WHAT DO YOU KNOW ABOUT H2O?

ACTIVITY BOOK

www.conserveh2o.org
Water is the most valuable natural resource on earth. We can’t live without it. Which means we need to use it wisely and learn as much about it as possible. This Be Water Smart book of puzzles and games will test how much you know about H2O. Open your mind and let the info flow. Get water wise!
Water is the most valuable natural resource on earth. We can't live without it. Which means we need to use it wisely and learn as much about it as possible. This Be Water Smart book of puzzles and games will test how much you know about H2O. Open your mind and let the info flow. Get water wise!

Just turn on the faucet and water flows. But where does it all come from? Decode the secret messages below to find the source:

`AV OA AV OA AV OA CFEY TYYOV JOJ FRAOFV.`

`>LYGV RV LLTLLOV CFELY OLV>OF.`

`VEJO AV OA LEYOV CFEY.BLLLV JOJ>OF>IO.`

`F<EO>JO. >LYGV RV LLTLLOV <CFELY OLV>OF.`

`<OFVAV<CD. `_
Give an example of standing surface water.

About how many inches of snow make up an inch of water?

What type of soil is most likely to allow groundwater contamination?

What are smaller streams that flow into larger streams called?

Of all the earth's water, how much of it is found in the oceans?

Water that runs off hard surfaces is called?

What is a geographical area called where all the water drains naturally to one place?

What is the scientific name for the study of groundwater?

What is the name of an artificial lake that stores water?

What is the name for an underground layer of sand, gravel, or other rock that is a source of groundwater to a well or spring?

Tributaries

Aquifer

Watershed

97%

Reservoir

10 inches

Surface run-off

Hydrogeology or geohydrology

Sandy

Lake, ponds, swamps, bogs, marshes
Some water-saving ideas are spinning in this “water wheel”. For each numbered suggestion, go around the circle clockwise, reading every other word. (Cross them out as you go.) Keep going until you’ve read all the words. You can write the five tips in the spaces below.

1. ___
2. ___
3. ___
4. ___
5. ___

1000 gallons of H₂O can run through an outdoor hose in an hour! It’s no wonder so much H₂O is wasted outdoors.
WHAT’S YOUR H2O IQ?

ARE YOU A WATER SAVER? We don’t mean the lifeguard kind, we’re talking about people who use only the water they need and leave the rest for the fish and Mother Nature (she gets thirsty, too). Answer the following questions and see how you “measure up” as a water saver.

WHEN I BRUSH MY TEETH I...
- a. Only turn the water on to wet my brush and rinse.
- b. Leave the water running the whole time.
- c. I never brush my teeth; I prefer “Pearly Browns.”

I USE THE TOILET FOR...
- a. The stuff you can’t do unless you unzip.
- b. Shooting baskets with tissue.
- c. My dog’s water dish; he loves the extra flavor.

FOR ME, THE SHOWER IS...
- a. A quick dip; I have better things to do than wrinkle.
- b. Where I can take time to improve my yodeling skills.
- c. What? Shower and lose my signature scent?

WHEN MY PARENT ASKS ME TO DO THE LAUNDRY I...
- a. Make sure there’s a full load, before starting the washer.
- b. Know the fewer things I wash, the fewer I’ll have to fold.
- c. Fold the stuff in the hamper and spray it with Lysol™ – so far they haven’t noticed.

DURING THE DAY I QUENCH MY THIRST WITH...
- a. Water that was chilled in the refrigerator.
- b. Cold water I got by letting the tap run until cool.
- c. A super-big, super-sugary, and super-caffeinated super-sipper!

WHEN I CAN’T FINISH A GLASS OF WATER I...
- a. Use it to water the plants.
- b. Dump it down the drain.
- c. Put my grandpa’s teeth back where I found them; it was the only glass I could find!

IF YOU ANSWERED...

MOSTLY “a’s” You’re a Water Super Saver! You know water is vital for life, but you don’t waste it either.

MOSTLY “b’s” Remember – there’s a limited amount of water available for use and you may be using more than your share. See if you can modify a habit or two and turn your “b’s into “a’s”.

MOSTLY “c’s” You may be saving water, but you’re lacking serious personal hygiene. It’s okay to USE water, just use it wisely!
Water is a vital resource and conserving it is smart. Your brain is also a valuable resource. Use it to connect each question with the right answer.

**Conserving water is important because it**
- a) saves money
- b) helps salmon
- c) we won’t have to build more reservoirs
- d) all of the above

**How can you save water while brushing your teeth?**

**Which of the following is the best example of water waste?**
- a) washing the driveway
- b) bathing
- c) drinking
- d) fires

**How much water does the average family of four use each day?**
- a) 240 gallons
- b) 120 gallons
- c) 500 gallons
- d) 50 gallons

**True or False: A faucet that is dripping 60 drops a minute will waste about 8 gallons a day or 240 gallons in a month.**
- True

**True or False: You can use your water meter to check for leaks.**
- True
**Know Your H₂O**

Cover the true/false answers on the right side of this page. Circle T for True and F for False on the left side. Check your answers and see how water smart you are.

