

Scientist Activity Pin

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Air & Water Pressure:

- 1) Hold a glass over a dishpan and fill to the brim with water. Cover the top with a piece of cardboard. Press on the cardboard with one hand, turn the glass upside down and let go of the hand touching the cardboard. The cardboard will stay stuck to the glass.
- 2) Stick a clear straw in a glass of colored water (for clarity), suck up the water until the straw is full. Putting your tongue or a finger over the straw lift it out of the water. The water will stay in the straw until you let go.
- 3) Fill a glass with colored water, place the short end of a bendable straw in the glass and bending the straw so that the long end will be below the surface of the water in the glass. Place a second shorter glass next to the first. Suck on the long end until water starts to move up the straw. Point the long end in the second glass and let the water flow out. The water will continue to flow until the water reaches the same level in both containers.
- 4) Fill a dishpan with water. Poke several holes in the bottom of a detergent bottle using a small pick or cork screw. Place the bottle in the water and fill with water. Bring the bottle out and the water will run out the bottom. Put a finger over the hole in the lid of the bottle and the water will stop running. The bottle can be used for a shower when outside.

Bernoulli's Principle:

- 1) Cut a soda straw about 2/3 thirds through about the midpoint of the straw. Fold the straw back so that it forms a 90 degree angle. Pour colored water into the a glass or cup and have the scouts blow hard into the opposite end of the straw. Air moving rapidly across the top of the straw will cause the air pressure to lower within the straw causing the water to rise in the straw and go down in the glass.
- 2) Place two ping-pong balls on the table about two inches apart. With a straw blow a steady stream of air between the two balls. As you blow the balls will come together until they hit the stream of rushing air and bounce back apart.
- 3) Cut a long thin strip of paper and make a fold 1/8 from each end. Try and blow under the beneath the bridge formed to try and blow it over. The more you blow the more it will bend toward the surface it is sitting on. Air pressure is higher above the paper bridge then below, so the paper is bent toward the surface.
- 4) Make an airfoil section(section of an airplane wing)by gluing a strip of paper around a straw, pencil or small stick. Hold the stick in front of you and blow a stream of air over the leading edge of the airfoil. The airfoil should rise.

Inertia:

- 1) Place a doll in the middle of the back of a pickup type truck. The pickup bed needs to be large enough for the doll to slide in. Move the truck rapidly forward and then make it turn a curve sharply. The doll will slide to the side of the truck since it will keep wanting to go in a straight line accordingly to the principle of inertia.
- 2) Place several books on a smooth table. Push them toward a stick or another book you are holding as an obstacle. When the bottom book is stopped by the obstacle, the books on top continue due to the law of inertia.
- 3) Place a bucket on the floor, drop a ball into it. Easy, it drops right in. Now while walking past the bucket try to drop the ball in when your hand is positioned exactly above it. You miss. This especially shows up if you try to do this while running past the bucket. Since the ball has acquired your moment of inertia it tends to keep going forward after you have dropped it; thus it misses the bucket.
- 4) Put a marble, golf ball, or ping pong ball into a glass or jar that is laying on its side. Move the glass forward quickly, then stop it. Due to Newton's First Law (Inertia), the ball continues forward though the glass is stopped.

Pascal's Law:

- 1) Place a glass in water, turn it upside down and lift it slowly. What happens when the bottom of the glass rises above the surface of the water. The water stays in the glass and is raised with it. But as the top of the glass breaks the surface of the water, the water in the glass falls out. This happens due to the fact that the air is pushing down on the water outside the glass and when the glass breaks the surface, air can rush in. The air no longer supports the water so the water falls out according to Pascal's Law.

Optical Illusion:

- 1) Make a frame out of construction paper or cardboard and attach a piece of cellophane. Draw a picture (i.e. a house) on a piece of white paper using a marker the same color as the cellophane. Look at the picture through the cellophane and the picture disappears.
- 2) Fill a drinking transparent glass with water. Set a nickel in the palm of your hand and hold the glass over the coin. If you look down into the glass you will see the coin without any trouble. Cover the top of the glass with your other hand and look at the coin through the side of the glass and you will notice that it seems to disappear. The reason for this illusion is that first you looked straight down at the coin. The second time you looked through the side of the glass. When looking through the side of the glass the light rays are bent as they pass through the water and you couldn't see the coin. This is known as refraction.