm front and Figure D shows a cold front. Find the parts listed below. Write the correct letter in the spaces provided. Then circle the correct choice.

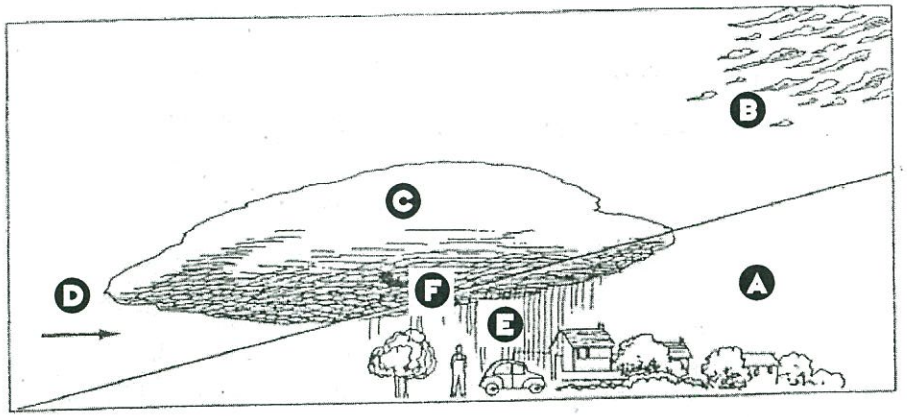


Figure C

1. warm air mass D
2. cirrus clouds B
3. cold air mass A
4. stratus clouds C
5. warm front F
6. area of precipitation E
7. A warm front is moving from (circle one) left to right OR right to left.
8. A warm front changes weather (circle one) slowly OR quickly.

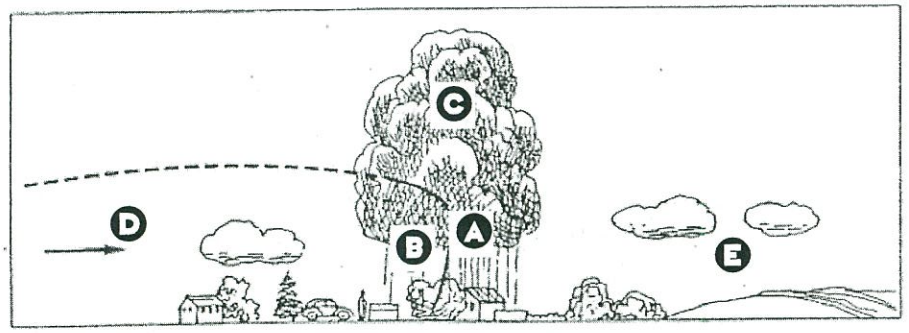


Figure D

1. warm air mass E
2. cold front A
3. cold air mass D
4. storm clouds C
5. area of precipitation B
6. The cold front is moving from (circle one) left to right OR right to left.
7. A cold front changes weather (circle one) slowly OR quickly.

Matching: Air Masses

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

	Column A	Column B
c	1. maritime polar	a) dry and warm
a	2. continental tropical	b) moist and warm
d	3. continental polar	c) moist and cold
b	4. maritime tropical	d) dry and cold
e	5. humidity	e) amount of moisture

Matching: Fronts

Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

	Column A	Column B
c	1. ▲▲▲▲▲	a) symbol for a stationary front
a	2. ▲▬▲▬▲	b) caused by a warm front
e	3. ▬▬▬▬	c) symbol for a cold front
b	4. slow weather changes	d) caused by a cold front
d	5. rapid weather changes	e) symbol for a warm front

True or False

In the space provided, write "TRUE" if the sentence is true. Write "FALSE" if the sentence is false

F 1. A moving cold front moves cold air over warm air.
F 2. A cold front has gentle slope.
F 3. A cold front always brings snow.
T 4. A cold front builds storm clouds.
F 5. A cold front brings slow weather changes.
T 6. Precipitation along a cold front lasts a short time.
F 7. "Stationary" means moving.
T 8. A stationary front is a front that is not moving.
F 9. A stationary front never moves.
F 10. A stationary front can bring clear and warm weather.

