Land and Water Study Guide

Answer Key

Part 1 - States of Matter

1. What are the three states of matter for water? Give several examples for each.
   - **Solid** - Ice cube (non water examples = candy bar and a log).
   - **Liquid** - Rain, steam, fog, and dew
   - **Gas** - water vapor (which CANNOT be seen!)

2. What is a physical change in matter and how is it different from a chemical change? Give several examples of each.
   - **Physical** - when a substance changes in size, shape, or form. Examples include a clay animal being made from a ball of clay, a cookie breaking in half, an ice cube melting, a flood that causes the dirt on a hill to erode, and run-off that washes away the soil.
   - **Chemical** - when a substance is changed into a new form of matter. An example is when a tree is burned in a fire.

Part 2 - Water on Earth and How it Moves

3. What percent of the Earth's water is salt water (found in oceans)?
   
   97%
4. True or False (circle one): Ocean water is a valuable source of fresh water.

5. Give 3-4 examples of fresh water sources.
   - Lakes, springs, and glaciers

6. What do you think the water will most likely be used for in this picture? Drinking water

7. List some sources of drinking water in Michigan.
   - The ground, an aquifer, and/or surface water.

8. In South Lyon, most of our drinking water comes from an aquifer (starts with an “a”) under the ground.

9. Water is recycled on Earth through the water cycle. List the steps of the water cycle.
   - Evaporation, condensation, precipitation and refill/collection
10. What would happen if water no longer evaporated?

   It would all remain on the surface of the Earth. It would no longer rain.

11. True or False (circle one): Dew is a type of precipitation. (Dew is a type of condensation)

12. List FOUR examples of precipitation.

   Rain, snow, sleet, and hail

13. During evaporation, water changes from a liquid to a gas.

14. During condensation, water changes from a gas to a liquid.

15. True or False (circle one): Rain is a form of condensation. (Rain is form of precipitation)

16. List FOUR examples of condensation.

   Clouds, steam, fog, and dew

17. True or False (circle one). You can SEE water vapor (water in its gaseous state). (when you can see it, it has began to condense back into a liquid)
18. When heat energy is added to water, what happens?

   **It evaporates**

19. What happens to water vapor (a gas) when there is a decrease in air temperature?

   **It condenses**

20. What is weathering? Give the definition and an example.

   Weathering is the BREAKING down of Earth’s materials. An example is when water gets in a rock and freezes and then expands. This causes the rock to break apart.

21. What is erosion? Give the definition and an example.

   Erosion is the MOVING of Earth’s materials. An example is water cuts through a plateau and forms a valley like the Colorado River did over many years to form the Grand Canyon.

22. True or False (circle one): Erosion is a physical change that alters Earth’s surface.

23. True or False (circle one): Runoff is a type of chemical change. *(Runoff is a type of physical change).*

24. An example of erosion is the movement of sand from dune to dune on the beaches of Florida.
25. **True** or False (circle one): Lakes are often formed by weathering and erosion. *(An example would be the formation of Lake Ontario, one of the Great Lakes).*

26. **True** or False (circle one): The Colorado River formed the Grand Canyon by cutting through a plateau and by the processes of weathering and erosion.

**Part 3 - Major Features of Earth**

27. What is a landform? Give the definition and three examples.

*A landform is a feature of Earth’s surface. Some examples include mountains, plateaus, and plains.*

28. True or **False** (circle one) Oceans are landforms. *(Oceans are not a feature of the land that makes up Earth’s surface).*

29. A high, relatively level area, often found next to mountains is called a **plateau**.

30. An area of flat land that has been leveled by erosion or deposition is called a **plain**.

31. List three types of landforms found in Michigan.

*Peninsulas, basins, plains and also, mountains*
32. True or False (circle one): A desert is a type of landform found in Michigan. (A desert is characterized by an extremely LOW level of precipitation. Even though Michigan has sand, these areas are NOT considered deserts).

