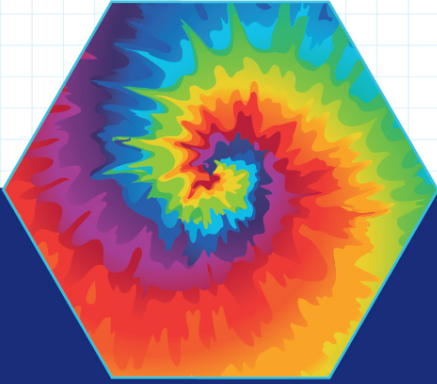
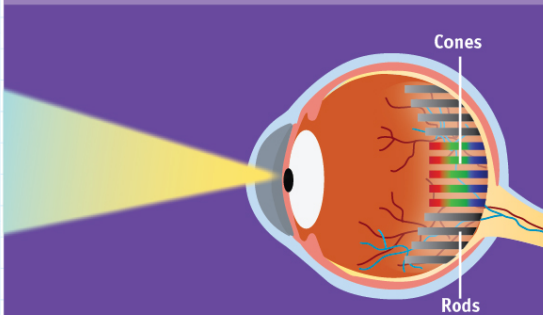




Color Lab

White light may not look like much...until you take it apart. Hidden inside are all the **colors of the rainbow**. Reveal the science behind colors in this kit.

Seeing Color



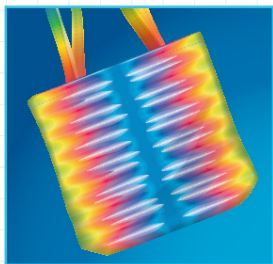
When light hits the **retina** (the lining at the back of the eye) through the pupil (the black center of the eye), it shines on tiny sensory cells called **rods** and **cones**. Rods send information about light and motion to the brain; cones detect color. One type of cone is sensitive to **green** light, one to **blue**, and one to **red**. The brain adds this information together to create all the colors we see.

Tie-dye Tote

Tie-dyeing is a way to create patterns by dyeing some parts of a fabric while keeping the dye away from other parts. Different forms of this ancient art are found all around the world, such as in Japan (**shibori**), India (**bandhani**), and Indonesia (**batik**). The **ice-dyeing** method in your kit is a more modern technique; some people even use snow!



Find out more about your
experiment and watch a video online!
littlepassports.com/science/color-lab



Tie-dye Tote

AREAS OF SCIENCE:



Chemistry, Physics, Optics

TIME TO COMPLETE:



Varies based on
room temperature +
drying time



Watch a video of this experiment at: littlepassports.com/science/color-lab

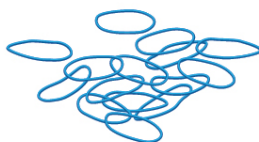
MATERIALS: Included



tote bag



wax stick



15 rubber bands



red, blue, and yellow dyes



latex-free disposable gloves

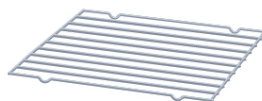
MATERIALS: From Home



3 cups of ice



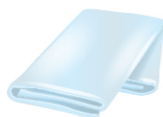
larger container
(for the rack to rest on and
catch the dye)



rack



large bowl of warm water



newspapers or plastic tablecloth
(to protect your work surface)



scissors



work clothes
(to wear as you dye)



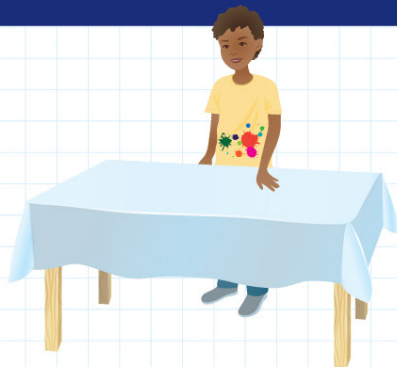
Safety Note

- **CHOKING HAZARD** – Children under 8 years old can choke on glove pieces that are torn off or ripped. Discard torn gloves or glove pieces at once.
- The dyes can permanently stain fabrics and other materials. Wear gloves and handle the dyes with care.
- Be careful using the rubber bands, as they can snap.

