All About Water

Kids' Activity Book

Illinois Extension
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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WELCOME!

Come explore the magic of water!

Water covers over 75% of the Earth's surface, and yet only a small amount is available for us to use every day. The activities in this book will help you learn more about the cool things water can do. It will help you learn where you can conserve water and help those around you make good water use choices.

- This booklet contains activities and experiments for children of all ages and their grown-ups. The activities use common items found in and around the house.
- Some of the items used in these activities can and will be used more than once.
- Following the activities in order will allow you to use these items in multiple projects.

Please Note: These activities are designed to be carried out by children working with a parent, guardian, or other appropriate adult. The adult involved is fully responsible for ensuring that the activities are carried out safely.

This activity book is generously sponsored by:

ILLINOIS AMERICAN WATER

We Keep Life Flowing

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Table of Contents

Materials

- 16 oz. plastic water bottle
- Permanent marker (Sharpie)
- 1 quart plastic bag (Ziploc)
- Timer
- 4-inch piece of natural string. (Cotton and jute are examples of natural material.)
- Paper or binder clip
- Small piece of coffee filter or paper towel
- Rice
- Green/Brown lentils
- Container
- 3 small cups
- 3 tongs or spoons
- Coffee filters
- Calculator (optional)
- Rubber band
- Ruler

WATER CONSERVATION

How much water do you use at home?








Background

- The Earth might seem like it has abundant water, but in fact less than 1 percent is available for human use. The average American family uses more than 300 gallons of water per day at home.

Question/Problem

Are there areas in your home that you could conserve water?

Hypothesis

Changing a water use behavior can reduce the amount of water a family uses each day.

Materials

- Date recording sheet (included)
- Timer
- Calculator (optional)

Procedure

1. Observe the different times your family uses water.
2. Record the type of use on your data sheet.
3. Record how many minutes or hours each activity takes.
4. Analyze data. What activity used the most water?
5. List your results on the next page.

Results

Record your results here. Did any result surprise you? What activity took the most water?

Conclusion

Based on your observations, where do you think your family can conserve water? Adopt one of your ideas for water conservation and collect new data. Did it work?

WATER USAGE REPORT

BY:

Date : _____
Name : _____
Project Name : _____
Unit / Topic : _____

TIMELINE

NOTES & IDEAS

MILESTONES

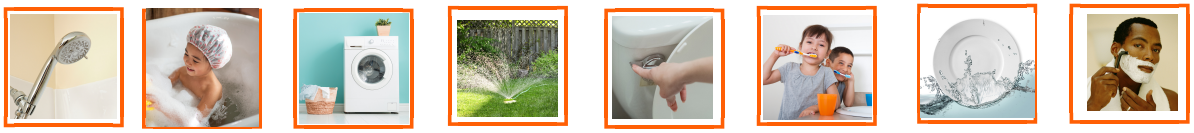
_____

_____

_____

WATER USAGE

Which uses more water?



Background

- The average American family uses more than 300 gallons of water per day at home. Roughly 70 percent of this use occurs indoors. Some historians estimate that people in medieval times used approximately 5 gallons of water per day.

Question/Problem

What areas of the home use the most water?

Game

Choose the card that uses the most water. Pick the most correctly and win the game. For 3+ people.

Materials

- Card Deck (print out included page and cut on the dotted lines)

Procedure

1. One person (adult or parent) is the emcee and will keep the answer sheet.
2. Turn all of the cards over so you can't see the printed image.
3. The first person will flip over two cards and then decide which item or activity uses the most water.
4. If they are correct they will keep the 2 cards.
5. If they are incorrect they will turn the cards back over and mix them up with the rest.
6. The next person takes their turn.
7. Once all of the cards are claimed, the winner is determined by who has the most cards.

