2014 Everyday Science with Answers

1. **Drop that coin in the glass**

Supplies Needed: One quarter coin, a drinking glass, an ordinary game card (or a 3"X 5" card).

What to do: Place the card on top of the glass. Put the coin in the middle of the card. Flick the card sharply with your fore finger.

Answer:

The coin fell into the glass
The coin and card both got knocked away
The coin got knocked away and card fell into the glass.

Explanation: The "inertia" of the coin to remain stationary is greater than the sliding force of the card below it, so the coin drops into the glass. (Inertia is the resistance of any physical object to a change in its state of motion or rest, or the tendency of an object to resist any change in its motion.)

2. **The reappearing quarter**

Supplies Needed: A quarter, an opaque saucer, tap water.

What to do: Place the quarter in the empty saucer. Look over the edge of the saucer so that you can see the saucer. Then slowly lower your head until the quarter is n longer visible. Stay precisely in that same place as you have someone slowly pour water into the saucer. Observe what happens to your ability to see the quarter.

Answer: The quarter:

Reappeared
Floated
Was never seen again

Explanation: When light traveling through air enters a different medium, such as water, the speed and wavelength of light are reduced because the molecules of water strike the photons of the light and slow them. This change in the "refractive index" causes the light waves from the quarter to "bend" and make the quarter appear to be in a different place.

3. **Wicking water**

Supplies Needed: Two equal height glasses, some paper towels, tap water

What to do: Fill one glass to the brim with water. Twist a piece of the paper towel until it forms something that looks like a piece of rope. Place the two glasses touching each other. Soak the twisted towel with water and place one end in the glass filled with water and the other in the empty glass. Wait a few minutes and observe the water level in the glasses. Leave the two glasses overnight and observe them the next morning.

Answers: A. After a time the empty glass:
Began to fill with water for the other glass
Remained empty

B.The next morning the water level in the two glasses:
Were about level
The glass that was originally filled was empty
The other glass was empty

Explanation: This is called 'capillary action', the water uses this process to move along the tiny gaps in the fiber of the paper towel. It occurs due to the adhesive force between the water and the paper towel being stronger than the cohesive forces inside the water itself. This process is the manner in which moisture travels from the roots to the rest of a plant. In this experiment the process will continue between the two glasses until the water levels are equal in each glass.

4. Make an orange float – or sink

Supplies Needed: An orange or tangerine, a deep container, tap water.

What to do: A. Fill the container with water. Place the orange in the water. Observe whether it sinks or floats.

B. Peel the rine from the orange. Place the orange in the water again. Observe whether it sinks or floats.

Answer: A. With the rine on the orange it**:**
Floated
Sank

B. With the rine removed the orange**:**
Floated
Sank

Explanation: With the rine on the orange it probably floated. The rine has tiny air pockets that lower its density to below that of water. When your removed the rine it probably sank. Removing the rind (and the air pockets) from the orange increases its density to that higher than water, causing it to sink.

5. Blobs in a bottle

Supplies Needed: A clear soda bottle or similar, vegetable oil, food coloring (any color), fizzing tables (such as Alka Seltzer), tap water

What to do: Fill the bottle about three-quarters full with water, then fill the bottle the rest of the way with vegetable oil. Wait until the oil and water separate. Add about 10 drops of food coloring. Break a selzer table in two and drop into the bottle.

Answer:
Air bubbles began to rise in the bottle
Colored oil blobs rise to the surface

Explanation: Initially, To the oil stays above the water because the oil is lighter than the water or, more specifically, less dense than water. When you added the selzer tablet, it sank to the bottom and started dissolving

and creating a gas. As the gas bubbles rose, they took some of the colored water with them. When the blob of water reached the top, the gas escaped and down went the water. Cool, huh? By the way, you can store your "Blobs In A Bottle" with the cap on, and then anytime you want to bring it back to life, just add another tablet piece.

Dazzling milk

Supplies Needed: A flat baking dish or similar, whole milk (not fat free milk), food coloring, liquid dish washin detergent.

What to do: Pour milk into the dish to a depth of about a half-inch. Add a drop or two of each color food coloring at various places in the dish. Carefully add a drop or two of liquid soap onto the food coloring spots.

Answer:

The colors spread all around

The colors spots just stayed put.

Explanation: The primary job of dish washing detergent is to break down fat on dirty dishes. Fat is also in whol milk. When you drop the liquid soap onto the milk, it tries to break down the fat. While doing that, it causes the colors to scatter and mix creating a very colorful display.

Rubberize an Egg

Supplies Needed: (Adult supervision required to hard boil an egg) A hardboiled egg, a wide mouth jar (large enough for the egg), vinegar.

What to do: Place the egg gently into the jar. Pour vinegar into the jar to cover the egg. Place a lid or food wrap over the mouth of the jar. Observe the egg daily for a week. Then remove the egg.

Answer:

The shell was still on the egg

The shell was gone and the egg was rubbery.

Explanation: The vinegar (acid) dissolves the eggshell which is primarily calcium carbonate (a base). The membrane beneath the egg shell still hold the egg together, but expands with the pressure within the egg to make it larger.

8. Journey to the Center of Gravity

Needed A paper clip, a drinking straw, cellophane tape

What to do: Bend the paper clip open to form a "J" shape.

A. Put the tip of the "J" on the tip of your index finger and try to balance it.

B. Now insert the unbent part of the paper clip into the drinking straw. Tape it if need be. Now put the end of the paper clip "J" on your index finder.

Answer: A.

The paper clip fell off.

The paper clip balanced on the tip of my finger.

B.

The paper clip fell off.

The paper clip balanced on the tip of my finger.

Explanation: This is a demonstration of the center of gravity. By adding weight to the bottom of the paper clip, you changed the paper clip's center of gravity. The center of gravity is where the force of gravity is equal on either side. That shift in the center of gravity allowed you to balance the paper clip on your finger.

9. Freeze those Mugs

Needed: Two identical drinking mugs, table salt, tap water.

What to do: Fill one mug three-quarters full with tap water. Fill the other mug to the same level with water saturated with salt. Put both mugs in the freezer for about two-hours.

Answer: Which mug had the most solid ice?

The mug with tap water

The mug with salty water.

Explanation: To become frozen salty water requires a lower temperature than ordinary water. This is called "freezing point depression." It is the reason that salt is sprinkled on roads in the winter to keep them free of ice and snow in the winter.

10. Bouncing Sugar Crystals

Needed: Sugar, a metal mixing bowl, plastic food wrap (such as Cling Wrap), a rubber band, a baking tray or cookie sheet, a big serving spoon.

What to do: Stretch the plastic wrap over the metal bowl. Place the rubber band around the rim of the bowl to hold it tight. Put a bit of sugar on the plastic wrap. Hold the baking tray near the bowl and bang on the tray with the spoon. Observe the sugar crystals.

Answer:

The sugar crystals just stayed still.

The sugar crystals jumped around.

Explanation: Striking the tray created sound waves (vibrations) that traveled through the air. The vibrations struck the plastic wrap and caused it to vibrate and that caused the sugar crystals to vibrate.