

Community in the Classroom Presentation Plan

Lesson Name Weather in a Bottle

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Grade Level 5 Standards Connection(s) Earth sciences core curriculum

Abstract:

Concepts of air flow and air pressure will be introduced through a number of simple demonstrations. Students will participate in a contest to inflate a windbag, witness an ear-popping experience in cloud making, learn how to put an inflated balloon in a bottle and make a simple barometer.

Vocabulary/Definitions:

Air pressure, condensation, hurricane/cyclone, condensation, clouds, precipitation

Materials:

What you'll bring with you

Bicycle pump+couplings, windbag, a few bottles, balloon, matches, work gloves, eye goggles, tapes, straws, bucket

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

Several clean, empty spaghetti or jam jars would be great (preferably one jar per 4-5 students)

Classroom Set-up:

Student grouping, Power/Water, A/V, Light/Dark, set-up/clean-up time needed

Classroom Visit

1. Personal Introduction: _____ 5 _____ Minutes

Who are you? What do you want to share with students and why? How will you connect this with students' interests?

Topic Introduction: _____ 5-10 _____ Minutes

Big Idea(s), vocabulary, assessing prior knowledge. What questions will you ask to learn from students?

What is air?

How does air flow?

What is pressure?

2. Learning Experience(s): _____ 30-35 _____ Minutes

Demonstrations, hands-on activities, images, games, discussion, writing, measuring... What will you do, what will kids do? Describe in order, including instructions to kids.

Air flow:

- Bernoulli Principle activity with windbag – how to inflate a windbag quickly [1]

Air pressure:

- What happens when you inflate a balloon?
- A balancing act - balloon in a bottle [2]



Condensation:

- What is condensation?
- Showing how pressure can affect cloud formation (clouds in a bottle demo) [3]

Reading the weather map

- What does “L”, “H” and all those arrows mean?
- Make a barometer. [4]

3. Wrap-up: Sharing Experiences and Building Connections _____ **5** Minutes

Putting the pieces together – how will students share learning, interpret experience, build vocabulary?

4. Close: _____ **5** Minutes

How can kids learn more? Thanks and good-bye! Clean-up.

I like to end each class with a question period. Questions don't have to confine to the topics discussed during the class.

TOTAL 50 – 60 Minutes

Follow-up – After Presentation

Suggest students write a letter explaining “How we learned about _____?”

The students can measure the atmospheric pressure (qualitatively) with the barometer made in class for a week, and send in their data.

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

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

[1] Windbag activity:

Materials: “long” (~4-5 feet) bag (suggestion: Diaper Genie bag)

How it works: This demo shows one can inflate a long windbag with one breath. As the speed of a gas increases, the pressure it exerts decreases. So when blowing into the bag, the reduced pressure caused by the long breath makes the ambient air flow in.

[2] Balloon in a bottle:

Materials: balloon, a 1-litre plastic bottle, drill a hole at the bottom of the bottle

How it works: With the lip of the balloon sealing the mouth of the bottle, it would be difficult to inflate the balloon when the hole at the bottom is covered. This is because our lungs are not strong enough to compress the air inside the bottle. With the hole at the bottom of the bottle exposed, air inside the bottle can escape as the balloon is inflated. Once the balloon is inflated, and then the hole at the bottom plugged, the balloon stays inflated. This is because in order to deflate the balloon, additional air to fill in the volume left behind by the deflating balloon is needed (but the bottle is sealed).

[3] Clouds in a bottle:

Materials: a clear 2-litre bottle, means to seal and pressurize the bottle (e.g. a rubber stopper with coupling to a bicycle pump).

How it works: With a small amount of water in the bottle, one can create clouds by changing the air in the bottle. Condensation depends on both pressure and temperature. When there is a sudden drop in pressure, water can condense more readily and clouds are formed.

[4] Barometer:



Material: a clean spaghetti/jam jar (lid not required), balloon, rubber band, drinking straw, masking tape.

How it works: When one seals the jar with the balloon, the air pressure inside the jar is the same as the ambient environment. As the atmospheric pressure changes over days, the balloon inflates or deflates slightly, causing the straw (needle) to change its position.

