



## Topic: Three States of Matter: Grades 4-6

**All matter in the world can be categorized as a solid, liquid or gas.**

Solid- definite shape and volume (amount of space matter takes up)

Liquid- no definite shape (take shape of container), but definite volume

Gas- no definite shape or volume (spread out to fill whatever space they are in)

Simple Experiments to demonstrate the properties of each state of matter:

- Supplies: funnel, spoon, baking soda, balloon, small bottle, vinegar
- Use a funnel to put two large spoonfuls of baking soda into a balloon.
- Fill a small soda bottle halfway with vinegar.
- Without letting any of the baking soda fall into the bottle, carefully pull the neck of the balloon over the bottle's opening.
- When the balloon is tightly pulled over the bottle, hold the balloon up so that the baking soda falls into the bottle. The balloon inflates.

When baking soda and vinegar mix, they produce a gas called carbon dioxide. There isn't enough room in the bottle for the gas, so it spreads out and fills the balloon.

**Gas has no definite shape or volume. It will spread out to fill whatever space it is in.**

- Supplies: two dish soap containers. One empty and one filled completely with water.
- Squeeze the empty one filled with the air.

The air, which is a gas, is compressed as the particles move close together. The bottle filled to the top with water can't be compressed because the liquid has a definite volume and its particles can't be forced to move closer together.

**Gas can be compressed into smaller spaces. It has no definite volume.**

Additional Idea:

### **The Incredible Can Crusher**

If you have access to a portable stovetop burner or a stove, this experiment is great.

<http://www.stevespanglerscience.com/experiment/00000043>