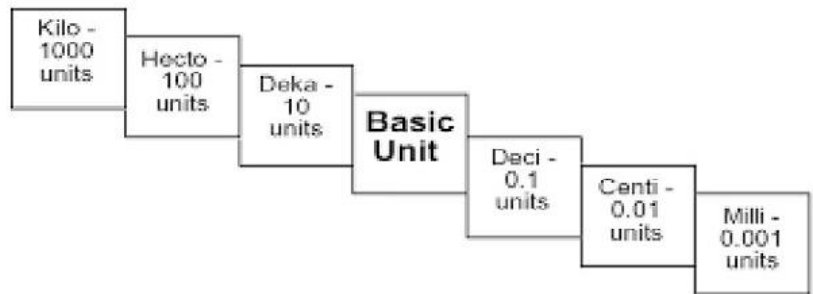


# Mrs. Gillin's Earth Science Fall Semester Test Review

The Earth Science Semester Test will cover all units of study including: Nature of Science, Hydrology, Atmosphere, and Meteorology. **The test will consist of 47 multiple choice questions and 4 constructed responses.** The questions below need to be completed in preparation for the test. Answers can be found in class notes, activities and labs, bell ringers, old tests, and the Earth Science textbook. **Semester test is worth 20% of your overall semester grade.**

## Nature of Science

1. What is the metric system's base unit for length, mass and volume?
2. What is the most accurate tool to measure length, mass and volume?
3. Understand density and be able to apply the density formula. For example: What is the density of an object that weighs 20 grams and has a volume of 5 ml? Density = Mass/Volume
4. If an object has a density of 1.1 g/cm<sup>3</sup>, would it float or sink in water with a density of 1.0 g/cm<sup>3</sup>? Why?
5. What is the difference between qualitative observations and quantitative observations?
6. Define independent, dependent and control variables (Be able to apply these variables in an experimental design).
7. Using the metric staircase:
  - a. convert 2 liters to centiliters
  - b. convert 25 cm to meters
  - c. convert 10 grams to milligrams.
8. Define hypothesis.



## Hydrology

9. What is the difference between weathering and erosion?
10. How do Deposition, Point Bar, Erosion and Cut Bank relate?
11. Why does acid mine drainage occur?
12. How do nitrates effect the Helena watershed (hint: eutrophication and algae)?
13. Draw a watershed and label divide, tributary, headwaters, river mouth and direction of river flow.
14. What type of rock material has high permeability and porosity?
15. What is porosity and how does it relate to groundwater?
16. Calculate the porosity: Void Volume = 37mL Total Volume: 100mL  
$$\text{Porosity (\%)} = \frac{\text{Void Volume}}{\text{Total Volume}} \times 100$$
17. Explain why the water table (level of ground water) changes throughout the year? Why does it rise or drop?
18. Explain the significance of the Continental Divide?

19. Why does rivers' discharge (cfs) change during the year? Be able to read a hydrograph.
20. Tenmile Creek has a velocity of 10ft/sec and a cross-sectional area of 25ft<sup>2</sup>, what is its discharge in cubic feet per second (CFS)? **Discharge = Velocity / Area**
21. Where does our school drinking water come from and is it safe for the future? What could damage our watershed?

### **Atmosphere**

22. What two gasses make up 99% of Earth's atmosphere?
23. Give an example for each of the three types of heat transfer: conduction, convection and radiation.
24. In which atmospheric layer does weather such as lightning and cloud formation occur?
25. List the layers of the atmosphere in order and describe the change in temperature of each layer.
26. What is the chemical formula for ozone and what chemical destroys this layer?
27. List two greenhouse gasses that Scientists believe contribute to Climate Change (Global Warming). What produces these?
28. Explain why atmospheric CO<sub>2</sub> levels rise and fall during the year.
29. What is the carbon cycle? What are 3 reservoirs?
30. How does air pressure change with altitude?
31. Explain why Earth has different seasons? Diagramming this answer may be helpful.

### **Weather and storms**

32. What heats our atmosphere and is the ultimate factor in creating wind?
33. Define dew point.
34. Describe the relationship between air temperature and the ability to hold water vapor.
35. Explain the dynamics of a cold front and a warm front (discuss interactions between warm and cold air masses).
36. Describe low pressure air mass behavior and weather.
37. Describe high pressure air mass behavior and weather.
38. Calculate the relative humidity: Specific Humidity: 15 Capacity: 23 RH= (Specific/Capacity) x 100
39. List three processes that cause air to rise. And what happens to air as it rises?
40. How did a cloud form in the "Cloud in the Bottle" lab? (include the three ingredients).
41. Remember crushing the cans...well, how was the can crushed?

42. How does Coriolis Effect change the winds in different hemispheres?

43. Why does cold air sink and warm air rise?

**Below are the topics for the constructed response questions. Write (or model) a complete response to these questions.**

1. Describe the Greenhouse Effect. In your answer list two greenhouse gasses in Earth's atmosphere and explain how they trap the sun's rays contributing to Climate Change (Global Warming).

2. Describe the carbon cycle, be sure to include 4 reservoirs and how carbon moves between them. Also explain why the carbon cycle is important when discussing climate change.

3. Draw a model of a watershed, be sure to label a tributary, river mouth, confluence, headwaters and divide.

4. Describe the formation of a **storm**. You may choose to describe the formation of a tornado, rainstorm, hurricane, dust storm, blizzard, or monsoon. Your answer should include:

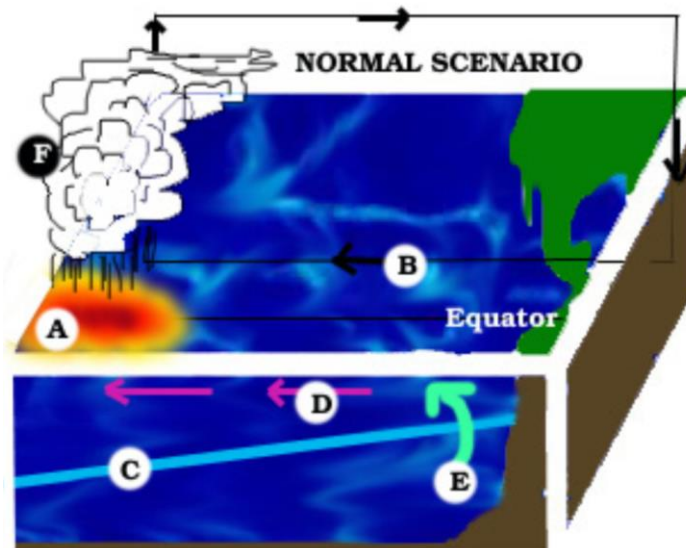
- What conditions lead to the formation of the storm (what causes it).
- What weather is associated with the storm
- Safety precautions and damage expected during storm

5. Either model or describe in 5 steps how clouds form in nature, include dew point and temperature in your answer.

6. Explain the phenomenon of El Nino.

- Label the picture with what land masses are found on either side of the Pacific Ocean.
- Choose 3 of the features of the scenario in a non-El Nino year. Identify where each feature is shown in the diagram.
- For each of the 3 features you chose, explain how it will be different in an El Nino year. You can do this by writing or drawing.

Features	
<input type="checkbox"/>	Ocean current
<input type="checkbox"/>	Thermocline
<input type="checkbox"/>	Convection
<input type="checkbox"/>	Upwelling
<input type="checkbox"/>	Normal Circulation
<input type="checkbox"/>	Warm Pool



Land mass  
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Land mass  
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