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| **Opener** | **Supplies** | **Concept** |
| **Go with the Flow**Familyengineering.org | 1 liter plastic bottle with cap, thumb tack, duct tape, ruler | **Water Pressure**: Holes punched at different depths from the top of the bottle – when water flowed out, water pressure was less at the top hole and more at the bottom (so water from the bottom hole squirted further out) |
| **Shoulder Hold**Familyengineering.org | A piece of paper | **Center of Gravity**: Standing with your left foot snug against the wall, hold a piece of paper against the same wall with your left shoulder. Now try to pick up your right foot without letting the paper fall. |
| **Liquid Layers**Stevespaglerscience.com | Clear plastic cups, water, salt, clear drinking straws, food coloring (\*warn students: do not drink) | **Density**: Make different concentrations of salt water ahead of time (super saturate with warm water). Color each concentration with food coloring. Using the drinking straw try to stack the different colors up in the straw (the densest layer needs to be at bottom). |
| **Inertia Challenge** Stevespanglerscience.comAnd Familyengineering.org | 1 liter plastic bottle, plastic inertia ring, hex nuts (or, playing card, cup, and nickel) | **Inertia**: Put the hex nut on top of the ring, and ring on top of the bottle. By pulling the ring away quickly, the hex nut drops into the bottle. By flicking the card, the nickel drops into the cup. |
| **Terror Twister**Stevespanglerscience.com | 1-2 liter bottle connector (“terror twister”), water, foil confetti  | **Vortex / Centripetal Force**: fill one bottle ¾ with water, add foil confetti. Attach second bottle with connector. Rotating top, water filled bottle in a circle, quickly, then watch the vortex form and water spiral down into the bottom, empty, bottle.  |
| **Swinging Grapes**Navarro / Jimenez “magic science” series | Neodymium magnet, shish-ka-bob stick, grapes, string (\*sharp stick) | **Magnets**: Balance 2 grapes at opposite ends of a stick (stick should be swinging freely / hanging from a larger wooded rod. Use a neodymium magnet to repel water filled grape. |
| **Needle Through a Balloon**Stevespanglerscience.com | Shish-ka-bob stick, latex balloons, veg. oil (\* watch for latex allergies ; sharp sticks) | **Polymers**: Slowly poke the stick through the ends (least stretched) parts of the balloon. The latex self-seals around stick, but only in the areas of low stress.  |
| **Colors on the Mooove**Navarro / Jimenez “magic science” series | Milk, Q-tip, food coloring, dish detergent(\*goggles) | **Molecules / Ions**: pour some milk into a bow, and add a drop of food coloring into the middle. Dip the Q-tip in the detergent, then into the colored spot: the colors swirl away quickly as the positive part of the water molecules (in the milk) attract to the negative part of the detergent. |
| **Mysterious Melting**Educational Innovations | Foam and aluminum blocks, ice | **Conductors:** Aluminum is a better conductor that the plastic covered foam – so as heat moves from your hand to the Aluminum block faster than to the plastic block – so it feels colder (both blocks are really the same temperature). Now, place ice on top – the ice on the “colder” aluminum block melts much faster! |
| **1+1 is not 2**Navarro / Jimenez “magic science” series | 3 (25 ml) graduated cylinders, rubbing alcohol, water (\*goggles) | **Mixtures**: measure 5 ml of alcohol in one GC, and 5 of water in the other. 5+5 = 10, right? Pour them together – it will be slightly less than 10. Alcohol and water are miscible. |
| **Hidden colors**Navarro / Jimenez “magic science” series | Water soluble markers in several colors, graduated cylinder (GC), water, coffee filters | **Chromatography / Diffusion**: Cut filters into strips slightly longer than the GC. Pour a small amount of water into the GC. Put a heavy dot of color on the filter paper, above where the water should reach, then place filer into GC so that it touches the water – water will soak up the filter and as the pigments forming the color dissolve, they move up with the solvent front (some colors dissolve easily, and move farther) – so colors separate. |
| **Singer scares the salt**Navarro / Jimenez “magic science” series | Salt, sturdy cup, rubber glove or trash bag, scissors, rubber bands (\*watch for allergies if you use latex gloves) | **Vibration / Sound Waves**: cut the palm of the hand out of the rubber glove and stretch it across the cup – hold it in place with a rubber band – it is like a drum. Pour salt on top of rubber. Make loud noises near the “drum”. Or – hit a tuning fork and hold it close to the drum. |