



Chromatography Butterflies

What You Need

Coffee filters	Washable markers
Pipe cleaners	Eye dropper or spray bottle
Water	

What You Do

1. Fold a coffee filter in half.
2. Use washable markers to create a butterfly wing design on one side of the folded coffee filter.
3. Using an eye dropper or clean spray bottle, carefully squirt water onto your folded coffee filter.
As the water soaks into the coffee filter, the marker ink should begin to spread and transfer to the other side. Take time to observe and talk about changes in the colors and shapes of the butterfly wings.
4. Open the coffee filter, lay flat or hang up to dry.
5. Once dry, pinch in the middle of the coffee filter along the fold to create two butterfly wings.
6. Use a pipe cleaner to secure the wings in place and create a butterfly body and antennae.

Questions to ask

- What do butterfly wings look like?
- What happened to your design as it got wet? How do you think that happened?
- Did the colors of your butterfly wing change or stay the same? What did you notice?

What's the Science?

Marker ink is a mixture of many colored pigments. When you add water to your butterfly wing design, it flows through the coffee filter and carries these color pigments along with it. The pigments separate as the water flows because their molecules are different sizes and do not all travel with the water at the same rate. This is one example of "chromatography", a technique in which parts of a gas or liquid mixture (such as marker ink) are separated as it passes through a stationary substance (such as a coffee filter). Scientists use various types of chromatography to study everything from color pigments found in plants to the proteins found in blood.

Try This

Use science vocabulary: Use related science words such as solid, liquid, gas, mixture, separate, pigment, chromatography and molecule as you talk and play together. Children learn new vocabulary words when they hear grown-ups use them in context.

Extend your experiments: Find a few black markers of different brands. With each one, draw a dot on the coffee filter and then add water. *What colors do you see appear? Does each marker dot reveal the same colors or are some different? What do you think would happen if you used non-washable markers?*

Keep in Mind

- Children are natural scientists; let them lead the way in their experimentation! Encourage them to ask questions and make suggestions only when they are stuck/discouraged.
- The order suggested is not the only right or perfect way. Adjust the activities based on the age, ability, and interests of the children.

Additional Resources

Bob and Otto by Robert O. Bruel
Butterfly, Butterfly by Petr Horáček