



Water Conservation & Management

Teacher Page

Part I – Conservation

How much water does it take to...?

Take this quick quiz on **water usage**.

Answer Key

Play [this](#) game and fill in the blanks in all of the tips you can do to save water in and around your house. You can complete the tips on this **sheet**. Here is the **answer key**.

Part II – Treatment

The water treatment process...

Click through each link on this [website](#) to learn more about the water treatment process.

Write a 10 sentence paragraph about a water droplet that goes through the treatment process. Be as specific as possible, and use the following vocabulary: **coagulation, sedimentation, filtration, disinfection, storage**.

Part III – Clean Water Team

Join the team...

Begin by reading the introduction from the Clean Water Team comic book, sponsored by the American Farm Bureau Foundation for Agriculture. Full copies may be purchased as www.ageducate.org.

Vocabulary Answer Key

Team Members

Farmer
Soil & Water Conservation Expert
Water Treatment Specialist
Certified Crop Advisor
Research Scientist

Slide Breakdown:

Slide 1

Your name, the role of your worker, the date, a title for your presentation

Slide 2

Define what your worker does. What are the primary responsibilities of your worker? What do they focus on in their job? Where do they spend most of their time working?

Slide 3

Find a picture online of someone who does this occupation. Include the citation on this slide.

Slide 4

What problem does this worker try to fix or prevent?

Slide 5

What tools or equipment does this worker use regularly in their job? Include a picture of at least 1 piece of equipment on this slide.

Slide 6

Credits – Say where you got your information, cited in proper format format. Each source should be on its own line.



Evaluation

PowerPoint rubric



Virginia Standards of Learning

Science

Sixth

- 6.2 The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include
- potential and kinetic energy;
 - the role of the sun in the formation of most energy sources on Earth;
 - nonrenewable energy sources (fossil fuels including petroleum, natural gas, and coal);
 - renewable energy sources (wood, wind, hydro, geothermal, tidal, and solar); and
 - energy transformations (heat/light to mechanical, chemical, and electrical energy).
- 6.5 The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include
- water as the universal solvent;
 - the properties of water in all three states;
 - the action of water in physical and chemical weathering;
 - the ability of large bodies of water to store heat and moderate climate;
 - the origin and occurrence of water on Earth;
 - the importance of water for agriculture, power generation, and public health; and
 - the importance of protecting and maintaining water resources.

- 6.7 The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include
- the health of ecosystems and the abiotic factors of a watershed;
 - the location and structure of Virginia's regional watershed systems;
 - divides, tributaries, river systems, and river and stream processes;
 - wetlands;
 - estuaries;
 - major conservation, health, and safety issues associated with watersheds; and
 - water monitoring and analysis using field equipment including hand-held technology.
- 6.9 The student will investigate and understand public policy decisions relating to the environment. Key concepts include
- management of renewable resources (water, air, soil, plant life, animal life);
 - management of nonrenewable resources (coal, oil, natural gas, nuclear power, mineral resources);
 - the mitigation of land-use and environmental hazards through preventive measures; and
 - cost/benefit tradeoffs in conservation policies.

Seventh

- LS.12 The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include
- food production and harvest;
 - change in habitat size, quality, or structure;
 - change in species competition;
 - population disturbances and factors that threaten or enhance species survival; and
 - environmental issues (water supply, air quality, energy production, and waste management).

English Sixth

- 6.6 The student will write narratives, descriptions, and explanations.
- Use a variety of planning strategies to generate and organize ideas.
 - Establish central idea, organization, elaboration, and unity.
 - Select vocabulary and information to enhance the central idea, tone, and voice.
 - Expand and embed ideas by using modifiers, standard coordination, and subordination in complete sentences.
 - Revise writing for clarity.

- 6.7 The student will edit writing for correct grammar, capitalization, punctuation, spelling, and sentence structure.
- a) Use a variety of graphic organizers, including sentence diagrams, to analyze and improve sentence formation and paragraph structure.
 - b) Use subject-verb agreement with intervening phrases and clauses.
 - c) Use pronoun-antecedent agreement to include indefinite pronouns.
 - d) Maintain consistent tense inflections across paragraphs.
 - e) Choose adverbs to describe verbs, adjectives, and other adverbs.
 - f) Use correct spelling for frequently used words.

