



Disappearing Colors

Challenge:

You just spilled juice all over your new shirt and you are in BIG trouble.



Can you make the stain go away?

General Description:

Visitors will explore stain removal options by mixing a series of cleaning solutions (vinegar, dishwasher detergent, or bleach) with colored solutions. Visitors then use that experience to predict which solution will best remove the stains from cloth.

Objectives:

To show chemical reactions as evidenced by color changes, and to have visitors develop experimental skills by evaluating results and drawing inferences from their observations.

Materials:

For 5 stations (1 child per station)

- 5 plastic laminated paper grid templates
- Sponges to wipe off plastic sheets
- 30 plastic dropping bottles
- bleach, vinegar, detergent solution
- About 25 ml each of beet juice, purple grape juice and cranberry juice (not artificially colored)
- Pieces of white muslin fabric to stain
- Vinegar
- Powdered dishwasher detergent
- Clorox or uncolored generic bleach
- Paper towels for spills
- A container of clean water
- A safe container to dump solutions into and seal (waste container)



Activity Preparation (approx. 20 min.):

Prepare the solutions as follows in plastic bottles.

- 5% detergent solution: Mix 5 ml dishwasher detergent into 95 ml of water
- 10% bleach solution: Mix 10 ml bleach in 90 ml water

Each station includes:

- A laminated grid
- 6 plastic dropping bottles labeled with each solution and containing about 10 -15 ml (1/4 full) of the appropriate solution.

Directions:

Have visitors do the following:

1. Participant **must** wear a pair of safety goggles before beginning!
2. Add a drop of the appropriate juice to each juice square.
3. Add a drop of vinegar to each vinegar square with a drop of juice in it.
4. Add a drop of detergent to each detergent square with a drop of juice in it.
5. Add a drop of bleach to each bleach square with a drop of juice in it.
6. Observe the results.
7. At end of experiment, blot up the plain juice drops (in the first row) with the cloth. Let visitor add the solution they think will work best (bleach) to cloth to see the stains disappear.

Clean Up (approx. 15 min):

- Wipe off drops with a damp sponge and rinse the sponge in tap water.
- Juice and solutions can be rinsed down the drain.
- The juices can be saved if they are stored in a freezer. Extra bleach, dishwasher detergent, and vinegar can be saved for next time.
- Dry plastic sheets with paper towel.
- Clean goggles with window cleaner and white paper towels.
- Disinfect in goggle cabinet for full 15 minutes.

Safety Issues:

Participant must wear a pair of safety goggles before beginning!

Goggles must be sterilized before use.

Bleach is hazardous!! Do not get bleach on clothes or skin.

Participants should rinse with water, if they get bleach on themselves.

Any solutions in eyes should be flushed with water immediately.



Tips For Doing the Activity:

- If possible have all visitors start at the same time.
- Show participants stained cloth and explain that the task is to find out what will be best at removing the stain
- Younger children (under age 7) may need to practice dropping one drop of liquid at a time.
- Encourage visitors to put only one drop of juice in a square.
If too much of any liquid is used, the liquids run together.
- Warn visitors that bleach will turn colored clothes white.

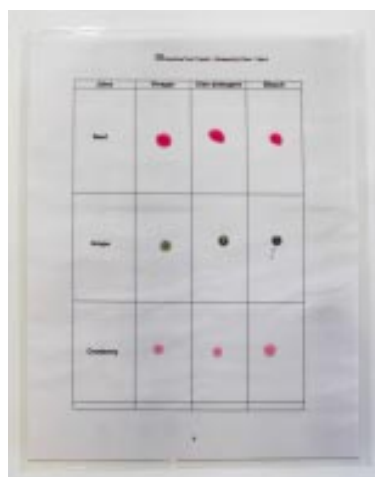
Background Information:

Most colored dyes change color either by oxidation (losing electrons) or reduction (gaining electrons), or by changes in pH (losing or gaining hydrogen ions). In this experiment vinegar acts by adding a hydrogen ions (making the solution more acidic). Dishwasher detergent acts by removing a hydrogen ions (making the solution more basic). Bleach acts by oxidizing the compound that colors the juice lose electrons.

Questions:

- What happens when you spill juice on your clothes?
- How can we get the stain out?
- After each set of solutions is used, what happened to the color?
- Which solution got the stain out best?

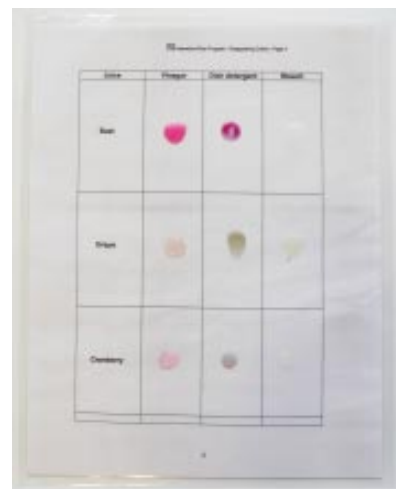
Before Juices alone



During Adding vinegar, detergent, and bleach



After Results



Credits and Disclaimer



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Disclaimer: Reasonable care has been taken in designing the Chemistry Challenge activities. These activities are intended for use with children and adults under direct supervision of qualified adults.

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Juice	Vinegar	Dish Detergent	Bleach
Beet			
Grape			
Cranberry			