GROW A RAINBOW

Spring is a great time to spot rainbows outside. But did you know you can grow your own rainbow right inside your home? Using common household items, this fun experiment is a visually beautiful way for children to learn about capillary action while exploring the science of cohesion and adhesion!

Photo Credit: Mombrite.com

MATERIALS

Paper Towels

Cups

Water

Washable Markers

METHOD

1) Take one paper towel piece and fold it in half lengthwise.
2) Draw the colors of the rainbow on both ends of the paper towel about 2 inches up the paper from the edge. Make sure the colors line up on each end, and that each rainbow stripe is well saturated with ink.
3) Fill both glasses ¾ full with water.
4) Gently place the first end of the paper towel into one cup, and the second end into the other cup. Only submerge half the colored area into the paper towel- Submersing the entire colored area into the water will cause the experiment to fail.
5) Watch as the colors begin to climb up the white paper towel to form a rainbow!

THE SCIENCE OF HOMEGROWN RAINBOWS

These homegrown rainbows are made possible by three scientific forces: Capillary Action, Cohesion, and Adhesion!

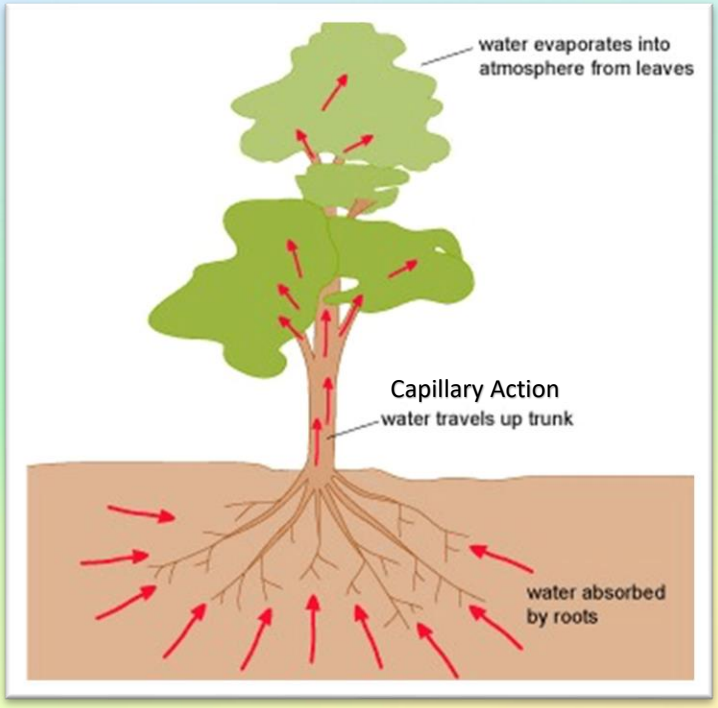
Capillary Action is a process whereby a liquid moves up and into a solid material with several small holes in it. In this case, the fibers in paper towels have many small holes. The water moves upward through the paper towel, carrying the ink with it.

Capillary Action happens because of Cohesion and Adhesion. Water molecules like to stick to each other- This process is called cohesion. They also like to stick to solids- This process is called adhesion.

Water is absorbed through the paper towel because when the first water molecules adhere to it and begin to move upward, it cohesively pulls the next water molecule up with it, like a chain.

WHERE DO WE SEE CAPILARY ACTION IN NATURE?

When we care for plants, where do we water them? On their leaves? On their branches? On their flowers? We water plants at their base where they are seated in the soil. Through capillary action, plants pull moisture up from the soil by their roots and disperse it throughout the plant, from the trunk and stems to the branches, leaves, and flowers. The water molecules travel up through the porous plant the same way they traveled up through our paper towels!



OPPORTUNITIES FOR EXPANDED LEARNING

Encourage your little scientists to experiment with different methods! What happens if you place the entire colored portion of the paper towel in water? Does the color pull up? Does it pull down? Does it stay in place? What scientific force takes over then? Have children time how long it takes the ink to move up the paper towel, and test what makes it move faster or slower. Try different types of paper (more solid vs more porous) and different types of ink (permanent markers vs washable makers), observe the different results, track their progress, and form theories as to why different materials react the way they do. Form predictions about what will happen with each new method, and compare your predictions with the final results! Try drawing different images on your paper towel, like this example where a child colored blue lines on one end of her paper towel to create a capillary action rainstorm over the sun drawn on the other end (conceptually resulting in a rainbow and plant)!

"GROW A RAINBOW" SUPPORTS NGSS!

While growing rainbows, children will: Plan and carry out investigations; Analyze and interpret data; and Construct explanations & design solutions, while learning about: Patterns; Cause and effect; Energy and matter; and Structure & function, and exploring: Life Science, Earth and Space Science, and Physical Science.

Arboretum At Home Nature Adventures sponsored in part by EDISION INTERNATIONAL and the ROTARY CLUB OF ARCADIA.