Seventh

- 7.8 The student will develop narrative, expository, and persuasive writing.
- a) Apply knowledge of prewriting strategies.
 - b) Elaborate the central idea in an organized manner.
 - c) Choose vocabulary and information that will create voice and tone.
 - d) Use clauses and phrases to vary sentences.
 - e) Revise writing for clarity and effect.
 - f) Use a word processor to plan, draft, revise, edit, and publish selected writings.
- 7.9 The student will edit writing for correct grammar, capitalization, punctuation, spelling, sentence structure, and paragraphing.
- a) Use a variety of graphic organizers, including sentence diagrams, to analyze and improve sentence formation and paragraph structure.
 - b) Demonstrate understanding of sentence formation by identifying the eight parts of speech and their functions in sentences.
 - c) Choose pronouns to agree with antecedents.
 - d) Use subject-verb agreement with intervening phrases and clauses.
 - e) Edit for verb tense consistency.

Eighth

- 8.7 The student will write in a variety of forms, including narrative, expository, persuasive, and informational.
- a) Use prewriting strategies to generate and organize ideas.
 - b) Organize details to elaborate the central idea.
 - c) Select specific vocabulary and information.
 - d) Revise writing for word choice, sentence variety, and transitions among paragraphs.
 - e) Use available technology.
- 8.8 The student will edit writing for correct grammar, capitalization, punctuation, spelling, sentence structure, and paragraphing.
- a) Use a variety of graphic organizers, including sentence diagrams, to analyze and improve sentence formation and paragraph structure.

- b) Use and punctuate correctly varied sentence structures to include conjunctions and transition words.
- c) Choose the correct case and number for pronouns in prepositional phrases with compound objects.
- d) Maintain consistent verb tense across paragraphs.
- e) Use comparative and superlative degrees in adverbs and adjectives.

Technology

- C/T 6-8.5 The student will demonstrate knowledge of technologies that support collaboration, personal pursuits, and productivity.
- Work collaboratively and/or independently when using technology.
 - Practice preventative maintenance of equipment, resources, and facilities.
 - Explore the potential of the Internet as a means of personal learning and the respectful exchange of ideas and products.
- C/T 6-8.7 The student will evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
- Use search strategies to retrieve information.
 - Evaluate the accuracy, relevance, and appropriateness of electronic information sources.
- C/T 6-8.9 The student will use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
- Choose the appropriate tool, format, and style to communicate information.
 - Independently use technology tools to create and communicate for individual and/or collaborative projects.
 - Produce documents demonstrating the ability to edit, reformat, and integrate various software tools.

Credits

This WebQuest was created by Kelly Trump for Agriculture in the Classroom.

Water Usage Quiz

Name: _____ Date: _____ Period: _____

Match the activity with the amount of water usage. Write the letter of your answer next to the number in the blank. These are all estimates from the websites below.

- | | |
|--|------------------------|
| ___ 1. Take a 10 minute shower | A. 600,000 gallons |
| ___ 2. Flush a toilet | B. 7 gallons |
| ___ 3. Run a dishwasher on the short cycle | C. 2 liters |
| ___ 4. Run a small load of laundry | D. 0.5 gallon |
| ___ 5. Brush your teeth (wet brush and rinse briefly) | E. 340 billion gallons |
| ___ 6. Fill an Olympic-sized swimming pool | F. 50 gallons |
| ___ 7. The amount a human should drink a day | G. 100 gallons |
| ___ 8. The amount a camel drinks at one time | H. 27 gallons |
| ___ 9. Approximate water used in 1 day for the whole USA | I. 4-6 gallons |
| ___ 10. Outdoor watering with a hose for 10 minutes | J. 30-50 gallons |

Facts and estimates were taken from the following websites:

<http://www.elmwoodpark.org/water/Facts.htm>

<http://www.kineticocolumbus.com/Columbus/Learn+About+Water/General+Water+Information/Water+Usage+Facts/>

<http://www.cityofsaalem.net/Departments/PublicWorks/Operations/Customerservices/Pages/WaterUseFacts.aspx>

Water Usage Quiz – Answers

Match the activity with the amount of water usage. Write the letter of your answer next to the number in the blank. These are all estimates from the websites below.

