



Science Experiment: Permanent Marker Tie Dye Project: Arts & Crafts

Supplies:

- Permanent markers (like Sharpies)
- Cotton items to decorate, like tee-shirts, socks, or dish towels
- Rubbing alcohol (isopropanol) **Read warning labels. Parental supervision is required, since rubbing alcohol is poisonous if swallowed. Do this experiment in a well-ventilated area, and do not expose your artwork to heat until is COMPLETELY dry, since rubbing alcohol and its fumes are flammable.*
- Rubber bands
- Eye droppers
- Containers like plastic cups or jars

Time: 20 minutes

What to Do:

1. To make your designs, stretch the cotton over the mouth of a jar or cup and secure it with rubber bands.
2. Use permanent markers to make several dime-sized dots of different colors on the stretched cotton.
3. Slowly drip rubbing alcohol onto the spots of color until the alcohol starts to soak outward, carrying the ink with it.
4. Allow your design to dry overnight. When completely dry, hang your shirt in the sun, or put it in the dryer for 15 minutes to set the color. Wash separately from other clothes, just in case

Reflect:

1. What happens if you draw lines, concentric circles or different shapes on your designs?
2. Can you layer colors and watch them separate?
3. What if you add rubbing alcohol next to the color, instead of directly on it?
4. How many drops of alcohol do you have to add to a dime-sized color spot before it starts to expand?

Apply:

1. What life skills did you use during this experiment?
2. How can you use these life skills in other areas of your life?
3. How can you teach others about this experiment?

Facilitator Notes: Pigments are molecules that give things color. The pigments in permanent markers are trapped in ink compounds that are **insoluble** in water, which means that they won't dissolve in water. However, if you add a **solvent**, like rubbing alcohol, or **isopropanol**, to permanent markers, it dissolves the ink. As the alcohol moves through the cloth you are decorating, it carries the pigments along with it. Small pigment molecules move faster than big ones, so the colors sometimes separate into their different color components as they move through the cloth. The alcohol evaporates into the air, leaving the ink in the fabric, and since it is still insoluble in water, it won't come out when you wash it.

Source: <http://kitchenpantryscientist.com/> (including video)