Washing dishes in the sink

Washing dishes in the dishwasher

Washing a load of clothes

Taking a 5 minute Shower

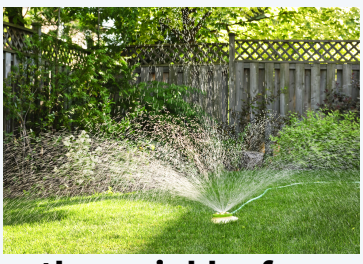
Washing your hands

Flushing a toilet

Brushing your teeth

Shaving

Taking a Bath



Running the sprinkler for one minute

Water Usage Answer Sheet

Washing dishes in a sink	**9-27 gallons**
Washing dishes in the dishwasher	**6-12 gallons**
Taking a 5 minute shower	**10-25 gallons**
Taking a bath	**Around 36 gallons**
Washing a load of clothes	**25-40 gallons**
Washing your hands	**1 gallon**
Flushing the toilet	**3-4 gallons**
Brushing your teeth	**Less than 1 gallon**
Shaving	**1 gallon**
Running the sprinkler for one minute	**12-30 gallons**

The age of appliance or fixture impacts the amount of water used. Older appliances and fixtures generally use more water.

Water usage data from U.S. Geological Survey, 2023

AMAZING WATER

Water in all its forms

Background

Water comes in three forms (states of matter):

- **Liquid** – Water in the form you drink or wash your hands.
- **Solid** - When the water temperature drops below the freezing point of 32 degrees Fahrenheit it turns to ice. Ice cubes are frozen water and so is snow.
- **Gas** – When water gets too warm it starts to evaporate into vapor. Steam coming out of a teapot is water that got very warm and has started to evaporate.

Question/Problem

What happens when water freezes?

Materials

- Plastic bottle
- Water

Activity

1. For this activity you will simply need a 16-ounce plastic recyclable water bottle full of water. **Note** how you can squeeze the bottle gently with your fingers because the liquid form of water can be moved in the bottle.
2. Next, put the bottle into the freezer and leave it for about 3 hours and then discover what happens to the bottle. You could also check on the bottle each hour until fully frozen and talk about what you notice happening to the bottle.

Phenomenon

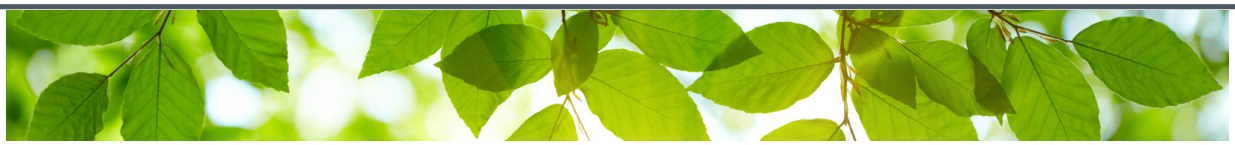
When water changes from liquid to ice it expands which means it takes up more space. When the water began to freeze it started pushing on the soft plastic of the bottle. When the water is fully frozen it pushes the water bottle out as far as it can and if too full can even push the cap off for more room!

Discussion

Did anything surprise you during the experiment?
What questions do you have as a result of this experiment?

TRANSPIRATION

How plants are part of the water cycle



Background

- The water cycle is the processes that circulates water through the earth's oceans, atmosphere and land.
- Plants play a part in the water cycle through transpiration.
- Plants need water, but they only use a small percentage of what they take in the rest (90% to 95%) is released during transpiration.

Question/Problem

How do plants breathe?

Hypothesis

Fresher air can be found on the windward side of the street.

Materials

- Plastic bag (Ziploc)
- Rubber band

Procedure

Capturing water from a living leaf

1. Take a plastic bag out to a tree branch.
2. Put the plastic bag over the branch making sure to have at least one leaf in the plastic bag.
3. using a rubber band, tie the plastic bag to the branch as tightly as you can.
4. Now wait a couple of hours and then see what happened.
5. Remove bag and rubber band from tree.

*****Note: the water in the bag will smell and we do not recommend drinking it.**

Results

- Variations on this experiment:
  - try one branch in the sun and one in the shade. Is there a difference?
  - try one during the day and one at night?
  - try different types of plants, is there a difference in the amount of water?

Conclusion

Over time the transpired water vapor from the leaf will fog up the bag. Eventually the water will condensate (change from vapor to liquid) into droplets of water on the inside of the bag. This will rundown the sides of the bag and puddle in the bottom. Proof that trees transpire water vapor.

WATER CYCLE

Make your own mini water cycle

Background

The basic components of the water cycle include water, evaporation, condensation, and precipitation. The water cycle has more actions, but for this activity we will focus on these four components.
When water is warmed by the sun it evaporates into a gas called vapor. As it rises into the atmosphere it cools and condensates, turning back into liquid which may fall as rain, snow, or hail.