Global and Local Winds

Wind Basics: (Word Bank: from, uneven, low, high, pressure, temperature, faster, touching, more, less)

- Wind is caused by the uneven heating of earth's atmosphere, causing differences in temperature and pressure.
- Land (a solid) heats up and cools down much faster than water (a liquid).
- The air is heated by the surface it is touching.
- Air always moves from areas of high pressure to areas of low pressure.
- Cold air has more pressure and hot air has less pressure.
- Winds are named for the direction they blow from.

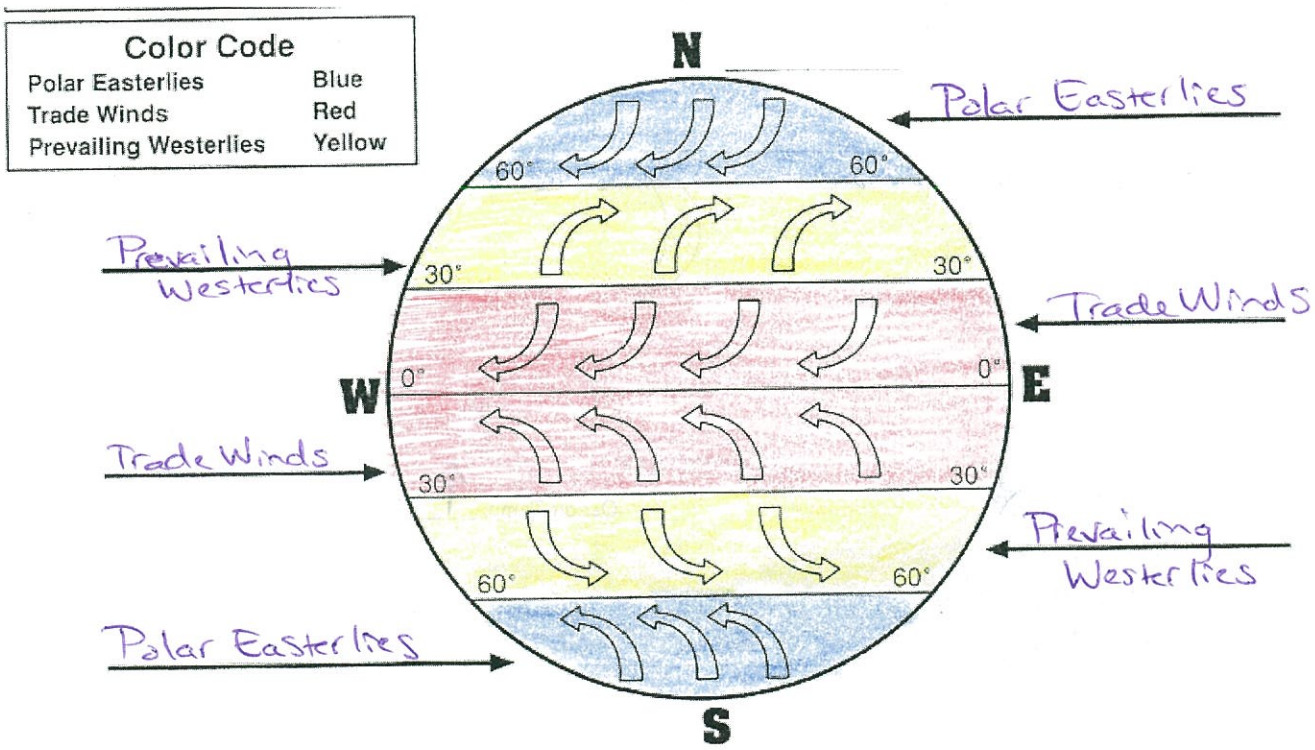
Global Winds:

Because Earth is spinning, global winds bend to the right. This is called the Conolis Effect.

