

# Is Your Marker a Mixture?

## Simple STEM Activities You Can Do at Home

<b>Purpose:</b>	The purpose of this activity is for students to investigate how mixtures can be separated using the unique properties of each part of the mixture.
<b>Standard:</b>	<p><b>S5P1. Obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change.</b> a. Plan and carry out investigations of physical changes by manipulating, separating and mixing dry and liquid materials.</p> <p><b>S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.</b> a. Develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures.</p>
<b>Materials:</b>	Cup or glass, water, 1-2 paper towels, scissors, several colors of washable markers.
<b>Procedures:</b>	<ol style="list-style-type: none"> <li>1. <b>Cut</b> several strips of paper towel about 1 inch wide.</li> <li>2. Using markers, <b>draw</b> a line across each strip 1 inch from the bottom.</li> <li>3. <b>Add</b> just a little water to your cup and place the ink end of the towel into the water without letting the line go under water. Hold carefully.</li> <li>4. <b>Observe</b> as the water and ink absorb up the paper towel.</li> <li>5. When the water and ink reach a height of 3-4 inches, pull the towel out.</li> <li>6. <b>Observe</b> the ink carefully and determine what colors of dye it contained.</li> <li>7. <b>Explain</b> why you think the colors of dye were separated</li> </ol>
<b>Science Behind It:</b>	<p>Mixtures are substances made by combining two or more different materials without a chemical reaction between them. If needed, a mixture can usually be separated back into its original materials. Tossed salad and mixed nuts are both examples of mixtures that contain a variety of ingredients. If desired, each ingredient can be separated such as a picky eater who hates tomatoes might routinely do with their salad.</p> <p>One substance that might seem pure but is often a mixture is the ink from a pen. Ink is usually a mixture of several colored dyes (or pigments). When needed, we can separate these dyes by passing them through a material in which the dyes move at different speeds. Black, brown, and gray ink are always mixtures of several dyes. One method used to separate colored ink is called chromatography. When we place a piece of paper with a sample of <b>ink</b> on it in a liquid solvent, the <b>ink</b> dissolves and moves up the paper along with the solvent. The different dyes in the ink move up the paper at different speeds and this causes them to become separated as part of the process. In this activity we will use water as our solvent and water-based, washable markers. These markers contain ink and dyes that will dissolve in water.</p>
<b>Questions to Ask:</b>	<ol style="list-style-type: none"> <li>1. According to your results, were most of your markers mixtures?</li> <li>2. Explain why you think the colors of dye were separated by this process?</li> </ol>