Materials

- The quart size plastic bag from your transpiration project.
- Packing tape or other strong sealing tape.
- ½ cup of small rocks. Aquarium rock works well.
- Water cycle template included in this activity
- A permanent marker

Activity

Slide the template into the bag and trace the water cycle onto the bag using the permanent marker. Remove the template from the bag. Add the rocks to the bag and hold it upright. Then add enough water to just cover it. Zip the bag shut and seal the top with tape. Find a window with the most daily sun and tape the top of the bag to the window. Depending on the amount of sun and time of year it might take a while to see the results so keep checking it.

Phenomenon

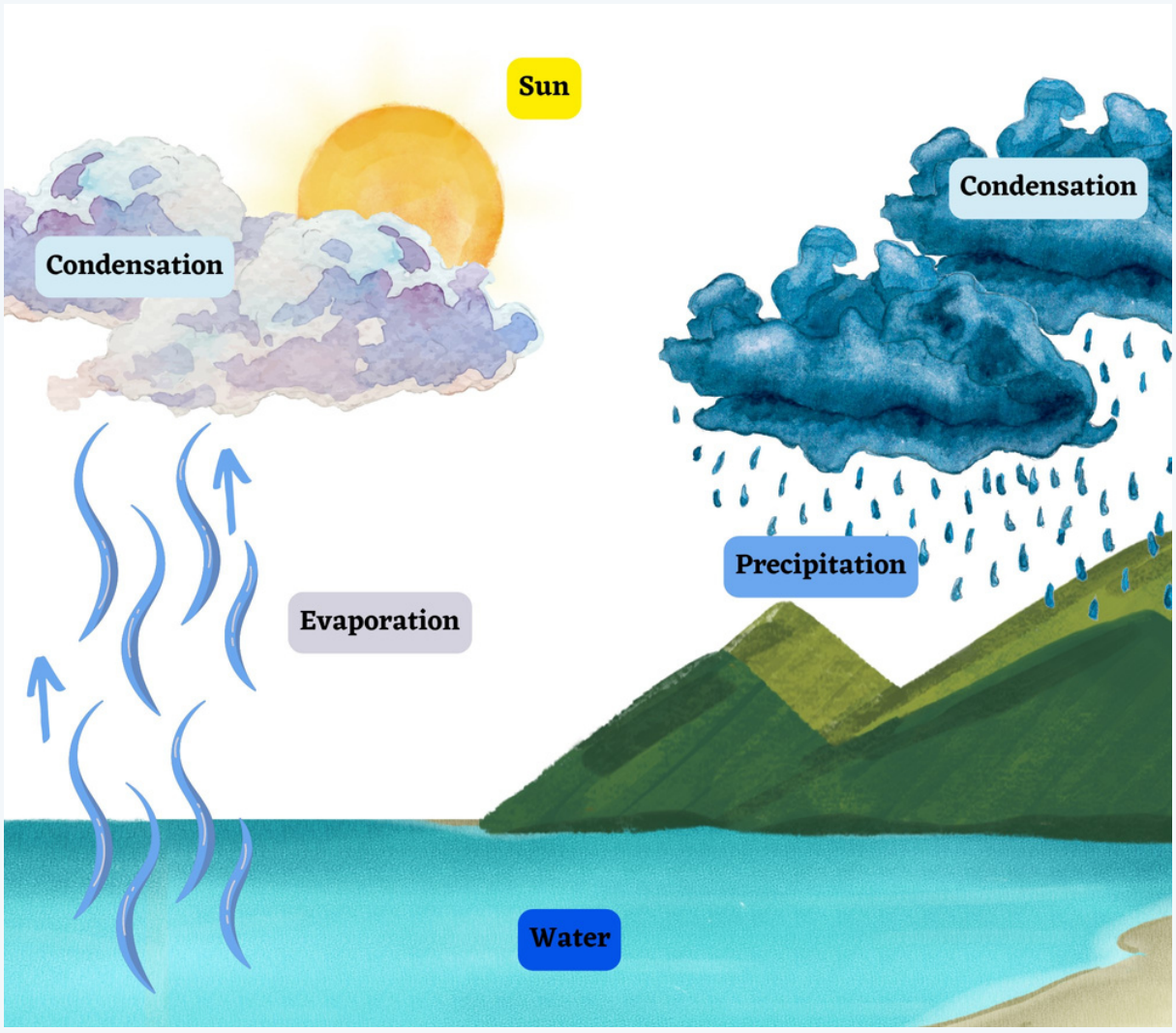
As the sun continues to warm the water in the bag it will evaporate, creating a fog of vapor on the inside. When the vapor cools against the side of the bag, which is the same as the air temperature in the room, it will start to condensate on the sides of the bag. You should see the water droplets start to get bigger and then slide down or precipitate back into the water in the rocks.

