

River Talk: Analogies of a Watershed

(Adapted from a lesson of the same name in *Discover a Watershed: Watershed Manager The Water Course and International Project WET, 2002*)

Virginia SOLs English 6.3 b, 7.4 b and Science 6.7

Key Concepts use of analogies, stream and river processes and components of a watershed

Vocabulary Terms are defined on the student sheets.

Setting classroom

Summary Students analyze the relationship between a pair of watershed words and select a word or phrase to complete a second pair, using the same type of analogy. This lesson is useful for both science and language arts instruction, as analogies frequently appear on standardized tests.

Learning Objectives

Students will:

1. strengthen their watershed vocabulary.
 2. enhance critical thinking skills by identifying analogies.
 3. increase their ability to recognize relationships in the world around them.
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Background Information

Every watershed is unique, yet there are components they all share. Understanding the common parts of each basin provides a foundation for understanding the dynamic whole of a watershed, just like learning anatomy is the first step to understanding the complexities of the human body.

The use of analogies, like the one above comparing a watershed to the human body, helps us understand something new by relating it to something known. Analogies show similarities or things in common, between pairs or words or phrases. The relationships usually fall into one of the following categories:

1. **Purpose** – one word in the pair shows the purpose of the other words (protractor : measure angles)
2. **Opposites** – the words are opposites (light : dark)
3. **Part/Whole** – one word in the pair is a part of the other, the whole (branch : tree)
4. **Action/Object** – one word in the pair does an action with or to the other word, a object (fly : airplane)
5. **Association** – one word in the pair is what you think of or associate when you see the other (chicken : egg)
6. **Object/Location** – one word in the pair tells the location where the other word or object is found (milk : refrigerator)
7. **Cause/Effect** – one word in the pair is the cause of the other word or phrase, the effect (hurricane : power outage)

In this activity, students will learn the names and roles of different parts of a watershed by solving analogies that compare the processes of a watershed to everyday situations.

Materials

- Student Sheet
 - Vocabulary List
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Procedure

1. Review with the students the different types of analogies and how analogy exercises work. Explain that we are going to use this method to learn or reinforce science vocabulary related to watersheds.
 2. Explain to the students that they have been provided with a word bank as options for completing the student sheet. Each term should only be used once and there are extra terms that don't need to be used.
 3. After giving the students a reasonable amount of time to work independently, review the answers from the key. Students can make a case for alternative answers. For example, the words "river" and "water" would technically be correct for more than one analogy, however the answers in the key the most specific. Ask if anyone needs further explanation of a particular term or terms.
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Answer Key

1. hydrophytic plants
 2. base
 3. main stem
 4. precipitation
 5. river
 6. ecosystem
 7. groundwater
 8. water
 9. riparian buffer
 10. macroinvertebrate
 11. Pamunkey River
 12. condensation
 13. sedimentation
 14. nitrate
 15. aquifer
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Assessment

This lesson can be used as an assessment tool in itself, throughout a unit on watersheds and water resources.

River Talk: Student Sheet

Read the definition of any unfamiliar water/watershed words. Then use logic to figure out the relationship between the first pair of words, and apply that same relationship to fill in the blank in the second pair of words.

Word Bank (Vocabulary):

acid	aquifer	base	Chickahominy River
condensation	dam	drought	ecosystem
erosion	groundwater	headwaters	hydrophytic plants
impervious	James River	main stem	macroinvertebrate
mouth	Nitrite	Pamunkey River	porous
precipitation	recharge	riparian buffer	river
sedimentation	tributary	water	watercourse
watershed	wetland	York River	

1. farm : crops / wetland : _____
2. headwaters : mouth / acid : _____
3. branches : tree / tributary : _____
4. hunger : food / drought : _____
5. stoplight : traffic / dam : _____
6. musicians : orchestra / _____ : watershed
7. deposits : bank account / recharge : _____
8. highway : traffic / watercourse : _____
9. frosting : cake / _____ : river
10. Secretariat : Triple Crown winners / mayfly : _____
11. Chickahominy River : James River / _____ : York River
12. porous : impervious / evaporation : _____
13. accident : traffic delay / erosion : _____
14. lemon : lemonade / _____ : fertilizer
15. refrigerator : food / _____ : groundwater

River Talk: Vocabulary List

Acid	any substance that has a pH below 7.0 or that has more free hydrogen ions than hydroxide ions
Aquifer	a geologic formation that stores or transmits water
Base	any substance that has a pH above 7.0 or that has more hydroxide ions free hydrogen ions
Chickahominy River	tributary of the James River, located on the coastal plain east of Richmond, known for its adjoining wetlands
Condensation	the process by which a gas or vapor changes to a liquid
Dam	a barrier built across a watercourse, for impounding or diverting the flow of water
Drought	an extended period with little or no precipitation
Ecosystem	a community of microorganisms, plants and animals and their interrelated physical and chemical environment
Erosion	the process in which a material is worn away by a stream or river often due to the presence of abrasive particles in the water
Groundwater	water stored in rock crevices and in the pores of geologic materials that make up the Earth's crust
Headwaters	the source of a stream or river
Hydrophytic Plant	a plant characterized by its adaptations to a water-saturated environment
Impervious	incapable of being penetrated
James River	major tributary of Chesapeake Bay, flows 450 miles across Virginia
Macroinvertebrates	organisms without backbones that are large enough to be observed without the aid of a microscope
Main Stem	the major reach of a river formed by the smaller tributaries that flow into it.
Mouth	the point of discharge of a stream or river into another body of water
Nitrite	formed from the combination of nitrogen, ammonia and oxygen. A common pollutant.
Pamunkey River	formed by the North and South Anna Rivers near Ashland, Va.
Porous	full of pores, the state of being permeable by water and air
Precipitation	water that falls as rain, snow, sleet or hail
Recharge	water entering an underground aquifer through fractures or infiltration
Riparian Buffers	land areas directly along a river, stream or other body of water exhibiting physical characteristics and plant and animal communities influenced by water.
River	a natural stream of water of considerable volume, larger than a brook or creek
Sedimentation	the accumulation of fine particles of sediment in waterways as a result of erosion
Tributary	a stream or small river that contributes its water to a larger river
Water	an odorless, tasteless, colorless liquid made up of a combination of hydrogen and oxygen
Watercourse	any natural or artificial channel through which water flows
Watershed	land areas that drains water into a particular body of water
Wetland	landform characterized by the presence of water, hydric soils and hydrophytic vegetation. Transition zone between upland and open water environments.
York River	major tributary of Chesapeake Bay, begins at the confluence of Pamunkey and Mattaponi Rivers