

NATS 101 Introduction to Weather and Climate, Section 54, Fall 2005
Study Guide: Questions for 15&17 November readings

1. What are the ideal conditions for upwelling and where is an example of it occurring? (only question I got last week)
2. What is a front? Briefly describe the four specific kinds of fronts.
3. How might a thunderstorm develop?
 - a. Unequal heating of the surface
 - b. Topographic lifting
 - c. Warm, humid air lifting in a conditionally unstable environment
 - d. all of the above
4. Lightning can happen
 - a. from cloud to cloud
 - b. from cloud to ground
 - c. from ground to cloud
 - d. all of the above
5. The triangles on a cold front symbol
 - a. point in the direction the front is moving
 - b. point in the direction the front is coming from
 - c. represent the intensity of the front
 - d. none of the above
6. Thunderstorms tend to form
 - a. when cold, humid air rises in a conditionally unstable atmosphere
 - b. when warm, humid air rises in a conditionally unstable atmosphere
 - c. when cold, humid air rises in a stable atmosphere
 - d. when warm, humid air rises in a stable atmosphere
7. Give three ways to identify a front.
8. Name the four types of fronts.
9. What type of wind shear is involved in the formation of ordinary thunderstorms? Severe thunderstorms?

Solutions to select study guide questions:

1. What are the ideal conditions for upwelling and where is an example of it occurring? (only question I got last week)

Winds must blow alongshore from pole towards equator (either hemisphere). Ekman transport due to Coriolis effect is to the right of the wind (NH), moving surface water away from the coast. Upwelling must take place to replace the surface water moving offshore. An example of this is the upwelling that occurs off the California coast due to northerly winds that blow alongshore in California during summer.

2. What is a front? Briefly describe the four specific kinds of fronts.

Stationary front - this front does not move; represented by alternating semi-circles and triangles facing opposite directions which indicate the cold (behind blue triangles) and warm (behind red semi-circles) sides of the front; typically associated with fair weather with occasional cloudiness and light precipitation

Cold front - a zone of cold air moving into a warm air region; represented by a blue line with blue triangles pointing in the direction of the motion of the front; cold, dense air forces warm air upward; warm, rising air if moist enough will form cumuliform clouds, narrow band of thunderstorms; in US generally move SE, S, or E

Warm front - region of warm air replacing cold air; represented by a red line with red semi-circles pointing in direction of movement; generally produce stratus clouds, maybe nimbostratus clouds

Occluded front - describes a cold front meeting a warm front; represented by a purple line with alternating triangles and semi-circles on the same side pointing in the direction of movement; generally, the air behind the front is colder than the air ahead of it (cold occlusion); if air ahead of front is colder than air behind front it is a warm occlusion

3. How might a thunderstorm develop?

- a. Unequal heating of the surface
- b. Topographic lifting
- c. Warm, humid air lifting in a conditionally unstable environment
- d. all of the above**

4. Lightning can happen

- a. from cloud to cloud
- b. from cloud to ground
- c. from ground to cloud
- d. all of the above**

5. The triangles on a cold front symbol

- a. point in the direction the front is moving**
- b. point in the direction the front is coming from

- c. represent the intensity of the front
- d. none of the above

6. Thunderstorms tend to form

- a. when cold, humid air rises in a conditionally unstable atmosphere
- b. when warm, humid air rises in a conditionally unstable atmosphere**
- c. when cold, humid air rises in a stable atmosphere
- d. when warm, humid air rises in a stable atmosphere

7. Give three ways to identify a front.

- sharp temperature changes over short distances
- shifts in wind direction
- clouds and precipitation

8. Name the four types of fronts.

warm, cold, stationary, occluded

9. What type of wind shear is involved in the formation of ordinary thunderstorms? Severe thunderstorms?

Little or no wind shear is related to ordinary thunderstorm development. Strong vertical wind shear is associated with severe thunderstorms.