<table>
<thead>
<tr>
<th>T or F</th>
<th>Statement</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T</strong></td>
<td>AS AIR RISES AND COOLS, THE WATER VAPOR IN IT WILL CONDENSE.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>The tiny drops of water move closer to each other to form clouds. It takes billions of drops to make a cloud!</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>WHEN THE SUN DRIES UP WATER IN LAKES AND STREAMS, IT COMPLETELY DISAPPEARS.</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>The sun causes water to evaporate and become water vapor: like when steam rises from boiling water. The water vapor is still there you just can’t see it.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>MOST OF THE EARTH’S FRESH WATER LIES UNDERGROUND.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>Most of our fresh water is found in between cracks in rocks and in soil.</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>SNOW ISN’T CONSIDERED PRECIPITATION.</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Both rain and snow are ways water returns to the Earth’s surface, which is called precipitation.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>A PERSON NEEDS TWO AND A HALF QUARTS OF WATER A DAY TO LIVE.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>Yes! If you think that’s a lot, a milk cow needs 37 gallons of water a day!</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>WE EACH USE ABOUT 70 GALLONS OF WATER A DAY.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>From brushing our teeth to taking a bath, we each use about 70 gallons of water a day.</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>THE WATER YOU DRINK HAS BEEN AROUND FOR MILLIONS OF YEARS.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>We have the same amount of water today as we did back when dinosaurs roamed the earth and seas. It’s the same molecules, they have just been moved around!</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>OF ALL THE WATER IN THE WORLD, 50% CAN BE USED FOR DRINKING.</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Less than one percent of the Earth’s water is fresh and can be used for drinking.</td>
<td></td>
</tr>
</tbody>
</table>
WATER USE FACTS AND FIGURES

How much water does it take to:

Flush the toilet .......................................................... 6 gallons
  with a water saving device ....................................... 4 gallons
  with an ultra-low flush toilet ............................ 1.6 gallons
Run the faucet without an aerator ...........5 gallons per minute
  with a water saving aerator ........ 2.5 gallons per minute
Take a shower ...................................................... 5 gallons per minute
Run the dishwasher ...................about 17 gallons per load
Run the washing machine .............. 41-49 gallons per load
Run a garden hose ...........................5 gallons per minute

USE THESE FACTS TO HELP YOU SOLVE THE PROBLEMS BELOW.

6:32 AM Dr. Drop, in the bathroom, turns on a faucet without an aerator to brush her teeth.
How much water would she use if she leaves the water running three minutes? _______________
How much water would she use if she turns the water on for 15 seconds to wet her toothbrush
  and again for 45 seconds with an aerator? ________________

6:35 AM Dr. Drop blows her nose. How much water would she use if she puts the tissue in the
garbage can? ____________ How much water would she use if she flushes the tissue down a
regular toilet? ____________

6:40 AM Dr. Drop gets in the shower. How much water would she use if she showers until
7:00am? ____________ How much water would she use if she takes a short, five minute
shower? ____________

7:05 AM Dr. Drop, in the kitchen, gets a glass of cold water. Not counting the water in her
glass, how much water would she use if the water came from a pitcher of icy water in the
refrigerator? ________________
How much water would she use if she lets the water run for one minute without an aerator?
______________

EVERYWHERE AND NOT A DROP TO WASTE!

T or  F As air rises and cools, the water vapor in it will condense.

T or  F When the sun dries up water in lakes and streams, it
completely disappears.

T or  F Most of the earth's fresh water
lies underground.

T or  F Snow isn't considered
precipitation.

T or  F A person needs two and a half
quarts of water a day to live.

T or  F We each use about 70 gallons of
water a day.

T or  F The water you drink has been
around for millions of years.

T or  F Of all the water in the world,
50% can be used for drinking.

The tiny drops of water move closer to each other to form
clouds. It takes billions of drops to make a cloud!

The sun causes water to evaporate and become water
vapor: like when steam rises from boiling water. The
water vapor is still there you just can't see it.

Most of our fresh water is found in between cracks in
rocks and in soil.

Both rain and snow are ways water returns to the Earth's
surface, which is called precipitation.

Yes! If you think that's a lot, a milk cow needs 37 gallons
of water a day!

From brushing our teeth to taking a bath, we each use
about 70 gallons of water a day.

We have the same amount of water today as we did back
when dinosaurs roamed the earth and seas. It's the same
molecules, they have just been moved around!

