SHARPIE
COLOR

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Mess-free tie dye with Sharpie markers makes a great handmade craft or a color-mixing lesson that's easy and fun. Create a simple design of dots and lines with different colored Sharpie pens directly on your t-shirt or whatever item you choose. Using a special dropper bottle, drip rubbing alcohol carefully on the design and let chemistry do its work. The colors explode before your eyes!

Materials
• Large-mouth plastic cup
• Rubber band
• 91% isopropyl alcohol
• Sharpie® pens, various colors
• Piece of white cotton fabric
• Dropper squeeze bottle

EXPERIMENT
Warning: Rubbing alcohol is very flammable and must be kept away from any open flames or heat. This experiment must be conducted in a well-ventilated area, preferably outdoors or in a room with open windows.

1. Place the plastic cup inside the middle of the t-shirt. Position the opening of the cup directly under the section of the shirt that you want to decorate. Stretch the rubber band over the t-shirt and the cup to secure the shirt in place.
2. Place dots or circles of ink from one marker in a circle pattern about the size of a quarter in the center of the stretched out fabric. If you like, use another color marker to fill in spaces in between the first dots. There should be a quarter size circle of dots in the middle of the plastic cup opening when you are finished.
3. Slowly squeeze approximately 20 drops of rubbing alcohol into the center of the circle of dots. DO NOT flood the design area with rubbing alcohol. The key is to drip the rubbing alcohol slowly in the center of the design and allow the molecules of ink to spread outward from the center. As the rubbing alcohol absorbs into the fabric, the ink spreads in a circular pattern. The result is a beautiful flower-like pattern. Students often remark, however, that the design looks like the colorful surface of a compact disc.

4. Apply as much or as little rubbing alcohol as desired, but do not let the pattern spread beyond the edges of the cup. Allow the developed design to dry for three to five minutes before moving on to a new area of the shirt.

5. It is important to heat set the colors by placing the shirt in the laundry dryer for approximately 15 minutes. Teachers have also suggested rinsing the shirt in a solution of vinegar and water as a means of setting the colors.

Enjoy experimenting with various patterns, dot sizes, and color combinations. Instead of using dots, try drawing a small square with each side being a different color, or use primary colors to draw a geometric shape and accent it with dots of secondary colors. Half circles, wavy lines, and polygons all make unique patterns when rubbing alcohol travels across the ink. Your designs are only limited by your imagination. Try as many different patterns as you like. The secret is to keep your patterns small and in the center of the design area on the shirt.

**HOW DOES IT WORK?**
This is really a lesson in the concepts of solubility, color mixing, and the movement of molecules. The Sharpie markers contain permanent ink, which will not wash away with water. Permanent ink is hydrophobic, meaning it is not soluble in water. However, the molecules of ink are soluble in another solvent called rubbing alcohol. This solvent carries the different colors of ink with it as it spreads in a circular pattern from the center of the shirt.
HERE IS WHAT YOU NEED

PLASTIC CUP
RUBBER BAND
ISOPROPYL ALCOHOL
SHARPIE® PENS
PIECE OF COTTON FABRIC
DROPPER BOTTLE
1. Drape the cotton cloth over the cup.

2. Secure the cloth with a rubber band.
3. Transfer the alcohol to the dropper bottle.

4. Decorate the cloth with the Sharpie pens.
THIS IS WHAT OUR DESIGN LOOKS LIKE
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PUT 15-20 DROPS OF ALCOHOL IN THE CENTER OF YOUR DESIGN AND LET IT GO FOR A COUPLE MINUTES.
Try adding drops in several different spots and see what results.

Let your designs dry for 3-5 minutes.
HEAT-SET YOUR DESIGN BY PLACING IT IN THE DRYER FOR ABOUT 5 MINUTES