Before Dyeing:

Set up

- Protect your work surface with newspapers or a plastic tablecloth.
- Wear work clothes in case the dye spills or splatters.



Choose a Technique

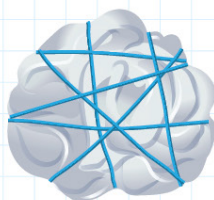
Choose one of these three techniques for your tote bag (or make up your own). **Refer back to your selected technique at Steps 3 and 4 of the instructions for where to wrap the rubber bands and where to put the dye.**

Crumple

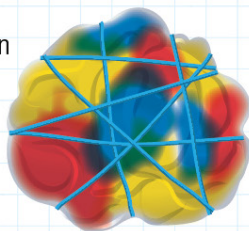
1. Scrunch up all parts of the fabric of the tote bag until you make a crumpled ball.
Note: Tuck in the tote's handle as part of the crumple.



2. Tightly crisscross several rubber bands around the ball so that the folds of the bag are secure.



3. Apply the dye all over the ball on top of the ice.



Result:

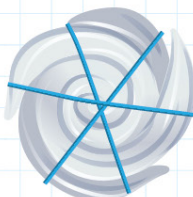


Spiral

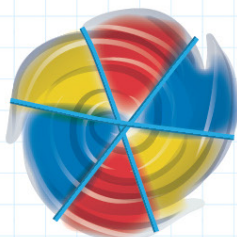
1. Using one hand, pinch the fabric at the center of the tote bag. Twist the tote bag in a circle until all of the fabric has taken on a spiral shape.
Note: The tote's handle should be on the outer edge of the spiral.



2. Tightly crisscross three rubber bands around the spiral shape creating six wedge sections.



3. Apply the dye to each wedge on top of the ice.

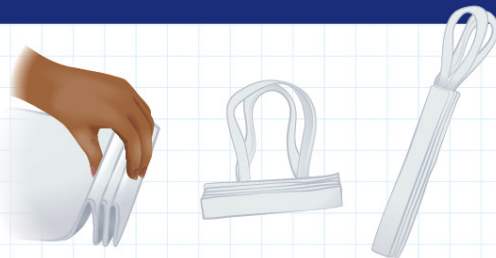


Result:



Stripes

1. Fold the tote bag like an accordion, either horizontally or vertically.

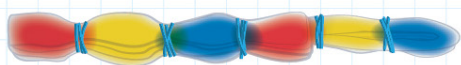


2. Tightly wrap rubber bands around the tote bag to secure the folds. Evenly space the rubber bands apart from each other.

Note: Wrap the tote's handle with rubber bands, too.



3. Apply the dye to each section on top of the ice.



Result:



Instructions:

Step 1

If you like, decorate the tote bag using your wax stick. Firmly press down on the tote as you draw with the wax stick. The wax prevents the fabric from absorbing the dye so your design will show.

Note: For best results, retrace your design multiple times.



Step 2

Submerge the tote bag completely in warm water. Wring out the tote bag over the bowl so the fabric is not dripping wet.



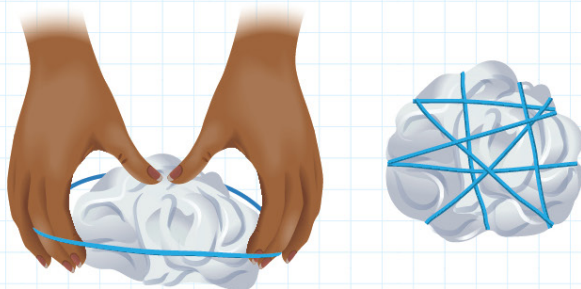
Step 3

Fold your tote bag. Refer to the section on tie-dye techniques for pattern ideas or make up your own.



