

State 3: Gases

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Unit: [Physical Science](#)

Course: Science 3rd Grade

Subjects: Science, Science Skills, Biology / Life Science, Earth and Space Science, Physical Science, Physical Science, Science, Matter and its Properties

Grade Level: Second grade

Objective: Students will explore the existence and properties of gas through an experiment in blowing a balloon up inside of an empty water bottle.

Length: 45 minutes

State Standard: CA Grade 3 Physical Sciences 1(e) Students know matter has three forms: solid, liquid, and gas.

Assigned Files: [D5-TeacherNotes.pdf](#)

PREP

- Balloons (for each student)
- Empty water bottles (for each student/table group)
- Crepe Paper
- Empty clear container (bowl, tupperware, jar)
- Small solid object that would fit in the container
- Small amount of liquid that would fit in the container

LAUNCH

- **Hold** up the container and **ask** the students what will happen to the solid objects shape if you put it in a container.
- Expected response: The solid's shape will remain the same.
- **Show/Tell** about a liquid. **Ask** what will happen to the shape of the liquid if it is poured into the container.
- Expected response: It will take the shape of the container, it will fill up the bottom of the container.
- **Ask:** What if I blow air inside? Accept multiple answers.
- Can we see air?
- Can we touch air? Taste it? Smell it?
- How do we know a gas is there?
- Today we will do an experiment to be able to draw a conclusion about how we know gases exist.

EXPLORE

- Ask for a volunteer to come up.
- Have them cover their ears, while you forcefully press the sides of the empty bottle to make the air inside hit their face.
- **Ask:** What is in the bottle? Gas. How do you know?
- Ask for another student to come up and blow up a balloon.
- **Ask:** What is the balloon filled with? Gas. How do you know?
- Ask if there is any student in the classroom who thinks that they can blow up the balloon inside of the empty bottle.
- Have the student come up to try. Let them have a good try, but don't let them hurt themselves.
- **Ask:** Does anyone else think that they can do it?
- **Tell:** at each of your tables, you will have the chance to try to blow up the balloon inside of the empty water bottle.
- Allow each student to try. *You can even try, they might think that an adult can blow harder or more air.
- Have the students put down their balloons and bottles.
- Have the students share at their table why they think the balloon couldn't blow up. Have them think about why we are able to blow it up outside of the bottle, but not inside.
- Call on students to share their predictions.
- Expected response: The air inside of the bottle is taking up space and blocking the balloon from blowing up inside of it.
- If the students do not get to this understanding, prompt them to think about what is inside of the bottle that could be blocking the balloon.
- Now that the students know what is preventing the balloon from blowing up, have them brainstorm ways that we could get the balloon to inflate into the bottle. *They can use other materials.
- Using scissors, you can cut holes in the bottom, so when the balloon starts to inflate, the air inside the bottle gets pushed out.
- *Students may come up with other ways.
- After all groups have cut their bottles and inflated the balloon, bring them to the carpet to close the lesson.

CLOSE

- *Optional Activity:* Tape crepe/tissue paper to air condition/fan.
- Students can make a conclusion about why the paper is moving.
- **Chart:** (*See teacher notes PDF)
- A **gas** expands or fills up all of a space.

- **Gases** are usually invisible.
- **Gas** particles spread out all around.
- Tomorrow, you will create an art project about the 3 states of matter that you have learned about.

REFLECTION/NOTES

To get students to conceptualize gases is harder than solids and liquids. Solids and liquids you can touch and experiment with, but gases can be a much harder concept. This requires students to inductively reason the existence and properties of gases. The observation that the air is blocking the balloon from blowing up in the bottle leads to the hypothesis of cut holes to "push" the air out of the bottle, so the balloon has room to blow up inside.
