



WALKING RAINBOW EXPERIMENT

MATERIALS:

Water
Paper Towels
Clear Cups
Food Coloring

VOCABULARY:

Color Wheel	Primary Colors	Secondary Colors	Gas
Capillary Action	Gravity	Solid	Liquid
Matter	Molecules	Surface Tension	Force

DIRECTIONS:

1. Fill 6 cups with water. Fill 3 of them $\frac{1}{4}$ full and fill 3 of them $\frac{2}{3}$ full.
2. Dye one of the $\frac{1}{4}$ full cups yellow, one $\frac{1}{4}$ cup blue and one $\frac{1}{4}$ cup red. It is important that you dye the cups with more water for this experiment to work.
3. Arrange the cups in a circle in the following order: red, clear, yellow, clear, blue, clear.
4. Roll up 6 pieces of paper towel
5. Dip one end of a rolled paper towel into the red water and put the other end in the clear cup next to it.
6. Dip one end of a rolled paper towel into the clear cup and put the other end in the yellow cup next to it.
7. Dip one end of a rolled paper towel into the yellow cup and put the other end in the clear cup next to it.
8. Dip one end of a roller paper towel in the clear cup and put the other end in the blue cup next to it.
9. Dip one end of a rolled paper towel into the blue water and put the other end in the clear cup next to it.
10. Dip one end of a rolled paper towel into the clear cup and put the other end in the red cup next to it.
11. Let the project stand for at least 10 minutes. You will see the color creep up through the paper towels and into the clear cups. The primary colors will mix and form secondary colors in the clear cups.



THE STEAM BEHIND THE EXPERIMENT:

When the paper towels are rolled up and placed between two jars, they exemplify capillary action, which is how liquid can move up something, rather than follow the usual pull of gravity and pull down. To get a bit technical, intermolecular forces between the liquid and the paper towel creates surface tension that reacts with the adhesive force between the liquid and paper towel. This causes the water to move up the paper towel and into the next jar. Capillary action is how plants pull water from the soil and up into their leaves to keep watered. Then, once the paper towels pull color from the base red, blue, and yellow primary color jars, the resulting mixture creates the secondary colors of green, purple, and orange, completing the rainbow. Water moves from jar to jar due to capillary action and surface tension. The surface tension of the water keeps the water from falling off the paper towel onto the table below as it creeps up the paper towel. Capillary action is the force that is applied to the molecules in the water as they are absorbed by the towel. The pressure gently pushes the water all the way through the towel, and down into the jar next to it. The water stabilizes and ends up at the same level in all the jars because of how things like to stabilize. Once the water level is the same in all the jars and the paper towels are all wet, the water stops moving from jar to jar. This is how the colors remain in primary in secondary colors, rather than continuously traveling from jar to jar, which would make all the jars turn brown.

MAKE IT AWESOME:

Try using larger cups and see what happens.

EXTENSIONS:

1. What happens when you use different amounts of food coloring?
2. What happens if you change the order of the cups?
3. What other changes can you come up with for this experiment?

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