- | | |
|--|------------------------|
| __F__ 1. Take a 10 minute shower | A. 600,000 gallons |
| __I__ 2. Flush a toilet | B. 7 gallons |
| __B__ 3. Run a dishwasher on the short cycle | C. 2 liters |
| __H__ 4. Run a small load of laundry | D. 0.5 gallon |
| __D__ 5. Brush your teeth (wet brush and rinse briefly) | E. 340 billion gallons |
| __A__ 6. Fill an Olympic-sized swimming pool | F. 50 gallons |
| __C__ 7. The amount a human should drink a day | G. 100 gallons |
| __J__ 8. The amount a camel drinks at one time | H. 27 gallons |
| __E__ 9. Approximate water used in 1 day for the whole USA | I. 4-6 gallons |
| __G__ 10. Outdoor watering with a hose for 10 minutes | J. 30-50 gallons |

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<http://www.kineticocolumbus.com/Columbus/Learn+About+Water/General+Water+Information/Water+Usage+Facts/>

<http://www.cityofsalem.net/Departments/PublicWorks/Operations/CustomrServices/Pages/WaterUseFacts.aspx>

NOTES

1. Take a shower 10 minute shower - about 5 gallons per minute
5. It would use more water if you let it run while you brush
- Camel drink at one time: Accepted belief is anywhere between 30-50 gallons at one time.
9. This total includes water used in irrigation, in industry, in fire fighting and in street cleaning.

Water Game – Conservation Tips

Name: _____ Date: _____ Period: _____

Go to the following website:

http://www.ecokids.ca/pub/eco_info/topics/water/water/index.cfm

Play the water conservation game. Click on the each room of the house and find the tips. Read each tip, and fill in the missing words on the worksheet.

Bathroom

- Repair _____ faucets and always _____ your taps tightly so they don't _____.
- Install _____ - _____ showerheads.
- Never flush _____ of any kind down the toilet.

DID YOU KNOW?

- About _____ % of indoor home water use occurs in our _____, and _____ are the single largest water users. Toilets use over 40% more water than needed!

Kitchen

- Don't run the water _____ while thawing _____, hand washing dishes or while washing _____ and _____; use a partially filled sink instead with a _____ rinse afterward.
- Wash _____ and use the _____ cycle.
- Keep a _____ of _____ in the refrigerator, instead of running the tap for a _____ glass of water.

DID YOU KNOW?

- Less than _____ % of the water produced at a large _____ plant is used for drinking purposes.

Laundry Room

- Adjust the _____ and use _____ or _____ water instead of hot.
- Use _____ friendly (low or no phosphate and biodegradable) _____.

Yard and Garden

- Take care of your garden hoses. Don't keep them in the _____ or _____ them across the driveway.
- Collect _____ from the eaves of your house in a large garbage pail or rain barrel.
- If you water your lawn, do it in the cool _____ to avoid evaporation and be careful not to water the _____.
- Clean _____ and _____ with a broom, not with water from a hose.
- Water the _____ not the _____ and use compost and mulch.
- Use a _____ of water to wash your bike or car, then rinse quickly using a _____ on your hose.
- Never throw garbage, _____ or _____ down your toilets, sink drains, the storm drain or onto the ground. Improper disposal leads to _____ of our local creeks, streams, lakes and soil. Take your hazardous waste to your local waste management facility.

DID YOU KNOW?

- Watering the lawn thoroughly _____ per week makes better use of our water than watering it _____.
- Dumping household cleaners, pesticides, oil, gasoline, etc. down the toilet, drain or storm sewer pollutes aquatic _____ and harms every creature that depends on them (including humans).

Bedroom

- Water your _____ plants with water from a rain barrel.

DID YOU KNOW?

- Plants are an active part of the _____ -- they release moisture from the surface of their leaves to the air through transpiration.

Water Game – Conservation Tips – Answer Key

Name: _____ Date: _____ Period: _____

Go to the following website:

http://www.ecokids.ca/pub/eco_info/topics/water/water/index.cfm

Play the water conservation game. Click on the each room of the house and find the tips. Read each tip, and fill in the missing words on the worksheet.

