

### **Make Your Own Toys at Home!**

and learn about the science behind the “magic” of the chemistry-related toys featured in our “Joy of Toys” program! Please ask an adult for permission and help.

**Fortune Fish** This “fish” is made of cellophane. Its surface is hygroscopic, so it absorbs water. The side of the fish touching your hand absorbs sweat and expands, making the bottom of the fish bigger than the top; so it curls up. Need more fish? Check the Internet!

**Cool Sidewalk “Chalk”** Mix 2 parts **plaster of Paris** powder and 1 part **water**. Add tempera **paint** for color. Pour into a disposable plastic cup, container, or mold and let harden. Remove from mold. *Plaster of Paris is made when gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) is heated and the water is driven off, resulting in a powder. When you add water, a chemical reaction occurs and interlocking crystals form. Liquid water becomes part of the solid “chalk”.* Note: real chalk is calcium carbonate.

**Magic Coloring Book** Use a **Q-tip** to draw with **household “paints”** such as 1) beet, red-cabbage, or purple grape juice, or 2) phenol red (from a swimming pool supply store), or 3) a mixture of \_ teaspoon turmeric (a kitchen spice) with \_ cup rubbing alcohol. Draw over them with a color-change “wand” made by dipping a **Q-tip** into a mixture of 1 teaspoon **washing soda** (a strong laundry additive) and \_ cup **water**. *The “paints” contain an acid-base indicator which changes color depending on its pH. The red of some food is due to a chemical called an anthocyanin, which acts as an indicator. The washing soda is a base. When the washing soda is drawn over the “paints”, the indicator in the paints changes color.*

**Cartesian Diver** Fill a **pop bottle** with **water** to about 1-inch from the top. Fill your diver (dropper with brass nut attached) with enough water so that it barely floats. Tightly cap the bottle. To make the “diver” sink, squeeze the bottle (you may need both hands). *When you squeeze the bottle, the air inside the diver is compressed (air is more compressible than liquid). With a smaller air bubble the diver is less buoyant and it sinks.* Divers can also be made from ketchup packets or other materials. See the NCW activities at [www.terrificscience.com](http://www.terrificscience.com) for directions.

**Bubble Bottle** Put a little **water** in a **clear plastic bottle** (20-oz size works well) - about \_ of the way up. Add a few drops of your favorite **food coloring** and mix. Pour in **veggie oil**, leaving some space at the top. Drop in a \_ tablet of **Alka-Seltzer®**. Leave cap off. *The Alka-Seltzer® reacts with water and forms bubbles of carbon dioxide that float to the top, carrying drops of the colored water. When the bubbles pop at the top, the water drops fall back down.*

**Density Wand** Slowly pour **various kitchen or bath liquids** into a clear **bottle**. Suggestions: molasses, corn syrup, liquid glycerin, red wine vinegar, corn oil, water colored with food dye. Add sprinkles or trinkets. Observe the layers that form. *The liquids have different densities. More dense liquids will sink. Note that some liquids dissolve in each other; for example water and rubbing alcohol (they are both polar). Water and oil separate (oil is non-polar) with the lighter oil floating on top.*

**Magic Sand** Magic sand is regular sand treated with a hydrophobic (water-repelling) chemical. Play with it underwater and when you take it out, it’s dry! It can be purchased under the brand names Magic Sand™, Astro Sand™, Mystic Sand™, and Space Sand™.

**Alka-Setzer® Rocket** Fill a white film canister (with a tight, inside-fitting lid) \_ full of water. Add \_ tablet of Alka-Seltzer® and cap it. Immediately place it, lid side down, on a flat surface and move away. Do not point the canister at anyone. *When mixed with water, the ingredients in Alka-Seltzer® (sodium bicarbonate or baking soda, citric acid, and acetylsalicylic acid) undergo a chemical reaction. Carbon dioxide,  $\text{CO}_2$ , is formed. It is a gas and its pressure forces the lid off the canister causing “rocket” propulsion.*