

Tie-Dyed T-Shirts

Materials:

Item	Amount per student	Amount for 24 students
Washed and dried T-shirts	1	24
“Dye Fixer” Solutions (aq Na ₂ CO ₃)	In large buckets	2-3 buckets
Dye Solutions (made with urea-water, see below)	~0.3 L of various colors	7.5 L of various colors
Safety pins	1	24
Iron-On Name tag strip	1.5 inches	36 inches

Equipment:

Item	Amount per student	Amount for 24 students
Disposable gloves, assorted sizes	1 pair	24 pairs
Plastic for covering tables	N/A	
Rubber bands	3-10	Up to 240
Squirt bottles for applying Dye Solutions	1/color	2/color
Paper towels	5-10	Up to 240
Zip-lock bags (for carrying shirts home)	1	24
Grocery sacks (for carrying shirts home)	1	24

Staff Notes: several members of AXE should prep this lab with their own materials!

Safety Issues:

- Wear old clothes that you are not too concerned about! Wear gloves throughout the entire lab including clean-up!
- The dye fixer is rather basic, so wear gloves while working with that solution.

Procedure:

The members of Alpha Chi Sigma are prepping and running this lab, and have a wealth of experience doing their own and their friends' tie-dyes. Please ASK them if you have any questions about the procedure at any stage!

1. PUT ON GLOVES and double check that the plastic at your lab station is clean by wiping it off with a sponge or paper towel. Keep the gloves on throughout the dyeing process, and throughout the clean-up, too!
2. The shirts will be soaking in buckets of aqueous “Dye Fixer” (also called “soda ash” or sodium carbonate) when we arrive in lab. (They must soak for 10-15 minutes prior to dyeing; they can soak for over 24 hours, if needed.) Different sized shirts will be in different buckets. Find your size and wring out a shirt when you are ready to start the dyeing process. The shirt should still be moist, but not drippy wet!
3. Lay the wet shirt out on your clean lab desktop and attach your nametag with a safety pin. Fold twist and tie the shirt to affect whatever sort of design you prefer. Sample shirts should

be hanging around the room and on the workers in lab! See also the descriptions below for achieving each effect. Secure the tied up design with rubber bands. Tight rubber bands can help minimize color bleed.

4. Apply dyes to the shirt according to the desired affect. The dye solutions are in squirt bottles labeled with the colors they contain; a color scheme is also hanging in the room, so you can see what the dyes look like on fabric after one washing. (Note that these dyes are rather permanent and do not fade rapidly like Rit dyes often do!) Please use only one dye solution at a time, returning one bottle to the central table for others when you get the next one.
5. Be sure to soak the fabric thoroughly when applying the dyes! It should be drippy wet with dye solution. However, the more drippy it is, the more the colors will blend together. Be particularly sure that you have gotten dye into the center of folded fabric, for example with a stripe design, unless you want a lot of white in your design. Dye both sides of the folded shirt.
6. Wrap the shirt in a few paper towels and place in a drip-proof zip-lock bag. The dyes must stay in contact with the shirts for 4-24 hours to allow time for the dyes to react with the fibers. If you let it go longer, the edges between the colors are more blurred. Leave the shirt with AEM for washing.
7. OPTIONAL: If you prefer to wash your own shirt, you may do so by washing it in HOT water with ~1 tablespoon of dishwashing liquid, and then drying in a hot dryer. You may wash up to 24 shirts together in one large washer, but for this first washing, you wouldn't want to include anything but tie-dye materials.
8. After this first washing, it can be washed with other brightly colored clothes with regular clothes detergents.

CLEAN UP: Be sure to keep your gloves on throughout the clean-up time! Wipe off all tables and plastic sheets, at least twice, in case someone else wants to dye in your space.

Reflections:

1. What is the purpose of the dye fixer?
2. Knowing the chemistry of this fiber-reactive process, why would you need to use 100% cotton T-shirts for the best effects? Why would polypropylene fibers not dye well with these dyes and this process? How would a fabric that was only 50% cotton look after dyeing with this procedure?
3. What adjustments would you make in your procedure to change or improve your finished product?

Tie-Dye Patterns: A Few Ideas

Ideas for patterns for a tie-dye are endless.... Dyers can be wonderfully creative, but they may want some ideas for the first time. Please note that writing on the shirts tends to spread, looking like a blob and not as the dyer intended! Try some of these successful patterns, being sure to fully drench your tied-up shirt in dye solutions.

- Spirals. (The pattern that ALWAYS turns out fine!) Spread shirt out with the front side down. Grasp where you want the center of the spiral and carefully twist, keeping shirt flat on the tabletop. It will look like a pie shape. Use rubber bands to hold the shape. Be careful that the center of the spiral is not in a place that you do not want! Apply the colors to make the look that you want.... Usually that means coloring in the wedges of the “pie” with two or more colors. Turn over and REPEAT. Remember that colors do blend together if they are beside each other, so choose their locations with care.
- Multi-spirals. You can make as many spirals as you like. Be careful where you locate the centers! ;-) Be sure to color both sides of the shirt!
- Stripes. Fold shirt in accordion pleats with the fold direction perpendicular to the direction that you want the stripes to be. Rubber band it together; usually this requires some help for this design! Apply the dye in bands (perpendicular to the folds!) on the long tube of folded cloth. Be especially careful to fully saturate the shirt with dye for this design; it is the toughest to get completely dyed!
- V-Stripes. Fold the shirt in half lengthwise along the front center with the front toward the outside. Choose the direction that you desire the stripes as described above and make accordion pleats perpendicular to the desired stripe direction. Rubber band the shirt and apply the dyes in bands perpendicular to the folds.
- Sunburst. Fold the shirt in half lengthwise along the front center with the front toward the outside. Use a pencil to draw a semi-circle on the shirt where you’d like the sunburst edge to be. Make very small accordion pleats to gather the penciled line together. Put a rubber band around that gathered line. Allow the remainder of the shirt to form pleats and rubber band them together. Apply the “sun” color to that part of the folded shirt. Other colors can be added as bands beyond the edge of the “sun”.
- Heart. Follow the directions for the sunburst above, but draw a “half-heart” on the shirt instead of the semicircle....
- Fire. Grab pieces of the shirt and twist rubber bands around these areas. Apply dyes.
- Crinkle. Lie shirt flat on table and fluff up some areas and twist others. This pattern is more difficult to bind with rubber bands, but you can do it! Apply dyes in random patterns.
- Misha's Splatter Method. Lay shirt out flat on table and randomly splatter with dyes. This pattern yields variable results!