Bathroom

Bathroom

- Repair leaky faucets and always turn off your taps tightly so they don't drip.
- Install low - flow showerheads.
- Never flush garbage of any kind down the toilet.

DID YOU KNOW?

About 75 % of indoor home water use occurs in our bathrooms, and toilets are the single largest water users. Toilets use over 40% more water than needed!

The Sink

- Repair leaky faucets and always turn off your taps tightly so they don't drip. Even a small drip can waste tons of water.
- Use an aerator and a water-flow reducer attachment.
- Turn off the water while brushing your teeth or washing your hands.

DID YOU KNOW?

A tap leaking one drop of water per second wastes more than 25 L of water a day! That's 9,000 L a year!

Shower/Tub:

- Repair leaky faucets and always turn off your taps tightly so they don't drip.
- Have showers instead of baths and keep them short (5 minutes).
- Install low-flow showerheads.

DID YOU KNOW?

A five-minute shower with a standard showerhead uses 100 L of water.
A five-minute shower with a low-flow showerhead uses 35 L of water.

Toilet:

- Repair any toilet tank, bowl or base leaks. You can check the tank for leaks by adding food colouring to the water tank and observing whether it spreads to the bowl without flushing.
- Never flush garbage of any kind down the toilet.
- Install a low-flush toilet (that uses 6 litres or less per flush), or place a toilet insert or weighted plastic bottle filled with water in the water tank.

DID YOU KNOW?

About 75% of indoor home water use occurs in our bathrooms, and toilets are the single

largest water users. Toilets use over 40% more water than needed!

In the Kitchen

Sink:

- Repair leaky faucets and always turn off your taps tightly so they don't drip. Even a small drip can waste tons of water.
- Use an aerator and a water-flow reducer attachment.
- Don't run the water continuously while thawing food, hand washing dishes or while washing fruits and veggies; use a partially filled sink instead with a quick rinse afterward.

DID YOU KNOW?

Only 10% of our home water supply is used in the kitchen and as drinking water but a whopping 65% of it is used in the bathroom.

Dishwasher:

- Wash full loads and use the shortest cycle.

DID YOU KNOW?

An automatic dishwasher uses 40 L of water, compared to dishwashing by hand, which uses about 35 L.

Fridge:

- Keep a pitcher of water in the refrigerator, instead of running the tap for a cold glass of water.

DID YOU KNOW?

Water makes up 70% of the human body. Each day we must replace 2.4 L of water, some through drinking water & the rest through food (all foods contain water!).

DID YOU KNOW?

Less than 3% of the water produced at a large municipal water treatment plant is used for drinking purposes.

In the Laundry Room

Sink:

- Repair leaky faucets and always turn off your taps tightly so they don't drip. Even a small drip can waste tons of water.

DID YOU KNOW?

The laundry room accounts for 20% of household water use.

Washing Machine:

- Wash full loads and use the shortest cycle.
- Adjust the water level and use cold or warm water instead of hot.
- Use environmentally friendly (low or no phosphate and biodegradable) detergents.
- Repair any leaks around the washer taps and hoses.

DID YOU KNOW?

A traditional washing machine uses 130 to 250 L of water to launder a large load.

In the Yard and Garden

Tap/hose:

- Check outside hoses, faucets and sprinklers for leaks. Even a small drip can waste tons of water.
- Take care of your garden hoses. Don't keep them in the sun or drag them across the driveway.

DID YOU KNOW?

Practice wise water use! In the summer, lawn and gardening watering can increase the demand for water by more than 50%.

Rain Barrel:

- Collect rainwater from the eaves of your house in a large garbage pail or rain barrel. Make your own rain barrel!

Go to <http://www.gardengatemagazine.com/tips/40tip11.html> to find out how.

DID YOU KNOW?

Watering the lawn thoroughly once per week makes better use of our water than watering it every day.

Lawn & Sidewalk:

- If you water your lawn, do it in the cool morning to avoid evaporation and be careful not to water the pavement.
- Clean sidewalks and driveways with a broom, not with water from a hose. Using a broom instead of the hose saves about 200L of water...each time!
- Use a rain gauge (or simply a can) to measure natural rainfall and your lawn watering. Lawns can stay healthy with only 2 - 5 cm of water per week.
- Do not water your lawn on windy days and do not turn on sprinklers for the entire day.
- Keep your grass about 6 cm long because taller grass holds water better.