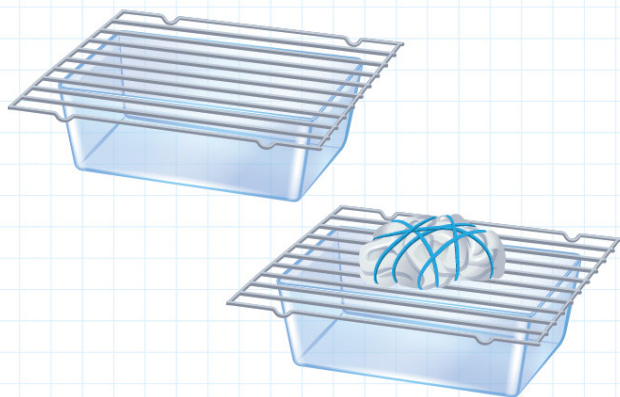
Step 4

Wrap rubber bands around the tote bag to keep the folds together. Refer to the section on tie-dye techniques (note that specific patterns require certain rubber band positions).



Step 5

Place the rack on top of your container. Set your tote bag on top of the rack.



Step 6

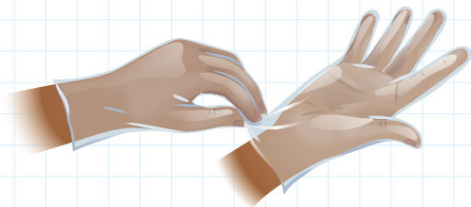
Carefully, place 1-1½ cups of ice on top of the tote bag. Break up any large chunks to help the ice melt more quickly. As the ice melts, it will help spread the dye.

Note: Avoid having the rack and tote bag directly in the container. As the ice melts, you do not want your bag soaking up the excess dye.



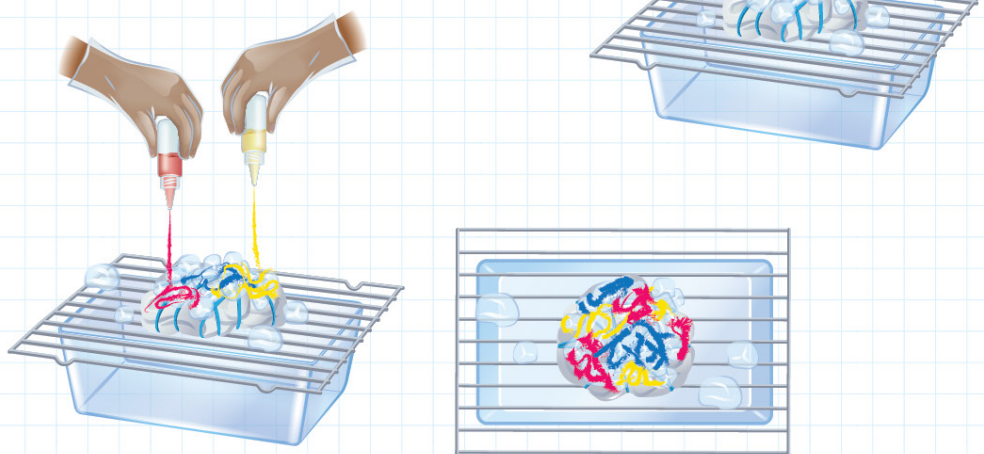
Step 7

Put on your gloves.



Step 8

Gently squeeze the dye powders onto the ice cubes, alternating between colors as you like. Save half of each powder for the other side of the tote bag.



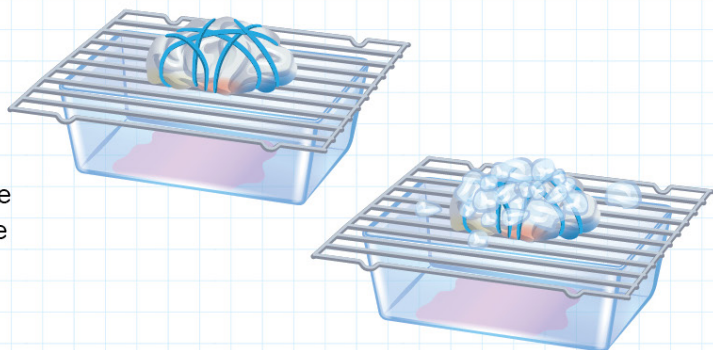
Step 9

Let the ice melt completely. As it melts, the ice will dissolve the powder and spread out the colors on the tote bag.