The 3 Global Winds are:

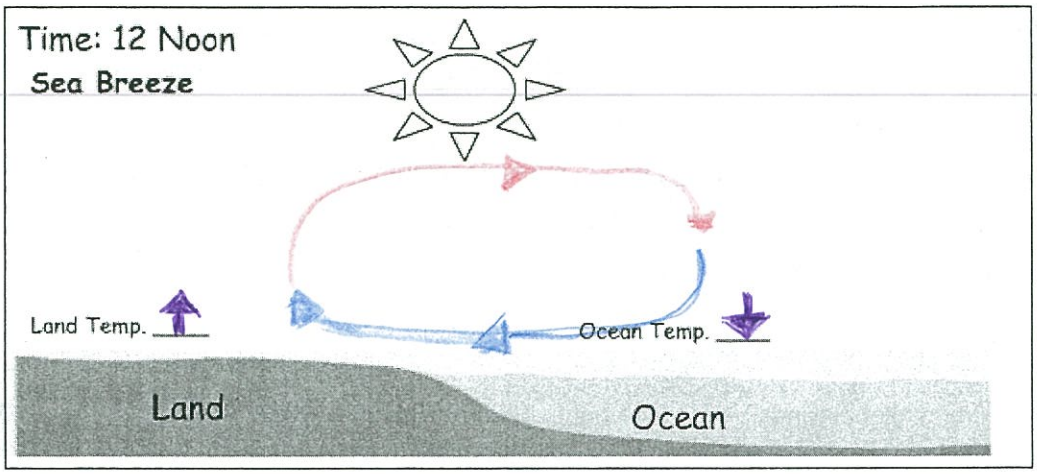
1. Polar Easterlies - 60° to 90° latitude
2. Prevailing Westerlies - 30° to 60° latitude
3. Trade Winds - 0° to 30° latitude

The area of little to no wind at the equator is called the Doldrums.



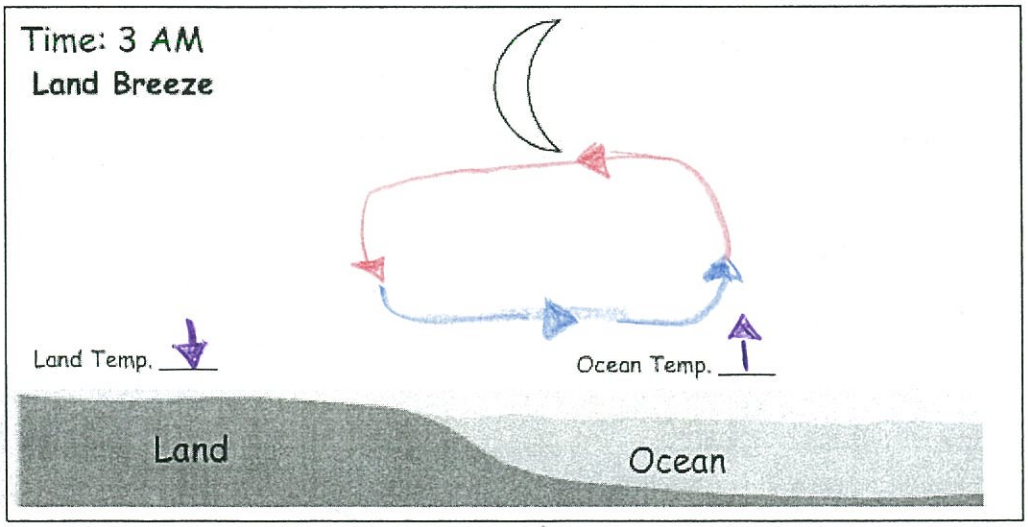
Local Winds:

Local winds occur daily and are based on local geographic features, such as coast lines, lakes, rivers, mountains and valleys.