Less than one percent of the Earth's water is fresh and
can be used for drinking.
Fill in the blanks below with the words on the left and discover what you can do to save water:

1. Water during the cool part of the day to avoid _________________.
2. Instead of using a _________________ to clean off your sidewalk or driveway, use a _________________.
3. Take a _________________ shower in ________________ minutes or less.
4. Run the dishwasher and washing machine with _________________ loads only.
5. When washing your car, use a hose with a _________________ nozzle.
6. Put a layer of _________________ around trees and plants to slow evaporation of moisture and discourage weed growth.
7. Position your _________________ so water lands on the lawn or garden, not on your _________________ or _________________.
8. Check _________________ and pipes for _________________. Even the smallest _________________ from a worn washer can waste 20 or more gallons a day.
9. Check your _________________ for leaks by putting a little _________________ in your toilet tank. If, without flushing, the color begins to appear in the bowl, you have a leak that should be repaired immediately.
10. Turn off the water while _________________ your _________________. Just wet your brush and fill a glass for mouth rinsing.
11. Don’t use your toilet as a _________________. Dead bugs and used facial tissue should go in the wastebasket.
12. Keep a bottle of cold water in the _________________ for drinking, instead of letting the tap run until cold.
Draw a line from each word to its definition.

Transmission System
- A device used for recording the amount of water passing through a pipe

Distribution System
- Water that is fit for consumption

Groundwater
- A facility for cleaning and treating fresh water for drinking

Water Conservation
- Using up goods and services

Precipitation
- Large water pipes over 18" in diameter and pumps used to distribute drinking water from the source to the community

Consumption
- Water underground, such as in wells and aquifers

Potable Water
- The act of destroying harmful microorganisms

Treatment Plant
- Pipes; valves to control water flow; and fire hydrants, tanks and reservoirs used in drinking water systems, which deliver water to homes

Water Meter
- Saving, not wasting, water

Disinfection
- Water vapor falling from the atmosphere as rain, hail, sleet or snow
Circle, in the puzzle below, the water words listed on the left.

Moving across the rows from left to right, use the remaining uncircled letters to fill in the blanks below and reveal the water conservation message.

AQUIFER
CONDENSATION
CONDUIT
CONSERVATION
CONSUMPTION
CONTAMINATION
DAM
DISINFECTION
DISTRIBUTION
DROUGHT
EVAPORATION
GROUNDWATER
HYDRANT
INTAKE
IRRIGATION
PIPES
POTABLE
PRECIPITATION
PUMP
RESERVOIR
SOURCE
SURFACE WATER
TRANSMISSION
TREATMENT PLANT
VALVE
WATER CYCLE
WATER METER
WATER SYSTEM
WATERSHED

D T R E A T M E N T P L A N T
O N T P W A T E R S H E D U S
E S U R F A C E W A T E R T H
I O E E W T O C O I I L T E T
R U A C A S N O A W N A R M S
R R T I T E D N B A T S A K D
I C E P E T E S A N A D N D I
G E B I R E N U G S K W S D S
A U R T M E S M R T E A M R I
T D O A E V A P O R A T I O N
I I T T T T U T T U E Q E S U F
O S R I E P I I N S U R S G E
N T P O R O O O D E I C I H C
N R U N O T N N W R F Y O T T
P I M F F A T H A V E C N E I
I B P W A B T E T O R L R W O
P U H V A L V E E E I I E L E N
E T Y O U E B R R R U S H Y O
S I U W A T E R S Y S T E M R
C O N S E R V A T I O N T E E
T N C O N T A M I N A T I O N
H Y D R A N T H C O N D U I T

Moving across the rows from left to right, use the remaining uncircled letters to fill in the blanks below and reveal the water conservation message.

______ __ ________ ______ ________
______ __ ________ ______ ________
______ __ ________ ______ ________
______ __ ________ ______ ________
______ __ ________ ______ ________
______ __ ________ ______ ________
______ __ ________ ______ ________
______ __ ________ ______ ________
Underground pipes carry water all throughout your community. Can you find the way water flows from the storage tank to the water fountain? Dive in.
Show what ya’ know about H₂O. Draw a line that connects each question with the correct answer. Put your thinking cap on. It might rain.

**Name the force that causes water to flow down hill.**

**When tiny drops of water gather together what do they make?**

**Which of the following is not part of the natural water cycle?**
- a) evaporation
- b) condensation
- c) devaluation
- d) precipitation

**As molecules of water freeze do they?**
- a) expand
- b) contract
- c) neither a or b

**What is water called that is located below the earth’s surface in rock crevices?**

**Find the scientific name for the natural water cycle.**

**Water evaporating from the leaves of plants and trees is called?**

**What is the temperature at which water boils in Fahrenheit?**

- 212 degrees
- Transpiration
- Gravity
- Groundwater
- A cloud
- c) devaluation
- a) expand or pull away from each other
- Hydrologic cycle
ACROSS

1. Layers of soil, sand and rocks that store groundwater.
5. To contaminate, to become unclean.
7. Water that is found underground in the cracks and spaces in the soil, sand and rocks.
9. Groundwater leaves the ground and enters a lake or stream in a _______ area.
10. An example of precipitation.
12. A pipe in the ground that is used to remove water from an aquifer.
13. Water on the earth’s surface which moves into a lake or stream without absorbing into the soil.

