



Inquiring Minds Want to Know

Science Activities for Young Minds

Chromatography Butterflies

WHAT YOU'LL NEED

- White coffee filters (one/child)
- Non-permanent markers
- Eye droppers/plastic pipettes/
plastic coffee stirrer (something
that allows water to drip)
- Bowl or cup for each child to hold
the filter
- Water
- Chenille stems (pipe cleaners)

WHAT TO DO

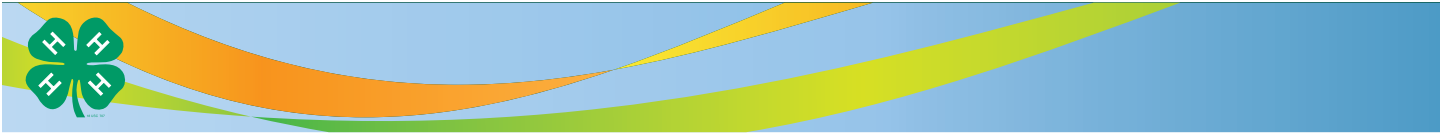
Remember: The purpose is NOT to teach a specific topic but to help children experience the excitement of **science exploration!**

GETTING READY

Put plastic tablecloths on surfaces to protect from spills. Set out markers, eye droppers/pipettes, bowl of water, coffee filters and chenille stems.

LET'S GO

1. Have each child draw a color circle in the center of his/her coffee filter with one color of marker. Time to get up and **observe**.
What color did they each choose? Why did they choose those colors?
2. Hold the coffee filter horizontally or rest the coffee filter on a bowl so the center of the filter doesn't touch the table. Have the kids **predict** what will happen if you add a drop of water.
What do you think will happen when you add the water? What will happen to the marker circle? Will the color spread? Will it stay the same?
3. Have the kids place one drop of water in the marker circle and **observe** the water spread. Add another drop when the water stops spreading. Repeat until you can see all the pigments that were in the marker.
What happened when you added the water? What happened to the marker circle? Did the color spread? Did it stay the same?
4. Make more marker circles on the coffee filter and repeat the water dropping process to make fun designs.
*Do you **predict** that different colors will spread differently? What do you **predict** will happen to the other marker circles? Did you find other colors when your color spread out?*



5. Let the coffee filter dry. Then accordion fold it from top to bottom. This creates wings for the butterfly. Wrap the chenille stem around the center of the folded coffee filter. Bend the tips to create antennae and fan out the wings to complete your butterfly.

TALK IT OVER

Why do you think we saw one color when we used the marker but many colors when we added water to the markers?

What did we do to the color when we added water? What did the colors do? Were they similar or were they different?

GOOD TO KNOW

1 to 5-year-olds:

- ▶ Be sure to use non-toxic markers and monitor children's use of the markers.

Upper middle and high school students:

- ▶ Use different brands of markers and predict if the results will be the same. Compare the results of markers of the same color but different brands.
Would the experiment work with permanent markers? Why or why not?
- ▶ Try using various solvents with permanent markers. Try solvents such as vinegar, dish soap or rubbing alcohol. (NOTE: rubbing alcohol should be used in a well ventilated area) *Which solvent worked? Why or why not?*

THE SCIENCE BEHIND IT

Coffee filter butterflies can be used to illustrate chromatography. Chromatography is the process of separating mixtures. Many inks and markers are a combination of several different color molecules. Each color molecule is a different size and can be separated by size. This results in a separation of the colors. When the liquid is put on the coffee filter in the colored circle, it flows through the filter and dissolves the color molecules, which are moved through the filter with the water. How far various colors get carried depends on their size. The bigger the molecules are, the more slowly they are moved with the water through the filter.

RESOURCES

- ▶ Your local university Extension office – <http://msue.anr.msu.edu/county>.
- ▶ Science Blast website – http://4h.msu.edu/programs/science_technology/science_blast.
- ▶ PBS – <http://www.pbs.org/parents/education/science/activities/preschooler-kindergarten/>.
- ▶ Steve Spangler website – <http://www.stevespanglerscience.com/lab/experiments/is-black-black>.

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