Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Item #\_\_\_\_\_\_

Atmosphere & Weather Study Guide

Use all of the documents in your science notebook and the links embedded to review and help you answer the questions in the study guide.

Part 1: [Layers of the Atmosphere](http://www.nasa.gov/mission_pages/sunearth/science/atmosphere-layers2.html)

1. Complete the chart below in order, beginning with the layer closest to Earth’s surface.

|  |  |  |
| --- | --- | --- |
| **Layer Name** | **Temperature Trend** | **Two Important Facts** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Part 2: [Characteristics of Earth’s Atmosphere](http://www.windows2universe.org/earth/Atmosphere/atm_press.html)

1. What is the relationship between altitude and density of air?
2. Explain air pressure.
3. Where is air pressure lowest: top of Mt. Everest or in a house at the beach? *Explain why.*
4. What gases compose, or make up, air and in what percentages do they occur? In addition, what different types of particulate matter can be found in the atmosphere?
5. What are two ways the atmosphere supports life?

Part 3: [Ozone](https://airnow.gov/index.cfm?action=gooduphigh.index) and Air Quality

7. What is ozone and explain how can it be both good and bad?

8. Where is the ozone layer found? From what does it protect us?

9. What is Acid Rain and what effects can it have on humans, plants and animals?

10. What is Smog and what effects can it have on humans, plants and animals?

11. The burning of fossil fuels is the main cause or one of the causes for the air quality issues that we studied. Explain the ways that humans use fossil fuels and what can be done to minimize the impact of this use.

12. What are some solutions for improving air quality? (Be sure to include the EPA and its role in your answer)

13. What is climate change? What kinds of impacts can climate change have on all living organisms?

Part 4: [Heat Transfer](https://www.wisc-online.com/learn/natural-science/earth-science/sce304/heat-transfer-conduction-convection-radiation)

14. Define each of the three types of heat transfer (conduction, convection and radiation) and give an example of each.

Part 5: [Water Cycle](http://water.usgs.gov/edu/watercycleatmosphere.html)

15. Precipitation forms when water droplets in the clouds become too \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to stay afloat and fall to the ground.

16. What process is most closely associated with cloud formation?

17. Explain the difference between infiltration and percolation.

18. What is transpiration?

19. Label the phases of the water cycle:

1)

2)

3)

4)

**#6**

**#5**

5)

6)

**#7**

7)

8)

**#8**

[Water Cycle Review](http://pmm.nasa.gov/education/water-cycle)

20. Identify the types of precipitation demonstrated by the diagram.

a. Begins frozen and then melts before hitting Earth’s surface. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Begins frozen, melts into rain as it falls and freezes when it hits something on the ground that is colder. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. Begins frozen, partially melts as it falls and then refreezes into ice pellets before landing. \_\_\_\_\_\_\_\_\_\_\_\_\_

 a b c d

d. Begins frozen, remains frozen and lands as a crystal. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e. Another type of precipitation (not shown in the diagram) is formed when ice is wind-tossed up into the cloud, falls and gets tossed up again and again causing it to grow in size. The ice pellets finally get too large to stay airborne and fall to the ground in this frozen form. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Part 6: [Water in the Atmosphere](http://climate.ncsu.edu/edu/k12/.humidity)

21. What is relative humidity?

22. The warmer the air is, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ water vapor it can hold.

23. What instrument is used to measure relative humidity?

24. What is dew point?

25. Using water vapor and air molecules in your descriptions, explain the differences between cold air and warm air.

Part 7: [Clouds](http://scied.ucar.edu/webweather/clouds/cloud-types)

26. What three things are clouds classified by?

27. Describe what each of the following root words and prefixes mean in relation to clouds:

a. Cumulus/cumulo –

b. Stratus/strato –

c. Cirrus/cirro –

d. Nimbus/nimbo –

e. alto –

28. What type of clouds are associated with thunderstorms?

Part 8: [Winds](http://www.eschooltoday.com/winds/Introduction-to-winds-for-young-people.html)

29. Warm air is less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than colder air and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the atmosphere.