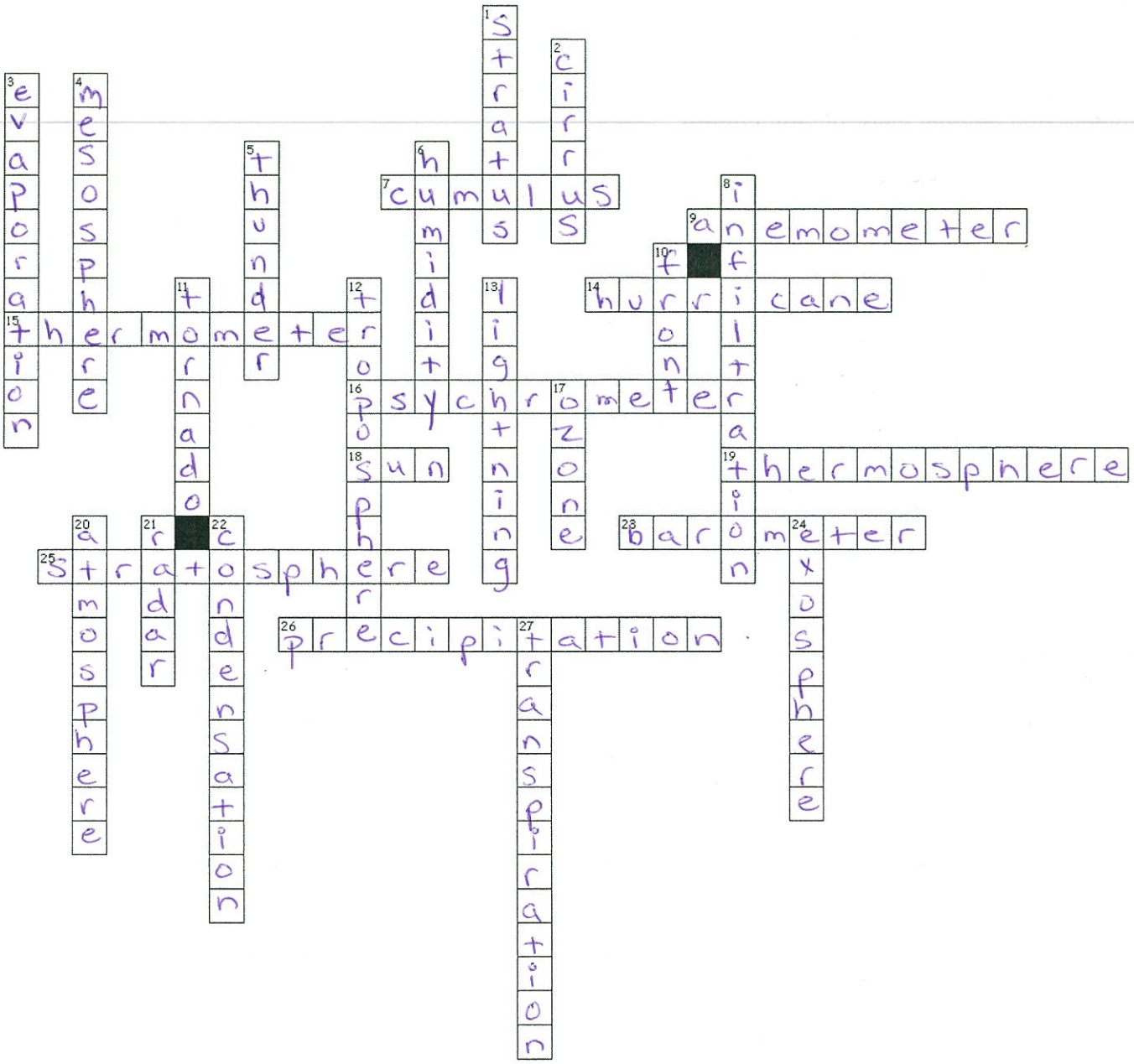
During the day, the land is warmer and the air above it has lower pressure. This air rises and is replaced by cool air from over the water, which has higher pressure.

At night, the water is warmer and the air above it has lower pressure. This air rises and is replaced by cool air from over the land, which has higher pressure.



