

John Cowens on Integrating Science in Your Classroom – “Simple Science” experiments

Musical Wine Glass

Fill a thin-walled wine glass halfway with water. Dip your cleansed index finger into the water and rub slowly around the rim of the glass. With a little practice, a lovely, resonating note is produced.

Explanation:

As your index finger rubs over the glass, friction is produced. Soon afterwards, the glass starts to vibrate and produces a sound. (Watch the water as you rub the rim in a circular motion. The vibrations can be seen clearly on the water surface.) The pitch of the sound depends on the amount of water in the glass.

Repeat this experiment but use three or four thin-walled wine glasses with different amounts of water in each glass. Can you turn the sounds into a pleasing chord or harmony?

Telekinetic Wine Glasses

Fill two thin-walled wine glasses half full of water and place them an inch apart. To create a loud humming sound, press and move your freshly washed index finger around the rim of one wine glass. Mysteriously, the second glass vibrates with the first! You can observe this vibration if you place a thin wire or paper clip across the second glass.

Explanation:

The vibration of the first glass is transmitted to the second by sound waves traveling through the air at approximately 700 mph. This “resonance” only occurs if the glasses produce the same pitch.

Reaction Time

Hold a straight, crisp dollar bill by the end with your index finger and thumb. Place it 1/2 inch (13 mm) above your friend’s slightly open fist and ask him/her to catch it. When you release the dollar your friend will not be able to catch it!

Explanation:

When your friend sees the dollar bill fall, he/she first sent a signal to the brain that commanded the muscles in the hand to “grab.” Time is naturally lost in this process. (The time between recognition and response is called “reaction time.”)

If you try this experiment on yourself, you will easily catch the dollar bill since the command to drop-and-grab are simultaneous.

Confused Writing

If you are right-handed, try writing your name while making clockwise and counter clockwise movements with your right leg. You’ll end up with illegible scribbles. (Fellow left-handed people, try this while moving your left foot. You, too, will scribble.)

Explanation:

The moment you circle your leg in the other direction, the pencil movements cross over completely. The leg movements are transferred to the writing. Each action needs so much concentration that both cannot be carried out at the same time.

Shooting Backwards

Hold an empty glass soda bottle horizontally and place a small 1/4inch (6mm) paper ball just inside its neck. With a quick puff, try to blow the ball into the bottle. The ball flies towards your face.

Explanation:

When you blow into the mouth of the bottle, the air pressure in the bottle is increased. Instantly, there is a partial vacuum just inside the neck of the bottle. As air pressure equalizes, the ball is driven out.