

Bay Area Scientists in Schools Presentation Plan

Lesson Name Does air really exist?

Presenter(s) Heike Held

Grade Level 1 Standards Connection(s) Physical Science: States of matter: Gases

Abstract:

We will learn that air and other gases really exist, although we cannot directly see or feel them. Like scientists, we will infer some properties through experiments. We will learn that gases are matter. They take up space and have a specific weight. They do not have a shape and fill any given space. We even will produce a gas in a chemical reaction! We will compare this gas to air and find that it is heavier than air.

Vocabulary/Definitions:

3 – 6 important (new) words

Matter
States of matter
Solid, liquid, gas
Experiment
Chemistry

Materials:

What you'll bring with you

Solid objects, various liquids (water, milk, juice), cylindrical and square containers to pour liquids from/into
Plastic bags
Balloons, clips to close balloons
2 Clear plastic cups, large clear container, tissue
Baking soda, vinegar, 16 oz. tubs, sand, measuring spoons for baking soda, small cups for vinegar
Authentic chemistry lab equipment for baking soda/vinegar experiment for demo by presenter, safety glasses
Helium inflated balloon
Paper towels

What students should have ready (pencils, paper, scissors)

No materials required

Classroom Set-up: *Student grouping, Power/Water, A/V, Light/Dark, set-up/clean-up time needed*
Groups of 4 students, seated at tables



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Classroom Visit

1. Personal Introduction: _____ **5** _____ Minutes

My name is Heike. My Dad was a teacher, and when I was a little girl, I knew that I wanted to become a teacher, too. But when in 7th grade chemistry was introduced, I was so fascinated with all the amazing discoveries chemists have made that I decided I wanted to become a chemist myself. I wanted to do research and find out things nobody knew about before. And so I went to University and became a chemist!

Topic Introduction: _____ **15** _____ Minutes

Some of you might be wondering what chemistry is, actually, and what it is that chemists do. I would say, most importantly, chemists want to find out what things are like. Chemists explore materials, and even make new materials out of materials they have! For example, chemists found out how to make the plastic that your cup is made out of, or the bumper on your parents' car. Other chemists work on making medications. We will produce a material today ourselves! When chemists talk about the materials they are dealing with, they call them "matter". Let's look at some examples of matter.

A1: Hand out 1 solid object and 1 liquid sample to each group.

Let's look at the items you got. What's this? A toy car? And this? Water? Who knows which one is a solid, and which one is a liquid? Work out the characteristics of solids and liquids (defined shape/takes on shape of surroundings. Demonstrate how liquids can be poured from cylindrical container into square one). Have students show their solid objects, then their liquids. We call this STATES OF MATTER: SOLID and LIQUID.

SOLIDS & LIQUIDS. Invite students to point to examples of matter that exist in the classroom. Most will be solid, of course, but some classrooms will have fish tanks and sinks where liquid is located.

Does anybody know what's around us? Air.

Have you ever thought about what air is? A (mixture of) gas. Gases are the third STATE OF MATTER!

How is air different from this block, or the water in this cup?

Can we see it? No.

Can we touch it? No.

Well, then does it even exist? Is it matter, or is it nothing?

GAS. During cool weather, some classrooms may also employ heaters that blow warm air into the room. Alternately, some classrooms might have radiators or space heaters that could be referenced for the discussion of gas in the room.

Chemists and other scientists are very curious people. They come up with ways to learn about things they sometimes cannot even see. Such activities that help us to learn about things are called experiments.



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2. Learning Experience(s):

25 Minutes

Air occupies space. **A2 (demonstrated):** Put cup with tissue up-side-down straight into bucket with water. Tissue stays dry. Something must be occupying the space in the cup.

A3 (demonstrated): Pouring air from cup to cup. Now we can actually see air as bubbles!

Feeling air: **A4 (students):** Wave your hand in front of your face. We feel something, so something = matter must be there. Wind moving leaves and branches. Air can be very strong! Demonstrate with small fan; One could demonstrate how some people like to fan their bodies in order to “cool off.”

A5 (students): Let air out of balloon, feel the draft.

Air occupies any space. Looking at the empty balloon: Where did the air go? Unlike the water I am pouring onto a tray or into a cup. Forms a puddle or adapts to the shape of the cup.

Making a gas: Carbon dioxide. **A6 (students, in groups):** Build sand “volcano” in plastic tub. Add baking soda, then dyed vinegar. Observe and describe!

Pre-determine a specific job for each group member. Each child in the group receives a letter card: A; B; C; or D. (The cards could be attached to yarn so that each child can wear his or her letter.)

Prepare a Job Chart.

Sequence the order of events for preparing the volcano.

Step #1. Scientist **A** will: _____

Step #2. Scientist **B** will: _____

Step #3. Scientist **C** will: _____

Step #4. Scientist **D** will: _____

A7 (demonstrated): Carbon dioxide generation from baking soda and vinegar in larger scale using real lab equipment. Let produced CO₂ bubble through dyed water to visualize the produced gas. Catch the CO₂ in a balloon!

Gases have specific weights: **A8 (students):** Compare the weight of the CO₂ filled balloon to air and Helium filled balloons.

3. Wrap-up: Sharing Experiences and Building Connections

5 Minutes

We have learned about the 3 states of matter: Solid, liquid, and gas. We have found out how solids, liquids and gases are different from each other. As an example for a gas, we have studied air. We have done experiments to show that air occupies space and can be felt. We have concluded that air is matter. We also have learned that air takes up any given space. In a chemical reaction, we have generated a gas from a solid (baking soda) and a liquid (vinegar)!



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4. Close:

5 Minutes

Thanks and good-bye!

Clean up.

TOTAL 50 – 60 Minutes

Follow-up – After Presentation

Suggest students write a letter explaining “How we learned about air and other gases?”

List or attach examples of activities, websites, connections for additional learning.

Attach worksheets, hand-outs, visuals used in classroom presentation.

- Make Parachutes with Binder Clips, Tape, and Coffee Filters (Lawrence Hall of Science)

English: http://www.mateoycientina.org/pdfs/comics_engl/LHS_12_eng.pdf

Spanish: http://www.mateoycientina.org/pdfs/comics_span/LHS_12_span.pdf

Reading Connections:

- Air is Everywhere by Melissa Stewart

http://www.melissa-stewart.com/books/exprmnt/bk_air1.html

- Can You See the Wind? by Allan Fowler <http://www.amazon.com/Can-Wind-Rookie-Read-About-Science/dp/0516208144>

- Feel the Wind by Arthur Dorros http://www.amazon.com/Feel-Wind-Lets-Read-Find-Out-Science/dp/0064450953/ref=pd_sim_sbs_b_2

- I Face the Wind by Vicki Cobb http://www.amazon.com/Feel-Wind-Lets-Read-Find-Out-Science/dp/0064450953/ref=pd_sim_sbs_b_2



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