Weather & Climate Unit Study Guide

The map of the United States to the right shows the locations of Missoula, MT, and Cape Elizabeth, ME.

1. Explain why Cape Elizabeth is more likely to have warmer winters and cooler summers than Missoula. (S6E4a)

Cape Elizabeth is closer to an ocean. Oceans store and transfer more heat than the continents because the ocean warms up and cools down slowly. Therefore, oceans moderate temperatures of surrounding areas.

2. Define air mass. (S6E4a,b) **A large body of air that has the same properties as the Earth's surface over which it develops**

3. What are the circumstances that cause precipitation and storms to occur? (S6E4b) **warm and cold air masses meet**

4. Describe the weather most associated with a high-pressure system and a low-pressure system. (S6E4a,b) Explain. **High-pressure systems have decreasing cloudiness because the sinking of cold air makes it difficult for warm air to rise, cool and condense. Low-pressure systems have cloudy weather because higher temperatures warm the ground and surrounding air which rises, cools and condenses to form clouds.**

5. Describe a tornado. (S6E4b) **When wind at different heights blows in different directions and at different speeds over land; a violently rotating column of air in contact with the ground**

6. Describe a hurricane (S6E4c) **A hurricane forms when warm, moist air rises quickly over the ocean, causing a strong, whirling storm with high winds and heavy rains**

7. Winds are blowing into the Southeastern U.S. from the Gulf of Mexico. A large air mass is moving quickly down from Canada. Predict what weather might occur in the Southeast. (S6E4a,b**)** **cloudy skies; stormy weather with a high chance of rain; cooler temperatures**

8. Describe three factors that impact the development of a storm when two air masses meet. (S6E4b) **differences in moisture, air pressure, and temperature impact the development of a storm**

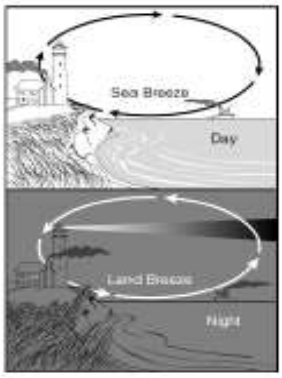
9. Identify the main factor that impacts the development of wind. (S6E4a,b) **atmospheric pressure**

10. What is the underlying reason for major systems such as hurricanes, tornadoes, and thunderstorms? (S6E4a-c) **The Earth is trying to redistribute its heat by moving air**

11. Where do tropical storms begin? Why? (S6E4c) **over water near the equator because tropical storms are fueled by warm water**

12. Describe the Coriolis effect. How does it influence wind patterns? **The rotation of the earth's surface causes wind systems to curve. This is known as the Coriolis effect.**

13. Explain what is happening in the two images to the right. Include in your explanation the following: Radiation; Conduction; Convection; Sea Breeze; Land Breeze; High pressure; Low pressure; Wind



Radiation; Conduction; Convection; Sea Breeze;
Land Breeze; High pressure; Low pressure; Wind
The sun's energy reaches the land through radiation and heats it up. The warm land heats the air directly above (touching) the land through conduction. This warm air rises. Water does not heat up as quickly as land, so when the warm air (low pressure) from the land rises the cooler air (high pressure) over the water takes its place. The warm air (low pressure) in turn rises into the atmosphere and cools off causing it to fall. The unequal heating and cooling causes convection currents to form. This is how wind is created.

14. Identify the forces that cause weather. (S6E4**)** **The interaction of air, water, and the sun**

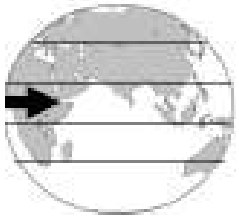
15. Explain how a warm ocean current flowing near land can influence the weather of that land. (S6E4) **Since water cools and heats slower than land, a warm ocean current will mean the water is warmer which then moderates the weather over the nearby land. In the case of a warm ocean current, the weather on the nearby land will be warmer than in areas away from the warm ocean current.**

16. Identify two ways in which energy from the Sun is distributed around Earth. (S6E4; S6E6) **Radiation and Convection**

17. Define climate. (S6E4) **The weather of a region averaged over a long period of time**

18. How does wind move between Low and High pressure areas? (S6E4a,b) **Wind moves from areas of high pressure to areas of low pressure**

19. In the diagram to the right, identify the area of the Earth that receives the most direct sunlight. (S6E6a**)** **Equator**



20. On the diagram of the Earth to the right, draw an illustration of the movement of global winds. (S6E4) **In the north winds move to the right, south to the left**

21. In the diagram to the right, identify the area where most tropical storms form. (S6E4b) **off the coast of Africa; over water near the equator**

22. The tables to the right show information from a weather station at two different times. Based on the changes between the weather conditions, what type of weather most likely passed by the weather station between time 1 and time 2? Explain your answer. (S6E4**)** **A cold front passed by the weather station because the temperature dropped and the pressure increased. Also, there is no precipitation. A cold front is a high pressure system which decreases cloudiness.**

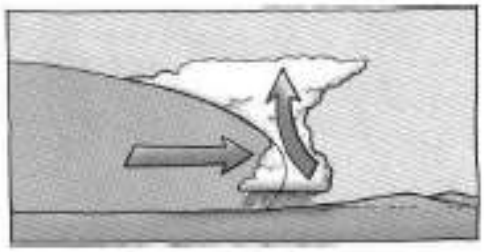
Conditions at Time 1

Temperature	45 °C
Pressure	1010 mb
Wind direction	From the south
Precipitation	None

Conditions at Time 2

Temperature	30 °C
Pressure	1025 mb
Wind direction	From the north
Precipitation	None

23. Identify the type of weather front shown in the diagram to the right. What type of weather can be expected? Explain (S6E4**)** **Cold front because the cold air is sinking and pushing the warmer air up. Rain and possibly violent storms will occur depending on the temperature differences between the fronts**



24. Identify the type of weather front shown in the diagram to the right. Explain (S6E4**)** **Warm Front because the warm air is rising over the cooler, more dense air**