

November 15 minute STEAM: Sharpie Science

Supplies

Piece of cotton material
2 permanent markers
Dropper bottle with rubbing alcohol



1. Use the markers to make small color designs on the cloth. Keep it simple – geometric shapes, dots, lines, wavy lines. The secret is to keep your designs small.
2. Slowly drop 15 -20 drops of rubbing alcohol in the center of the design and watch it for a few minutes. Don't flood a design. After some experience, you'll find that placing drops in various locations at once will result in some very interesting and colorful designs. It is better to use less than to overdo the rubbing alcohol.
3. When you have what you want, let the design dry for 3-5 minutes. Move on to another location and have at it!
4. Heat-set your designs by running them in a clothes dryer on normal setting for about 15 minutes

The Science

This is really a lesson in the concepts of solubility, color pigment mixing, and the movement of molecules. Remember that you're dealing colors of pigments and not colors of light. Permanent markers contain ink which will not wash away with water. Permanent ink is hydrophobic, meaning it is not soluble in water. However, the molecules of the ink are soluble in rubbing alcohol. As it spreads out in an even, circular pattern from the center of the application, the alcohol carries the various pigments of ink with it and "drops" them off at specific locations from the center depending on their unique solubility. You'll be very surprised at the colors that flow from just black ink.

Expand The Experiment

Try with drops of water and/or vinegar. Does anything happen?

Try using a different type of fabric. This fabric is mostly cotton, what would happen if you used linen or rayon or polyester?



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