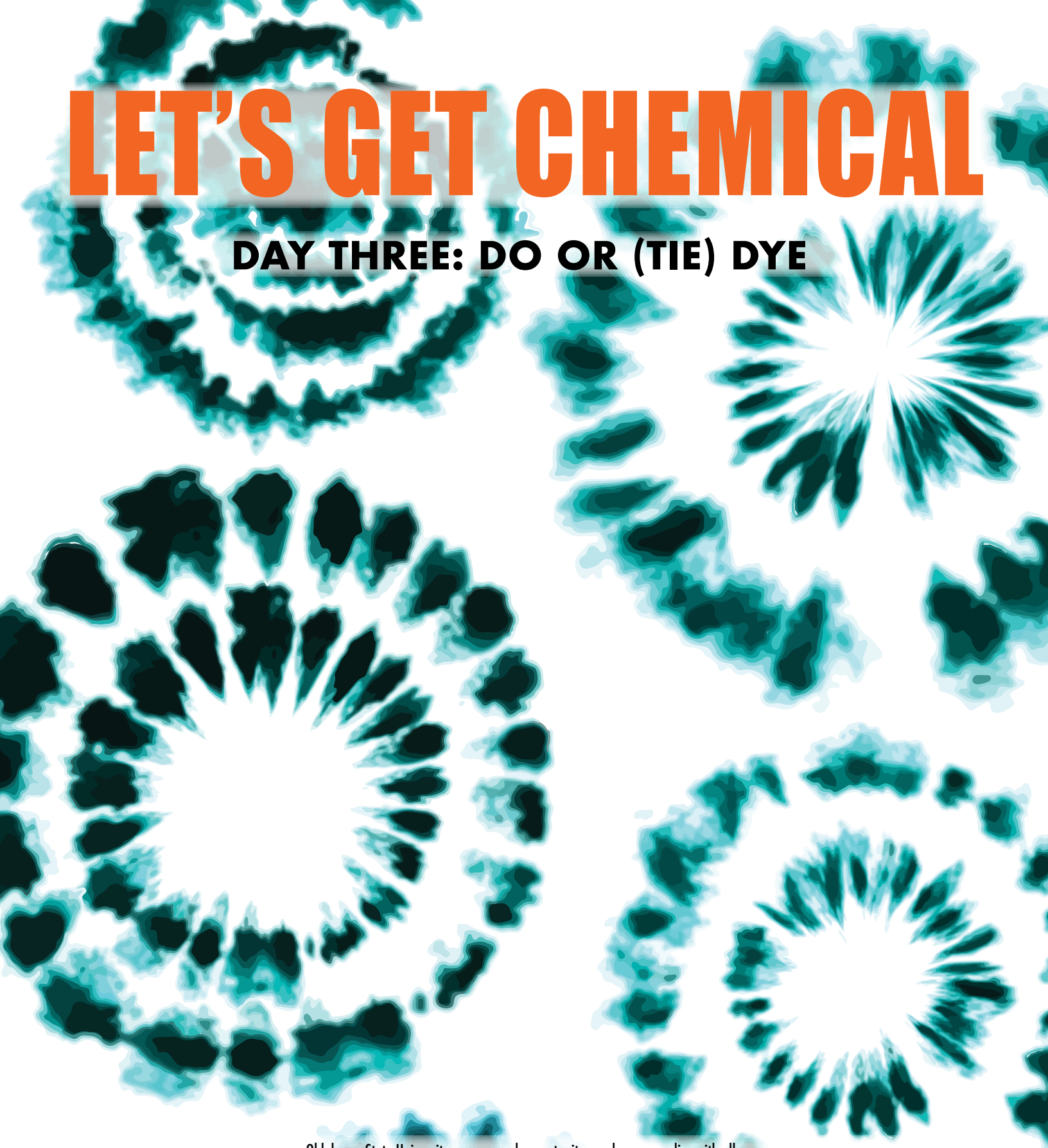
LET'S GET CHEMICAL

DAY THREE: DO OR (TIE) DYE



4-H STEM

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DO OR (TIE) DYE

Welcome to Let's Get Chemical Day Three!

Tie-Dye shirts are so cute! But do you know how they are made? When you use dye on fabric like a t-shirt, you are creating covalent bonds between the cellulose fibers in the shirt and the molecules of the dye. Covalent bonds occur when two or more substances share electrons with each other and stick (bond) together. This is why the dye does not wash out of the clothing, the dye molecules actually become a part of the t-shirt cellulose molecules.