Name:_____ Date:_____ Hour____

Water, Weather and Atmosphere Crossword Review Puzzle



Across

7. fluffy clouds, mid-level in sky
9. used to measure wind speed
14. a large, rotating tropical weather system with wind speeds of at least 119 km/hr
15. used to measure temperature
16. used to measure humidity
18. energy source for the entire water cycle
19. hottest layer of atmosphere; where aurora borealis occurs
23. used to measure air pressure
25. layer of atmosphere that contains ozone

Name:_____Date:_____Hour____

26. solid or liquid water that falls from the air to the earth (rain, snow, sleet, hail)

Down

1. thick, low lying clouds that blanket the sky
2. wispy clouds highest in the sky
3. changing from liquid to gas
4. middle and coldest layer of atmosphere
5. the sound that results from the rapid expansion of air along a lightning strike
6. the amount of water vapor or moisture in the air
8. process of water seeping and soaking into soil
10. the boundary that forms between two different air masses
11. a small, rotating column of air that has high wind speeds, low central pressure, and that touches the ground
12. closet layer of atmosphere to earth
13. the large electrical discharge that occurs between two oppositely charged surfaces
17. a gas molecule made up of three oxygen atoms and absorbs harmful UV radiation from the sun
20. a mixture of gases that surrounds a planet, such as Earth
21. used to measure location, movement, and intensity of precipitation
22. changing from gas to liquid
24. layer of atmosphere with thinnest air and furthest from earth
27. water movement through plants

WORD BANK:

evaporation
condensation
precipitation
infiltration
transpiration
atmosphere
humidity
front
sun
ozone
lightning
thunder
hurricane
tornado
thermosphere
mesosphere
troposphere
stratosphere
exosphere
thermometer
barometer
anemometer
radar
psychrometer
cirrus
stratus
cumulus

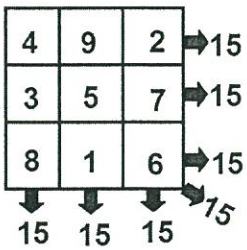
Name: _____

Date: _____

Magic Square: Weather

Air Temperature 7	Troposphere 12	Wind 1	Ionosphere 14
Ozone Layer 2	Nitrogen 13	Exosphere 8	Air Pressure 11
Mesosphere 16	Thermometer 3	Thermosphere 10	Anemometer 5
Barometer 9	Atmosphere 6	Oxygen 15	Weather 4

Directions: Read each sentence below. Find the answer to each sentence in the magic square above. Write the number for each sentence in the box with the correct answer. This is a self-checking activity. If you add all of the numbers in each row, column, or diagonal direction you will come up with the same answer.



1. The movement of air from an area of high pressure to an area of low pressure.
2. The layer within the stratosphere with high concentration of ozone; absorbs most of the sun's harmful ultraviolet radiation.
3. The instrument used to measure air temperature.
4. The state of the atmosphere at a specific time and place.
5. The instrument used to measure wind speed.
6. The blanket of air and gas that surrounds the Earth.
7. The average amount of heat in the air is known as _____.
8. The layer of the atmosphere which fades into space.
9. The instrument used to measure air pressure.
10. The hottest layer of the atmosphere.
11. The force of air exerted on an area from all directions, including directly down on Earth.
12. The layer which is closest to the Earth's surface.
13. 78% of the atmosphere is made up of _____.
14. Layers of electrically charged particles in the thermosphere that absorbs AM radio waves during the day and reflects them back at night.
15. 21% of the Earth's atmosphere is made up of this kind of gas
16. Which layer of the atmosphere protects the Earth from space objects such as meteors?

Magic Square Answer: 34

Name _____

Date _____

Atmosphere Task Cards Answer Sheet

1) B-Nitrogen
2) water vapor
3) false (it's oxygen)
4)
Solid – sleet, hail, snow
liquid – rain
gas – water vapor

5) (D) carbon monoxide
6) oxygen
7) troposphere, Stratosphere, mesosphere, thermosphere, exosphere
8) true
9) Stratosphere
10) D – temperature
11) false
12) C – thermosphere
13) decreases
14) true
15) The Troposphere is the lowest level of the atmosphere, temp. decreases with altitude in this layer. The Thermosphere is one of the outer layers of the atmosphere and temp. increases with altitude.
16) Troposphere
17) air pressure
18) B-gravity
19) decreases
20) true
21) Less air particles as altitude increases, so less air pressure

22) A-CFCs
23) Ultraviolet – UV rays
24) true