

Table Top Science Demonstration

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Composition of Air

Warning: Remind the children that we never play with fire. One small match can literally burn down your entire house. If they want to do a scientific experiment that involves fire, they must do it with a parent.

Show Box of Atoms and remind the children of the differences between a solid, liquid, and gas.

Today we are going to talk about gasses and about fire.

Light a short candle on a flat plate. **Q:** ok, so what is fire anyway ? **A:** Fire is just the energy that is given off from a chemical reaction. The energy comes in the form of heat and light.

Optional: show the molecule kit and give some basic explanation of how atoms recombine to create molecules.

1) Have a volunteer put a jar over the candle and watch the flame go out.

Q: Why did it go out ? **A:** The flame needs something in the air. Air is 78% Nitrogen and 21% Oxygen, and 1% Argon and other gases. The flame needs Oxygen in order to burn.

2) Put a jar over the candle with water around the base. Notice that air bubbles get sucked air in. This shows that the flame is consuming some of the air, so the air pressure inside drops.

3) Put a jar over the candle with clay around the base to form a vacuum seal. Notice the jar sticks down on to the flat surface. Air pressure outside is greater than the air pressure inside.

4) Tall candle on a plate of colored water. Put a narrow necked bottle over the candle / causes water to rise. Now we can actually measure how much of the air was consumed by the flame. Approx 1/5 of air is Oxygen (but in reality the flame also produces steam and CO₂, so it's not as simple as just 20% consumed).

5) Light the short candle in a bowl that is deeper than the flame is tall. Use an empty plastic juice bottle to mix Vinegar + baking soda (an acid and a base). This produces CO₂.

Slowly pour the CO₂ into the bowl. Notice that the flame goes out.

Explain that the CO₂ is heavier than air, and CO₂ does not burn like Oxygen does, so it smothers the flame.

Equipment Needed

Box of Atoms

Short candle

Tall candle

Flat surface / cutting board or plate

Lighter / matches

2 jars

Narrow neck bottle, like a flask

Oil based clay

Food coloring

2 Plastic spoons for mixing and baking soda

Waste Bucket

Consumables

Access to water

Vinegar

Baking Soda

Paper towels