33. The Grand Canyon is a (circle one): river, plateau, valley, or mountain.

Part 4 – Materials Used From Earth

34. Soil is a complex mixture of inorganic (never been living) and organic (living and/or decayed plant and animal matter). List a component of soil that is ORGANIC. **Humus**

35. Which of the following will float on water?
   - **Humus**
   - Gravel
   - Sand
   - Silt

36. What kind of soil is best for planting crops?
   
   *A mixture of sand, clay, and decaying matter.*

37. Put the following Earth materials in size from LARGEST to SMALLEST - clay, sand, gravel, silt
   
   Answer: Gravel (think “G” = GREAT big), sand, silt, and clay
38. Why is clay useful for creating pots for water storage?

It is difficult for water to penetrate clay because of the small pore space between particles. It also is soft and molds together tightly.

39. What three properties of soil make it useful for allowing water to be absorbed in the ground?
   - Size
   - Shape
   - Pore Size

40. What property of sand, silt, and gravel makes them useful for filtering our drinking water? Size

41. Earth materials are often used for other purposes.
   Gravel \longrightarrow cement for sidewalks
   Sand \longrightarrow made into glass
   Oil \longrightarrow made into gasoline

Part 5 - Human-Environment Interaction

42. Why do road crews plant trees and grass along the slopes next to a road bridge?

To prevent erosion of the sloped land.
43. Why would the removal of trees along a hillside be harmful?

**It may cause a land-slide to occur.**

44. True or False (circle one): If a farmer clears his land, it will rain more. *(It may cause an increase in runoff and nutrient depletion, an increase in erosion, and a drying up of the land, but will have NO impact on the amount of rainfall!)*

45. Water conversation is important because unpolluted fresh water is a **limited resource.**

Part 6 - Measurement

46. Math is often used by scientists in their investigations. What is the following instrument used to measure? solids, liquids, gases (circle one)

![Graduated Cylinder Diagram]

47. Liquid water is often measured in a graduated cylinder using what unit of measure? **Milliliters (ml)**
48. If 1 tsp (teaspoon) = 5 ml (milliliters), how many teaspoons would be found in the following graduated cylinder (note the top and bottom of the graduated cylinder are not shown).

\[
\frac{30 \text{ ml}}{5 \text{ (ml/tsp)}} = 6 \text{ teaspoons (tsp)}
\]
49. In the spring, construction crews begin building a new shopping center across from Wal-mart. The construction crew dumped a pile of dirt approximately 8 feet tall. A big storm came up the next day that brought heavy rain. In a paragraph, explain what changes might happen to the soil. Make sure to use your vocabulary terms for the processes that change Earth’s surface: WEATHERING, EROSION, and DEPOSITION.

The heavy rains slowly begin to **WEATHER** away (or break down) the pile of dirt. After it rains for a while, the dirt that has been weathered off the pile will start to wash away or **ERODE**. Water always moves in the direction of gravity, so the dirt may wash down a road and **DEPOSIT** in a small creek. The small creek will then become muddy as the sediment from the dirt pile mixes with the fresh water. It will eventually settle on the bottom of the creek or continue to flow down the creek until it possibly flows into a lake.
50. **Draw, label, and explain** the WATER CYCLE tracing the path water takes from a cloud, to a mountain/hillside, to a lake/ocean and back to a cloud. You must also have a SUN because the heat energy from the sun powers the water cycle. You must include the following TERMS - evaporation, condensation, precipitation, and refill/collection. It's a bonus to include, label, and explain terms like runoff and transpiration. **BE NEAT!**

![Water Cycle Diagram]

1. **Heat energy** from the sun powers the water cycle.
2. **Evaporation** occurs when the sun heats the liquid water causing it to turn into a gas as water vapor.
3. Clouds are formed when water vapor is *cooled* and *condensation* occurs.
4. **Precipitation** is when the clouds containing the condensed water become too heavy or too saturated to hold any more liquid. It then falls to the Earth as rain, snow, sleet, or hail.

5. Rain, snow, sleet, and/or hail that doesn’t seep into the ground refills the surface water in the lakes and oceans and the process starts over again.