Discussion

Did anything surprise you during the experiment?
What questions do you have as a result of this experiment?

Water Cycle Template

Cut out image to fit the size of your plastic bag.

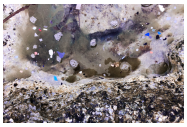


MICROPLASTICS

Can animals avoid them?







Background

Plastics degrade (break down) over time but never go away. Breaking into smaller and smaller piece, microplastics are bits of plastic less than 5mm in size, smaller than a popcorn kernel. They are found in every ecosystem on Earth.

Question/Problem

How do microplastics impact wildlife?

Hypothesis

Aquatic animals are affected by microplastics in their environment.

Materials

- Rice (represents food)
- Green/Brown lentils (represents microplastics)
- Container
- 3 small cups
- 3 tongs or spoons
- Coffee filters (optional)

Activity

1. Pour 5 cups of rice and 1 cup of lentils into the container.
2. Ask kids to pick what they want to be; a baby fish, baby turtle, or baby seabird. Tell them that they are hungry and their food is the rice “floating” in the ocean (container). But, their food is contaminated by plastics (lentils). Their job is to use their mouths (tongs) to put their food (rice) in their stomachs (cups) trying to avoid the plastic.
3. Allow 30 seconds to 1 minute to feed.

Option 2

For Older Kids:

1. Pour their "stomach contents" (from cup) into a coffee filter.
2. Count how many pieces of plastic and pieces of food they have.
3. Calculate the percent plastic in their diet (# lentils divided by # rice x 100)
4. Ask what they think would happen if the percentage gets too high.

Discussion

Many microplastics look just like food to small fish, turtles and birds.

- Were you able to feed without getting any of the plastics?
- If you calculated the percent of plastic in their diet, what was the highest percentage?
- What ways could you limit the amount of plastic in the environment?

CLIMBING WATER?

Capillary action of water

Background

Capillary action allows water to climb up. Water molecules can go up things like string, paper, coffee filters or anything that is absorbent. Another example would be getting a sponge wet. Water molecules like to be together and this helps you get a sponge wet. If you have a sponge you can dip one end in water and watch the water fill the sponge. Plants depend on capillary action to draw up nutrient-rich water to their leaves.

Materials

- Food coloring
- 4-inch piece of natural string. Cotton and jute are examples of natural material.
- Paper or binder clip
- Small piece of coffee filter or paper towel
  For added fun and understanding, cut the paper in the shape of a flower for a helpful visual.
- A small container that holds water. You can reuse an empty washed out container, plastic or glass, like a small yogurt cup or simply use small drinking glass.

Activity

1. Put about an inch of water in the cup and add several drops of food coloring. One end of the string will need to hang into the colored water so you may need to add a little more water once you do the next steps.
2. Cut a 2-inch square piece of your paper choice. This is where you can make it into a flower shape.
3. Connect one end of the string to the back of the paper and to the edge of the cup with your paper clip. Make sure your string is touching the back of the paper and the bottom of the string is into the water at least ½ an inch. You can also tape the edge of the flower to the cup to help hold it in place.
4. Wait and watch the colored water climb the string and color your paper using its capillary skills. This can take a little bit of time so feel free to come back to check on your experiment later.

Phenomenon

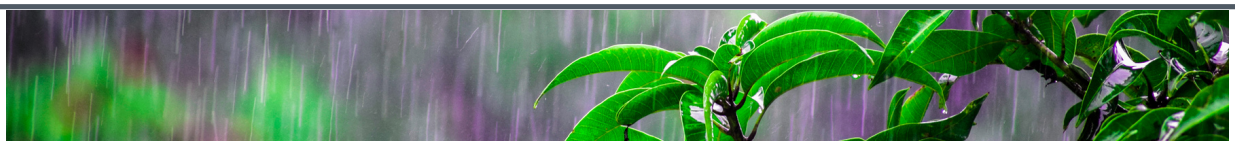
Water molecules like each other and where one goes the rest will follow. The natural string is absorbent which means it attracts water. As the water molecules follow each other up the string they bring the color with them because it is in the water and cannot be taken back out. Watch the colored water climb the string and color your paper using its capillary skills. This can take a little bit of time so feel free to come back to check on your experiment later.