DOWN

2. The largest use for groundwater is ________.
3. The stage of the water cycle when water changes from liquid to a vapor.
4. Clouds are an example of this.
6. A long period of dry weather could cause a ________.
8. Part of the water cycle when water soaks into the soil.
11. The movement of water underground is called groundwater ________.
**Aquifer** - an underground layer of rock, soil and sediment that is filled or saturated with water

**Condensation** – water changing from a gas to a liquid

**Conduit** – a pipe for transporting fluids, such as water

**Conservation** – saving, not wasting

**Consumption** – using up goods or services

**Contamination** – unfit for use; pollution

**Dam** – a structure built to hold back a flow of water

**Disinfection** – the act of destroying harmful microorganisms

**Distribution System** – pipes, valves to control water flow; and fire hydrants, tanks and reservoirs used in drinking water systems

**Drought** – a long period of dry weather without rain

**Evaporation** – the changing of water from a liquid to a vapor and rising into the air

**Groundwater** – water underground, such as in wells and aquifers

---

**Hydrant** – an upright pipe with a spout or nozzle for drawing water from a water main, installed for fire suppression

**Intake** – an opening which allows water into a conduit

**Irrigation** – supply water to dry land by way of ditches, pipes or streams

**Pipes** – tubes that convey fluid such as water. Water pipe material can be plastic, copper, ductile or cast iron, or concrete cylinder

**Potable Water** – water that is fit for drinking

**Precipitation** – water vapor falling from the atmosphere as rain, hail, sleet or snow

**Pump** – a machine that assists the flow of water in pipes; used to boost water to a higher elevation

**Reservoir** – a tank, pond or lake where water is collected and stored until needed

**Source** – a body of water such as a spring or lake that creates a primary water supply

**Surface water** – precipitation that does not soak into the ground or return quickly to the atmosphere. Surface water can be a stream, lake, river, pond, wetland, ocean or reservoir

**Transmission System** – large water pipes over 18" in diameter and pumps used to distribute drinking water from the source to the community

**Treatment Plant** – a facility for cleaning and treating fresh water for drinking

**Valve** – a device that controls the flow of water through a pipe by opening, closing or obstructing the passageway

**Water Cycle** – often called the hydrologic cycle; the circulation of water from the sky to the earth and back which includes precipitation, transpiration and evaporation

**Water Meter** – a device used for recording the amount of water passing through a pipe

**Water System** – a river and all its branches; or a series of pipes, storage tanks, pumps, fire hydrants connected together to deliver water

**Watershed** – an area of land from which water drains to a single water body like a river
How Much Is Enough?

To determine how much water your sprinkler system applies to your lawn, do the “tuna can test.”

1. Set 5 empty tuna cans (or something similar) at various places on your lawn within your sprinklers’ range. Place the cans halfway between the sprinklers and the areas that generally receive the least amount of sprinkler water.

2. Turn on your sprinklers for 15 minutes.

3. Measure the depth of the water in each can and record on a piece of paper.

4. Determine the average depth.
   For example: can #1 _____ + can #2 _____ + can #3 _____ + can #4 _____ + can #5 _____ = a total depth of: _____.
   Divide the total depth by 5 for an average depth of: _____.

5. Use the chart below to determine your watering times.

Find the average water depth in the tuna cans that you set out with your sprinkler.

The number to the right tells how much time it will take to get 1 inch of water to the lawn during the summer months.

### ADJUST YOUR FLOW - THE “INCH” CHART

<table>
<thead>
<tr>
<th>AVERAGE WATER DEPTH IN TUNA CAN (IN INCHES) AFTER 15 MINUTES</th>
<th>TOTAL WATERING TIME YOU’LL NEED TO GET ONE INCH OF WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>120</td>
</tr>
<tr>
<td>1/4</td>
<td>60</td>
</tr>
<tr>
<td>1/2</td>
<td>30</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
</tr>
</tbody>
</table>

To measure the collected water, place this strip in each tuna can as pictured.
The Regional Water Providers Consortium is a collaborative and coordinating organization that works to improve the planning and management of municipal water supplies in the greater Portland, OR metropolitan region. Find out more about the Consortium, its members, and its work in emergency preparedness, water conservation, and regional coordination at www.regionalh2o.org.