

LESSON PLAN by: Meganmarie Pinkerton

Adapted from: Activities for Teaching Science as Inquiry “Is air a real material substance like solids and liquids?”

Lesson: How do you know there is air in a bag?

Length: 30 minutes

Age or Grade Intended: 4th Grade

Academic Standard(s):

- 4.2.5 Write descriptions of investigations, using observations and other evidence as support for explanations.
- 4.3.2 Begin to investigate and explain that air is a substance that surrounds us and takes up space, and whose movements we feel as wind.

Performing Objectives: After discussing the meaning of evidence and conducting an experiment student will write three examples to show evidence that air is a real material substance.

After given materials to conduct and experiment students will write a description of the investigation including observations and evidence for explanations.

Advanced Preparation/Materials: The teacher needs: 4 plastic food storage baggies, one filled with a solid-sand, a second with water, a third with buttons, and a fourth with air, a medicine dropper, a syringe, and a cup of water. Students need science journals and writing utensils.

Introduction/Motivation: Engage Instruct students to close their eyes pass the 4 plastic baggies filled with each of the 4 substances around for students to feel, ask them not to say anything until you ask. With eyes still closed ask them what is in each bag? (Bloom’s knowledge, Gardner’s kinesthetic) Have them open their eyes and show them the bags. After discussion ask How do you know what is in each bag? What is your evidence? (Bloom’s comprehension) In reference to the air bag, Since you cannot see, hear, feel, smell, or taste what’s in the bag, how do you know that air is really in the bag? (Bloom’s comprehension) Explain that you will be talking about evidence that air is a real substance and discussing what evidence is.

Step-by-Step Plan:

1. Discuss the meaning of the term *evidence*. (observations that we can use to support conclusions) Give example of two boys who walk outside and the sidewalk is wet, one says it rained the other says their dad washes the car every Saturday.
2. Ask for evidence to back up the first boy’s conclusion. Discuss the conclusion and evidence from the second boy. (Bloom’s comprehension)
3. Discuss that although we cannot see air there is still evidence for its existence.
4. Break students up into pairs. Pass out a medicine dropper or a syringe and a cup of water to each pair. Have them work with these things to come up with evidence that air is a substance. Ask them to record ideas, methods, observations, and an explanation/evidence in their science journals. (Bloom’s application and synthesis, Gardner’s kinesthetic, linguistic, interpersonal and logical)**Encourage**
5. Instruct each group to share that they found and how they found it.
6. Brainstorm and write the two best ideas or principles that came from this experiment. Then describe two principles about air 1. Air is a real material

substance. Although we cannot observe air directly, we can observe its effects as it interacts with other materials. 2. Bubbles in water indicate that air is present. The bubbles are filled with air.

Closure: Clean up area. Explain to students that now that they understand that air is a substance they will be doing more air experiments as the week goes on. Instruct each student to write in their science journals three other ways that we can find evidence that air is a real substance. Then explain that the next experiment will include a glass, and a container of water. Ask each student to write a quick prediction of what they think the experiment will do. **Engage**

Adaptations/Enrichment: This lesson will work well with students who have ADHD, LD, and MiMH because it is hands on and will keep their attention. These students would benefit from written instructions or hints as to how to conduct the medicine dropper and syringe experiment. They would have a little bit of time to come up with their own ideas but then told how to do it before they reach frustration level. Then the questions or sections could be written out for them to fill in, or the students could just verbally tell the teacher what they did. They could also be shown different pictures some with examples of evidence that air is a real substance and others that don't show evidence and they can pick out the ones that show evidence for air rather than just write down examples. Enrichment could be where the students write their own experiment to show that air is a real substance and then conduct the experiment in front of the class and explain it. They could also research other things that we need evidence for, like the world is round and then research or prove the explanation in a written report, or presentation.

Assessment: - I will check the students' science journals to see that they wrote observations, ideas, explanations, and evidence for the eye dropper and syringe experiment.

-I will check the students' journal to see that they wrote three other examples of evidence that air is a real substance.