Discussion

Did anything surprise you during the experiment?
What questions do you have as a result of this experiment?

PRECIPITATION

Making your own rain gauge



Background

- Scientists called meteorologists use instruments to record weather information.
- Precipitation is measured by rain gauges.
- Precipitation can come in a variety of forms: rain, sleet, snow, etc.

Materials

- Plastic water bottle
- Ruler

Procedure

- Take an empty water bottle and carefully cut the top third of the bottle off.

Be careful! Edges of the bottle can be sharp.

- Turn the top part upside down and put it in the top of the other part of the bottle. the top part should look like a funnel in the bottle. Tape together.
- With a ruler, measure from the bottom of the bottle mark. Using a permanent marker mark increments of a 1/4 inch up the bottle, making the inch lines bigger.
- Bury the bottom part of the bottle outside in an area away from trees or other obstructions.
- Leave the top sticking out of the ground.
- Check each day for any precipitation.

Results

- Record the date and amount of precipitation collected in the rain gauge.

Conclusion

Did your results match those of the local meteorologist?

Recommended Water Science & Conservation Books for Children

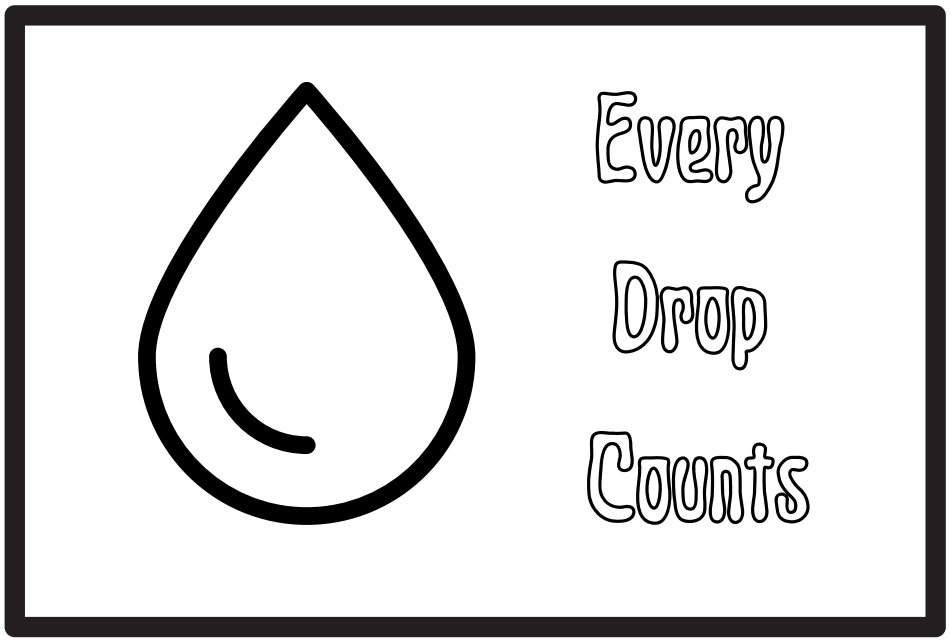
Water
by Frank Asch
A colorful book with simple words about water.
Perfect for young children.
Ages: 2-6

Drop: An Adventure Through the Water Cycle
by Emily Kate Moon
Drop, a drop of water, travels through the water cycle in this fun and silly adventure that brings the water cycle to life for young children.
Ages: 4-8

Water: Up, Down and All Around
by Natalie M. Rosinsky
Where do raindrops come from? An easy to understand information book about the water cycle.
Ages: 5-10

A Drop of Water: A Book of Science and Wonder
by Walter Wick
Water science explained using detailed photographs. This book is quite technical and geared toward older children.
Ages: 8-12

Color these catchy slogans and place them around your house as helpful reminders to conserve water



You have the power to

shorten the shower

The Dharma Trails

Save Water,

Save the Earth

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