

Air Masses

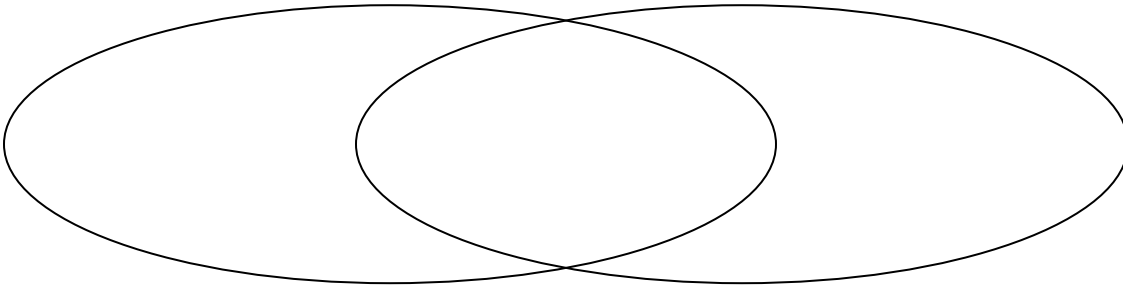
Name: _____ Period: _____ Date: _____

Essential Question: How do I explain the movement of air masses and their effects on weather?

1. What is **meteorology**? p. 299

2. Why did they name the **study of atmospheric phenomena** as meteorology? P. 299

3. Using Venn diagram: Show the **relationship between weather and climate**.



4. Why are the **tropics warmer than the poles**? p. 300-301 and movie

5. How can the tropics and other **places maintain fairly constant temperatures**? P. 301

6. What causes **wind**? P. 307, 282, 436, movie

7. What is an **air mass**? P. 301-303, or movie

8. Describe the five types of air masses. P. 302-303, figure 12-3

5 Type of Air Masses	Type of Air (warm or cold, dry or humid)	Source (Mexico, Pacific, Atlantic, Gulf)
1. Continental tropical (cT)		
2. Maritime tropical (mT)		
3. Continental polar (cP)		Canada and Alaska
4. Maritime polar (mP)		
5. Arctic (A)	cold and dry	Arctic region

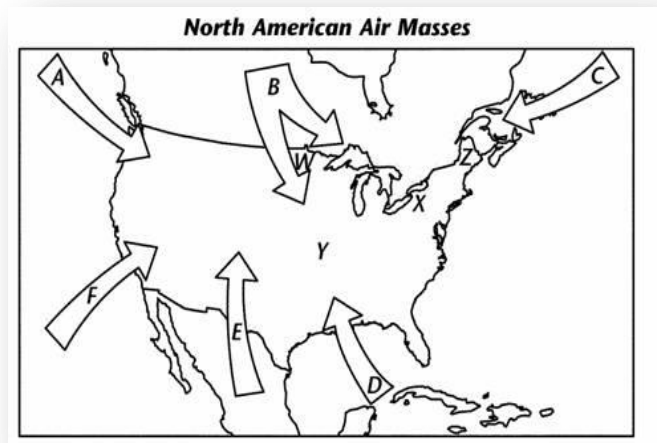
9. Name **three air masses** that affect weather in North Carolina. Clue: Find North Carolina in the map and look for the three nearest arrows pointing or passing on it. p. 303-figure 12-3

10. What is the difference between **arctic air mass and continental polar air mass**?

11. How is **direction of the air mass affected by temperature**? Clue: blue arrow is cold and red arrow is warm. p. 303-figure 12-3 _____

12. Use the figure on the right to answer the following questions. p. 303-figure 12-3

	Type of Air Mass (cT, mT, cP, mP, or A)
A	
B	
C	
D	
E	
F	



___ **13. Which statement describes the general movement of air masses?**

- A. They move from areas of high pressure to areas of low pressure.
- B. They move from areas of high altitude to areas of low altitude.
- C. They move from areas of low humidity to areas of high humidity.
- D. They move from areas of low temperature to areas of high temperature.

___ **14. Which contributes to the formation of hurricanes during the late summer?**

- A. the interaction between ocean water salinity and warm air masses
- B. the interaction between ocean water currents and polar air masses
- C. the interaction between ocean water temperatures and warm air masses
- D. the interaction between ocean water salinity and ocean water density

___ **15. Which *most likely* occurs when a fast-moving cold air mass moves into a region of warmer, moist air?**

- A. It causes light precipitation for a long period of time.
- B. It causes light precipitation for a short period of time.
- C. It causes heavy precipitation for a long period of time.
- D. It causes heavy precipitation for a short period of time.

	Type of Air Mass (cT, mT, cP, mP, or A)
A	Mp
B	cP
C	mP
D	mT
E	cT
F	mT

Key:

- 13. A
- 14. C
- 15. D

Air mass source regions range from extensive snow covered polar areas to deserts to tropical oceans. The United States is not a favorable source region because of the relatively frequent passage of weather disturbances that disrupt any opportunity for an air mass to stagnate and take on the properties of the underlying region. The longer the air mass stays over its source region, the more likely it will acquire the properties of the surface below.

The four principal air mass classifications that influence the continental United States according to their source region are:

- Polar latitudes - Located poleward of 60° north and south.
- Continental - Located over large land masses between 25°N/S and 60°N/S.
- Maritime - Located over the oceans between 25°N/S and 60°N/S

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- Tropical latitudes - Located within about 25° of the equator.

MiniLab

How does the angle of the Sun's rays differ?

Model the angle at which sunlight reaches Earth's surface. This angle greatly affects the intensity of solar energy received in any one place.

Procedure

1. Hold a flashlight several centimeters above a piece of paper and point the flashlight straight down.
2. Use a pencil to trace the outline of the light on the paper. The outline models how the Sun's rays strike the equator.
3. Keeping the flashlight at the same distance above the paper, tilt the top of the flashlight to roughly a 30° angle.
4. Trace the new outline of the light. This is similar to how the Sun's rays are received at the poles.

Analyze and Conclude

1. Describe how the outline of the light differed between step 1 and step 3. Explain why it differed.
2. How do you think the change in area covered by the light affects the intensity of light received at any one place?
3. The flashlight models solar radiation striking the surface of Earth. Knowing this, compare how much heat energy is absorbed near the equator and near the poles.

MiniLab

Purpose

Students will demonstrate how differences in the angle of the Sun affect the amount of solar energy received in the tropics and the polar regions.

Process Skills

model, recognize cause and effect, observe and infer

Materials

flashlight, pencil, dark construction paper

Teaching Strategies

Students should work in groups of three: one student to hold the flashlight, one to verify its angle and distance from the paper, and one to trace the outline of the light on the paper.

Expected Results

As the angle of the flashlight changes, the light is spread over a wider area. Solar energy also is spread over a wider area as the angle of latitude increases.

Analyze and Conclude

1. The outline of the light was larger in step 3. It changed because the light covered a larger area.
2. The amount of light received at any one place decreases when the light covers a larger area.
3. Solar energy is spread over a large area at the poles; thus, polar regions receive less solar radiation than do areas near the equator.

Assessment

Performance Challenge students to model the angle at which the Sun's rays strike the poles during winter. Students should increase the angle of the flashlight until the light is almost parallel to the paper. Use the Performance Task Assessment List for Model in PASC, p. 51.