Station 5: Is Air Really There?

Summary

Students are presented with the problem of proving that air has mass. To solve this, they must consider what they already know about air, and try to design an activity that will prove that air is really there!

Real-world connection

- How to understand a property of air—that air takes up space and has mass.

Preparation

Materials

- Metre stick (or dowling or similar long piece of wood)
- Scissors
- Masking tape
- Tack or pin
- Balloons
- String

- Student Instruction Sheet, one per station
- Student Handout, one per student

Curriculum outcomes

Theme: Properties of Air: Takes Up Space, Has Mass, Expands. For a complete list of curriculum outcomes, please go to the appropriate table at the end of this document.

Background information

This activity is intended to be full inquiry, a student-centred approach that allows students to freely explore a phenomenon themselves.

Full or guided inquiry?

You may consider a more guided approach for some groups (e.g. you might tell them to think of a way they could make a balance with a piece of string and a metre stick).

The idea is for the students to investigate through inquiry the best way to demonstrate that a balloon that is inflated (with air) has greater mass than one which is not inflated.

References

Jefferson Lab Science Education. **http://education.jlab.org/qa/matter_03.html.** Retrieved December 21, 2008.

Marin-Hansen, L. 2002. Defining Inquiry: Exploring the many types of inquiry in the science classroom. The Science Teacher. 69(2): 34-37.

LIVEWORKSHEETS

Station 5: Is Air Really There? – Student Instructions

Where is air? Is it really there? And if it is, does it take up space? If you can't see it, how can you know the answers to these questions for sure? If you sit down and think hard about what you already know about air and how it reacts, you will surely be able to figure out how to prove that it is really there... wherever that is!

1 QUESTION: Does air have mass?

2 To start, you need to first look at what is at the station.

3 Devise a plan using the materials provided and your Student Handout. If you are stuck, ask your teacher for a hint.

4 Carry out your investigation and record your data.

Materials

- Metre stick
- Scissors
- Masking tape
- Tack or pin
- Balloons
- String

LIVEWORKSHEETS

Station 5: Is Air Really There? – Student Handout

Devise your plan!

1 Look at the material you have to work with. Think of a way you can use all this to decide if air has mass. Now state your ideas by making a hypothesis. A hypothesis is just an "If..., then ..." statement. So for example, "If I do this, then this will happen." Please write your hypothesis below:

If _____

_____

_____

2 Now that you have your hypothesis, draw a picture showing how you are going to use the materials to answer the question: Does air have mass? Show in the drawing what you expect will happen.

Try out your plan!

3 Write down the steps to your plan, including how you will record your results.

First, I will...	Then, I will...	Finally, I will...

LIVEWORKSHEETS

4 Execute your plan and record your results.

Analyze and conclude

5 Explain what happened when you tested your hypothesis. _____

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6 Does this prove that air has mass? Why or why not? _____

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LIVEWORKSHEETS