30. Rising moist air causes areas of \_\_\_\_\_\_\_\_\_\_ pressure, creates clouds, and is associated with

 \_\_\_\_\_\_\_\_\_\_\_ weather.

31. Cool air is more \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than warmer air and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the atmosphere.

32. Sinking dry air causes areas of \_\_\_\_\_ pressure, evaporates clouds, and is associated with \_\_\_\_\_\_ weather.

33. How are winds created?

34. Explain how the jet stream influences the weather in North Carolina.

Part 9: [Global Winds](http://www.phschool.com/atschool/phsciexp/active_art/global_winds/)

35. Describe the global winds.

|  |  |  |
| --- | --- | --- |
|  **Global Winds** |  **Location** | **Characteristics** |
| Doldrums |  |  |
| Trade Winds |  |  |
| Horse Latitudes |  |  |
| Prevailing Westerlies |  |  |
| Polar Easterlies |  |  |

Part 10: [Air Masses and Fronts](http://www.srh.weather.gov/srh/jetstream/synoptic/airmass.html)

36. Match the following fronts with their descriptions.

 A. Occluded B. Warm C. Cold D. Stationary

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A warm air mass overtakes a cooler air mass leading to a long period of rain.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A warm air mass is trapped between two colder air masses.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A warm air mass and a cold air mass meet but neither move leading to several days

 of consistent weather.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A cold air mass overtakes a warmer air mass leading to stormy weather.

*Using the map to the right, answer the following questions:*

37. Low pressure often brings stormy weather, and high pressure

often brings fair weather. Which of the locations is most likely to

have clear skies?

a. Q

b. R

c. S

d. U

38. What kind of front does the line with the half circles represent?

39. In what direction is the cold front moving?

40. What type of weather should city “U” be expecting?

Part 11: [Weather Maps](http://www.srh.weather.gov/srh/jetstream/synoptic/wxmaps.html)

41. Match each weather tool with its definition:

|  |  |
| --- | --- |
| **Column I**\_\_\_\_ radar\_\_\_\_ weather balloon\_\_\_\_ ground station\_\_\_\_ satellite\_\_\_\_ weather planes and ships | **Column II**1. takes measurements of air conditions over a large area and at different altitudes such as temperature, air pressure, and humidity
2. takes measurements of cloud height; one type is Doppler which also detects air motion and precipitation
3. sends information back to Earth while in orbit; records cloud cover, warm and cool regions, and invisible water vapor
4. takes measurements in a single location on land such as temperature, precipitation, wind speed, and air pressure
5. takes measurements along a path; can be used to gather information from hurricanes or other storms
 |

Part 12: [Severe Weather - Hurricanes](http://www.weatherwizkids.com/weather-hurricane.htm)

42. What is a hurricane and how do they form?

43. What fuels a hurricane and what decreases its strength?

44. Explain the difference between the tropical systems and the classes of hurricanes.

45. What are the effects of hurricanes? Why are they so dangerous?

Part 13: [Severe Weather – Tornadoes](http://www.nssl.noaa.gov/education/svrwx101/tornadoes/)

42. What kind of weather conditions create tornadoes?

43. Where and when do most tornadoes occur?

44. What is the difference between a tornado watch and a tornado warning?

45. What scale is used to rate the strength of tornadoes? What is the scale based on?

Part 14: [Severe Weather – Thunderstorms/Floods](http://www.nssl.noaa.gov/education/svrwx101)

46. Explain the difference between a thunderstorm and a severe thunderstorm.

47. List and describe the dangers associated with thunderstorms.

48. Explain the difference between floods and flash floods and why flash floods are especially dangerous.

49. Why is driving across flooded roads a huge risk?

Part 15: Severe Weather – Drought, Winter Storms, Fog

50. Why is drought a problem?

51. Why are winter storms with freezing rain a problem in our area of N.C.?

52. What are precautions to take while driving in fog?

Part 14: [Quizlet Review for Atmosphere](https://quizlet.com/_hahqs)

Part 15: [Quizlet Review for Weather](https://quizlet.com/_xjjc8)

Part 16: [Additional Atmosphere and Weather Resources](http://edu.symbaloo.com/mix/atmosphereandweather)