DID YOU KNOW?

One lawn sprinkler spraying 19 L per minute uses 50% more water in just 1 hour than a combination of 10 toilet-flushes, two 5-minute showers, two dishwasher loads and a full load of clothes!

Garden:

- Plant trees, shrubs, herbs and flowers that are native and generally require less care and water.
- Water the roots not the leaves and use compost and mulch.
- Consider replacing grass with drought-resistant plants—the more plants the better, as vegetation reduces run-off.

DID YOU KNOW?

During the summer, about half of all treated water is sprayed onto lawns and gardens.

Cars and bikes:

- Use a bucket of water to wash your bike or car, then rinse quickly using a trigger nozzle on your hose.
- Wash the family car over grass or gravel to prevent any soapy runoff from going directly into the sewers.

DID YOU KNOW?

Using a bucket of water to clean the car instead of the hose saves about 300 L of water...each time!

Sewer grates:

- Never throw garbage, oil or chemicals down your toilets, sink drains, the storm drain or onto the ground. Improper disposal leads to contamination of our local creeks, streams, lakes and soil. Take your hazardous waste to your local waste management facility.
- Paint yellow fish on storm drains, to remind everyone that what goes down our drains ends up in our water systems. For more information about this activity, go to www.earthwater-stencils.com.

DID YOU KNOW?

Dumping household cleaners, pesticides, oil, gasoline, etc. down the toilet, drain or storm sewer pollutes aquatic ecosystems and harms every creature that depends on them

(including humans).

In the Bedroom

Potted plants:

- Water your indoor plants with water from a rain barrel.

DID YOU KNOW?

Plants are an active part of the water cycle—they release moisture from the surface of their leaves to the air through transpiration.

DID YOU KNOW?

Ice floats because as water freezes, it becomes lighter (less dense) than liquid water. If ice did not float, lakes would freeze from the bottom up, freezing/killing all the plants and fish as well. But the ice on top keeps the water underneath protected from the cold.

It

is like a blanket that keeps the water at a safe temperature for the living things in the lake.

Clean Water Team Vocabulary- Answer Key

Name: Answer Key Date: _____ Period: _____

In complete sentences, define the following vocabulary.

Watershed: A watershed is a section of water that drains into other sections. A large watershed can include rivers, streams, lakes, wetlands, mountains, farms, towns, or rangeland. All water is in a watershed.

Water Pollution: Pollutants are things that can harm the water quality. Some examples of pollutants are sediment, fertilizers, chemicals, bacteria. Pollution can also be caused from human activity such as industry, farming, and housing developments.

Point Source Pollution: Point source pollution is pollution that enters water from a single source, like a pipe or a drain. The pollution can "point" to the one contaminator.

Non-point Source Pollution: Non-point source pollution comes from a wide area. It can come from fields, lawns, and parking lots. It is hard to identify and control. It harms water in the entire watershed.

Runoff: Runoff is water that does not soak into land, but rather runs off into other water supplies. It may carry pollutants into larger bodies of water.

PowerPoint Grading Rubric

Criteria	F	D	C	B	A
Your name is present on slide one	2	3	4	4.5	5
The role of your worker is on slide one	2	3	4	4.5	5
Presentation titled on slide one	2	3	4	4.5	5
Your workers job is defined and their responsibilities are mentioned on slide 2	12	14	16	18	20
A picture of a worker is included with a proper Citation on slide 3	6	7	8	9	10
Tells the job the worker tries to fix/prevent on slide 4	2	3	4	4.5	5
Equipment is explained on side 5	2	3	4	4.5	5
1 picture of some equipment in included and cited Properly on slide 5	6	7	8	9	10
Credits slide represents everything and is done correctly	6	7	8	9	10
Presentation has appropriate background, with slide transitions and animations	6	7	8	9	10
Writing is grammatically correct with varying sentence structure and punctuation.	6	7	8	9	10
Student concentrated throughout activity	2	3	4	4.5	5
				Points earned:	/100_____
Comments					