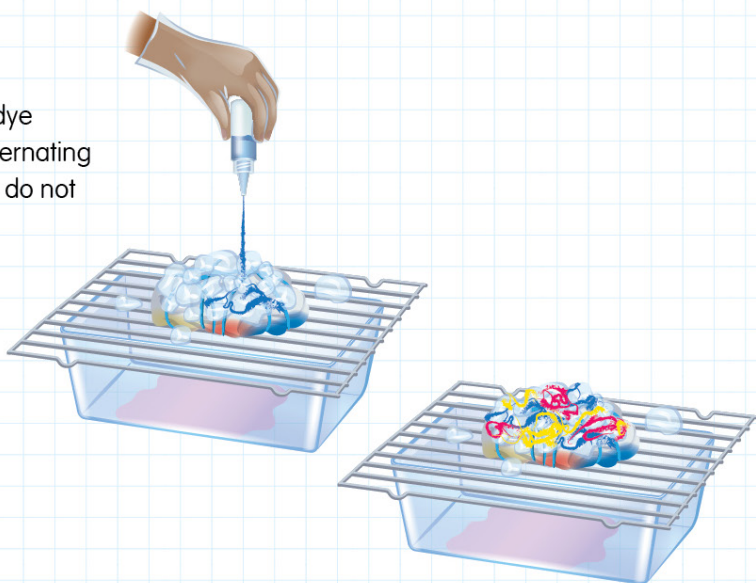
Step 10

Once the ice is melted, flip the tote bag over. Carefully, place another 1-1½ cups of ice on top of the tote bag.



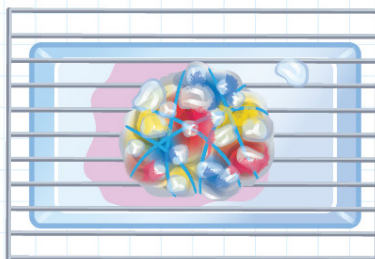
Step 11

Gently squeeze the remaining dye powders onto the ice cubes, alternating between colors as you like. You do not have to use all the powder.

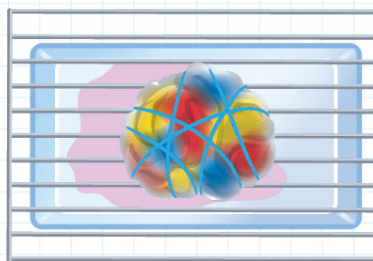


Step 12

Let the ice melt completely. Leaving the tote bag as is, let it dry for at least 24 hours so the dye can set.

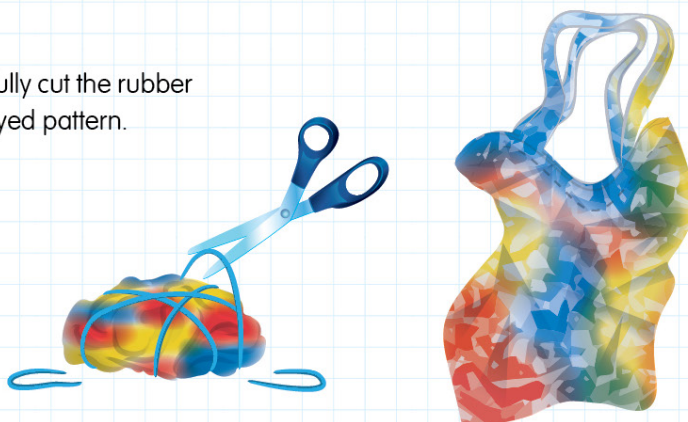


24h



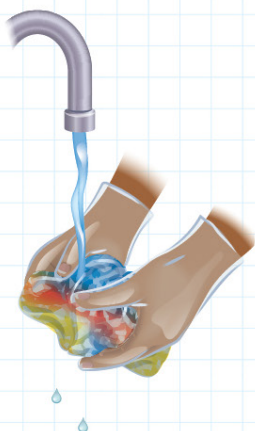
Step 13

Once the bag is dry, carefully cut the rubber bands to reveal your tie-dyed pattern.



Step 14

Put your gloves back on. Rinse the bag under the sink until the water runs clear.



Step 15

Ask an adult to help you wash your bag to set the dye. Put the tote bag in the washing machine on its own and run the wash.



Step 16

Ask an adult to help you machine or air dry your tote bag. Machine dry the tote bag on its own without other clothing. Your tie-dye tote is finished!

