Contents

Colorful Separations

Dyeing Eggs

Have you ever colored eggs? Do you remember using vinegar in the dye? Why is it used and how much is needed? This activity investigates the role of vinegar in the coloring of eggs.

How important is the concentration of the dye in the food coloring solution to the egg dyeing process? This activity investigates the impact of changing the concentration of dye.

What role does the thin coating on the outside surface of an eggshell play in the egg-dyeing process? This activity will demonstrate the importance of the cuticle to the coloring of eggs.

Salt and sugar are common household chemicals. Have you ever wondered what might happen if you added them to the dye solution when you color eggs? This activity is an investigation of the effects of salt and sugar on egg dyeing.

How does the time eggs are left in a dye solution and the temperature of the solution affect the intensity of color? This activity investigates the effects of changing these two variables.

How important to the egg-dyeing process is the pH of the food coloring solution? This activity investigates how the depth of color varies with the acidity or basicity of the dye solution.

Polymers

Activity		Recommended Grade Levels	Page
71	**Identifying Polymers by Density and a Flame Test**	K-3 4-6 7-9 10-12 Gen	107

What if you needed to recycle an assortment of polymers, but there was no obvious way to distinguish one type from another? This activity shows how to identify polymers using density, an easily measured property of matter, and flame tests.

72	**Thermoplastic and Thermoset Polymers**	K-3 4-6 7-9 10-12 Gen	113

Do all plastics behave the same way when heated? Anyone who has ever played with Shrinky Dinks® knows these plastic sheets shrink when heated and even melt if heated too much. But do all plastics melt when heated? How about the plastic handles on metal cookware? In this activity, students discover the answers to these questions, and use the different thermal properties of plastics to create fun products.

Cartesian Divers

Physical Properties and Changes

Observing Chemical Changes

Does iron burn? How about wood? While you surely know that wood burns, you may be less sure about iron. This activity demonstrates whether or not iron burns, and it also shows the role that surface area plays in burning.

Can dust burn explosively? This demonstration illustrates a small-scale dust explosion occurring in a can. It serves to introduce students to a potential problem associated with the storage of grain, flour, and other finely divided materials.

Can the energy changes that accompany chemical and physical processes be observed? In this activity, changes in temperature are measured when various substances are dissolved in water.

Have you ever wondered how Sterno®, the gelled alcohol fuel used in food warmers or chafing dishes, is made? In this activity, you will mix a saturated calcium acetate solution with ethyl alcohol to make this commercially available gel.

Have you ever seen bubbling in a chemical reaction? The speed at which bubbles form can indicate the rate of reaction. By observing the rate of bubble formation, you will get an idea of how concentration, surface area, and temperature affect reaction rates.

You have samples of three colorless and odorless gases—how can you tell which is which? The wooden splint test provides the answer in this activity. You will use three different reactions to produce oxygen, carbon dioxide, and hydrogen. Each gas has a different effect on a glowing or burning wooden splint.

Activity	Recommended Grade Levels	Page
91 Electrochemical Series	K-3 ☐ 4-6 ☐ 7-9 ■ 10-12 ■ Gen ■	245

Why do some metals react when placed in acids, forming bubbles of hydrogen, while other metals fail to react? The answer lies in the chemical activity of the different metals. This demonstration compares the chemical activity of several metallic elements.

92 Colorful Catalysis	K-3 ☐ 4-6 ☐ 7-9 ■ 10-12 ■ Gen ■	253

Can you observe a catalyst in action? Using dramatic color changes, this activity demonstrates the effect of a catalyst on the rate of a reaction of hydrogen peroxide and potassium sodium tartrate.

93 A Tornado Show	K-3 ☐ 4-6 ☐ 7-9 ■ 10-12 ■ Gen ■	257

A tornado that changes color! In this activity, a magnetic stirrer causes a vortex to form in an acidic solution containing universal indicator. As a base is added, color changes occur.

94 Changes in Odor	K-3 ☐ 4-6 ☐ 7-9 ■ 10-12 ■ Gen ☐	263

What makes bananas, pineapples, pears, and wintergreen have the odor they do? In this activity, you will make esters that produce these characteristic odors. By noting the change in odor, you will detect that a chemical change has occurred.

Crystals

Activity	Recommended Grade Levels	Page
101 **Silicate "Stalagmites"**	K-3 4-6 7-9 10-12 Gen	307

Have you ever used Magic Rocks®? If you have, you saw an unusual array of colorful "stalagmites" sprout from small rock-like crystals. This activity provides three novel ways of investigating the interesting and unusual chemistry behind Magic Rocks®.

Our Everyday World

Can you create your own miniature tornado? This activity allows you to simulate the twisting and swirling motion of a tornado by mixing salt, soap, and water inside a bottle.

During the day, the sun looks whitish-yellow and the sky is blue. As the sun sets, it may appear to turn fiery red, and the sky may become pink, orange or red. Why do the sun and the sky appear to change colors? This activity demonstrates the effect that suspended particles play in this color change.

This activity will allow you to make your own cloud from smoke and water vapor. Once made, the cloud can be turned "on" and "off" by raising and lowering a plunger.

What causes silver to tarnish? Once it is tarnished, how can you clean and shine it without using costly commercial products? This activity will investigate the tarnishing process and show how to reverse it without any loss of silver.

Can you light a candle without touching a flame to the wick, or extinguish a candle flame without blowing out or smothering the flame? This activity investigates the properties of a candle flame and the products of its combustion.

Can the inside of a penny be removed, leaving only the copper shell? This activity will demonstrate the difference in activity of copper and zinc using a penny and an acid.