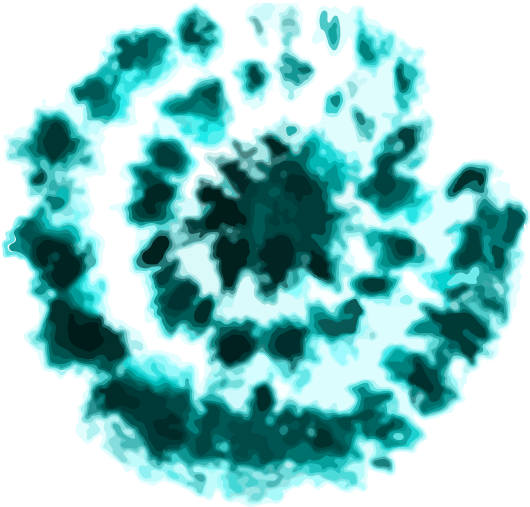
Did you know you can make tie-dye shirts with permanent markers? If you don't have regular dye, you can do the permanent marker method instead! The ink in a permanent marker is hydrophobic meaning it does not like water. Since the ink is hydrophobic, it won't wash out when its washed. However, the molecules of ink are soluble in some other solvents, such as rubbing alcohol. This solvent carries the different colors of ink with it as it spreads to create a pattern on the fabric.

Today, you are going to see these chemical reactions happen by making your own tie-dye shirts! Pick one of the two methods to use. When you are finished, let us know what you learned on the Microsoft Form linked at the end of this handout. If you enjoy today's activity and want to learn more about covalent bonds, check out this video!

https://youtu.be/K2eYZ5p1VYc

Vocabulary:

- Cellulose: substance that is the chief part of the cell walls of plants and is used in making various products.
- Covalent Bonds: chemical bonds between two nonmetal atoms. An example is water, where hydrogen (H) and Oxygen (O) bonod together to make water (H2O)
- Soluble: ability to be dissolved
- Hydrophobic: substance that does not like water



Challenge!

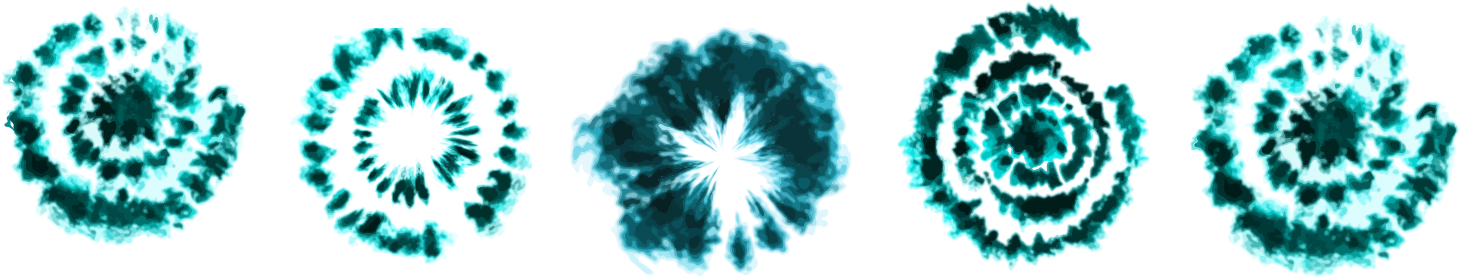
Make an extra tye dye t-shirt and gift it to a friend or family member!
Check out this fair entry idea: Category: Design and Construction
Section 4306 (44)

4-H STEM

DO OR (TIE) DYE

Time To Get Started!

As mentioned before, there are two different options for making your tie dye t-shirts! Pick one of the two options (or both) and show us your shirts on the Flipgrid linked at the bottom of this handout!



Option #1:

Materials:

- White T-Shirt
- Tie-Dye Kit or Fabric Dye
- Rubber Bands
- Plastic Wrap
- Washer/Dryer

Instructions

- Use your hands to twist, scrunch and pinch the shirt to form a design.
- Use rubber bands to secure design in place.
- Follow the directions on your tie-dye kit and apply dye to create the design.
- Add as much or as little dye as you want.
- Wrap the shirt in plastic wrap and let sit for 6-8 hours
- Place in the washer and dryer by itself and enjoy!

Option #2:

Materials:

- Colored Permanent Markers
- Plastic Cups or Jar Lids
- Rubber Bands
- Rubbing Alcohol
- Dropper Bottle
- White T-Shirt
- Dryer

Instructions:

- Place plastic cup inside t-shirt. Position the openening of the cup directly under the section of the shirt you want to decorate. Stretch a rubber band over the t-shirt to secure the cup.Use markers to place dots or circles of ink in a pattern in the center of the stretched fabric.
- Slowly squeeze drops of rubbing alcohol on top of the design. Do not flood the area.
- Allow the design to dry for 3-5 minutes before moving to a new area of the shirt.
- Repeat the first 4 steps to create as many or as little designs as desired.
- Put the shirt directly into the dryer for at least 15 minutes before wearing.

Resources: Journal of Chemical Educaion: The Chemistry of Fabric Reactive Dyes