**Water cycle and aquifer springs**

We will “visit” Wakulla Springs State Park in Florida. Underground springs have very clean, fresh, cool water that has enough pressure to force the water back out the surface. Let’s follow the journey of water high into the atmosphere and back down, deep underground.

<http://www.floridasprings.org/anatomy/>

Click on the picture to link 🡪 

Then click on the “Continue” link. Your notes are organized by the webpages on this site.

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If you finish and have time, continue to the “Protecting Springs” link (on the left sidebar).

 There are ways you can help the fresh water supply.

Link to “How You Can Help” under “Threats and Solutions” in this section.

 **Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**J o u r n e y o f W a t e r**[**http://www.floridasprings.org/learn/journey/**](http://www.floridasprings.org/learn/journey/)

**Evaporation:**

1) Where does the energy come from for evaporation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) What kind of heat transfer moves the water vapor upward? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) Why does the water vapor become water droplets? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Transpiration:**

4) What makes transpiration different than evaporation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) About how much of the rainfall returns to the atmosphere by evaporation or transpiration? \_\_\_\_\_

**Rainfall (Precipitation):**

6) What two factors are most influential in rainfall? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) Which two states have the most rainfall in the U.S.? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) What is the measure of the amount of water air can hold? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Runoff**:

9) Why does Georgia have more stormwater runoff than Florida? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10) Where does surface runoff water collect? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Percolation (infiltration):**

11) Where does the water go when it soaks into the ground in Florida? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12) What kind of rock is under Florida’s sandy soil which allows water to flow through it? \_\_\_\_\_\_\_\_\_\_\_\_

**Rainfall again:**

13) What is the most important step in the water cycle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Recharge basin:**

14) The area of percolation for an underground aquifer is called its **recharge basin**. What was the term we learned for the area of surface water runoff that flows into tributaries and rivers? [Note: This answer is not on the website … you’ll have to remember from our erosion and river system unit! It’s another name for “watershed.”] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Underground cave formation (Spleogenesis):**

15) What kind of weathering is responsible for underground cave formation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16) Limestone is sometimes made of crushed seashells. What lab did we complete in class that modeled this kind of weathering? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Groundwater flow:**

17) What force causes the water to flow underground? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18) When the spaces in the limestone are large and connected, the water flows more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Sinkhole / Spring formation:**

19) What causes a sinkhole to happen? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20) Why does water flow upward, out of a spring? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21) Where are the largest springs in the world located? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Human impact on the aquifer and spring water:**

22) What lawn care and agricultural products can harm underground water quality? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

23) What fraction of Florida’s public water use is for watering lawns? \_\_\_\_\_\_\_\_\_\_

24) How do livestock pollute the freshwater supply? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

25) As cities become larger, how does that affect groundwater recharge basins? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

26) The process of directing stormwater runoff through storm drains and culverts is called
 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

27) How can golf courses and athletic fields be bad for the water cycle and fresh water supply? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

28) Is it possible for underground water to be used up, or is it always restored through rainfall? Explain your answer. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

29) How can dumping trash into a dry sinkhole affect the water supply? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

30) List six ways recreation can affect the water quality:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Journey of Water – Answer Key

1) the sun

2) convection

3) it cools and condenses

4) Transpiration moves through plants; evaporation occurs with open water.

5) 70%

6) gravity and humidity

7) Florida and Louisiana

8) relative humidity

9) Florida has more sand, and Georgia has more clay

10) lakes, rivers, wetlands and oceans

11) into tiny holes in the rocks

12) limestone

13) They are all equally important

14) drainage basin

15) chemical weathering

16) vinegar and sea shells

17) gravity

18) quickly

19) Ground collapses into an underground cave

20) differences in the slope or "hydraulic gradient"

21) north-central Florida

22) chemical fertilizers and pesticides

23) half

24) wastes wash into the water

25) Demands for residential water, increasing storm water runoff and direct human impact

26) stormwater management

27) excessive irrigation, fertilization and pesticide use. With regular rainfall, these chemicals leech through the root systems and soil, and eventually into the aquifer.

28) withdrawing water from Florida's underground aquifer faster than it can be replenished, decreasing flow levels at many head springs, stressing sensitive spring plant and animal species, and causing ***permanent***, long-term damage to the geologic structure of the aquifer itself.

29) The sinkhole almost always feeds directly into the aquifer below.

30) trampling of native vegetation, the disturbance of wildlife,
an increase in soil erosion and cloudiness of water, trash pollutes
direct physical damage to plants and animals by boat props, groundings and anchors.
Trash also destroys the natural look and atmosphere of the spring's environment.