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What's the Matter?

Gearing Up

Get the students thinking by holding up an empty resealable plastic bag. Explain that there is something in this bag. Ask the students to tell you what they think is in the bag. Listen to their responses and tell them that in this exploration, they will discover what is in the bag. They will also examine the three states of matter - solid, liquid and gas.

Process Skills Used

observing comparing
predicting classifying
recording

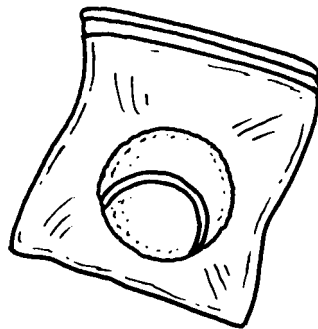
Guided Discovery

Background information for the teacher:

Matter is anything that has weight and takes up space. The three states of matter are solids, liquids and gases. Write the following properties of the states of matter on the blackboard. Solids: You can see solids and they have a specific shape. You cannot easily pass an object through a solid. Liquids: You can see liquids and they do not have a specific shape. Liquids take on the shape of the container they are in. You can easily pass an object through a liquid. Gases: Gases are often invisible and can change their shape easily. Gases expand to fill whatever container they are in. You can easily pass an object through a gas.

Materials needed for each group:

3 resealable bags
coloured water
an icy-pole stick
a tennis ball

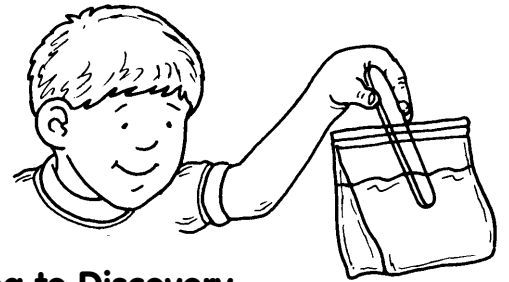


Directions for the activity:

Direct the students to place a tennis ball in one bag, put water in the second bag, and blow air in the third bag. Students will run three tests on each filled bag to determine whether it contains a solid, liquid, or gas.

1. Look at the contents of the bag.
2. Determine if the contents change shape easily.
3. Try to pass an icy-pole stick through the contents of the bags.

As they work, the students complete the activity sheet 'What's the Matter?'



Responding to Discovery

Discussion starters:

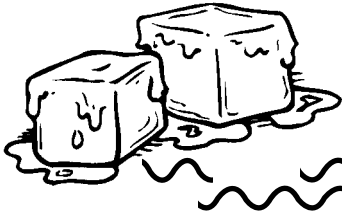
- Which bag contains a solid? How can you tell it is a solid?
- Which bag contains a liquid? How can you tell it is a liquid?
- Which bag contains a gas? How can you tell it is a gas?

Applications and Extensions

Ask students to name five different solids, five different liquids, and five different gases.

Real-World Applications

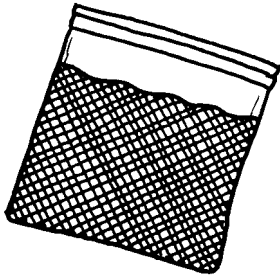
- Would you swim in a solid, a liquid or a gas?
- Would you drink a solid, a liquid or a gas?
- Would you sit on a solid, a liquid or a gas?
- Is chewing gum a solid, a liquid or a gas?
- Is the air you breathe a solid, a liquid or a gas?



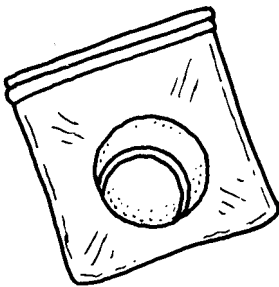
Name _____

What's the Matter?

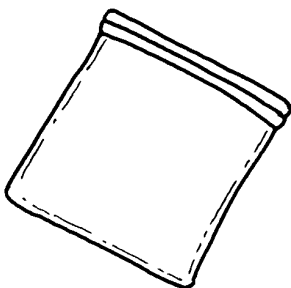
Use your expert observation skills to learn about the different states of matter.



Bag 1: The water	Observations
Squeeze the bag. Does the water change shape?	
Open the bag. Can you pass an icy-pole stick through the water?	
Can you see the water in the bag?	
What state of matter is the water?	



Bag 2: The tennis ball	Observations
Squeeze the bag. Does the tennis ball change shape?	
Can you pass an icy-pole stick through the ball?	
Can you see the ball in the bag?	
What state of matter is the ball?	



Bag 2: The bag of air	Observations
Squeeze the bag. Does it change shape?	
Can you pass an icy-pole stick through the bag of air?	
Can you see the air in the bag?	
What state of matter is the air?	

A Day at the Beach

Gearing Up

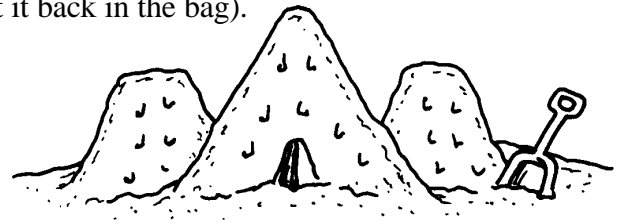
Hold a sheet of paper and ask the students what it is. Have them describe the attributes of the paper. (It is white, rectangular in shape, thin, a solid, etc.) Then, tear it in half quickly to grab the attention of the class. Ask the class to identify what it is now. Ask them to explain to you how it can still be paper after you changed it. Guide them to discover that the atoms that make up the paper are still atoms of paper. The state of matter has not changed, just the outside dimensions. Point out that this is called changing the matter physically.

Process Skills Used

comparing	observing
predicting	communicating

Directions for the activity:

Give each group of students a 4 litre bag of sand and a container. Tell the students to dampen the sand with some water so it stays together. Allow the students to run their fingers through the sand to observe how it feels. Challenge the students to change the sand physically. Give the students time to mess around with different containers. They can pack the damp sand into a container and carefully turn it over onto a paper towel. As you monitor the work of the students, challenge them to return the sand to its original condition (put it back in the bag).



Guided Discovery

Background information for the teacher:

Matter can change physically or chemically. In this lesson, the students will observe a physical change. A physical change may alter the size or shape of the matter, but the type of matter stays the same. For example, a block of wood is still wood even if it is cut in half. You have only changed it physically. In a chemical change, a solid may become a liquid.

Materials needed:

a bag of sand (You can purchase a large bag from a toy or building supply store for only a few dollars.)

4 litre resealable bags, different shaped containers (e.g. milk cartons, coffee cans, drink cans)

water

paper towels



Responding to Discovery

As students complete the activity sheet, ask them what they discovered about the sand. When you changed the shape of the sand, was it still sand or did it become a different type of matter? What other types of matter can change physically? If you wrinkled a piece of paper, could you restore it to its original shape? What if you cut paper and glued it back together? Would that be an example of changing matter?

Applications and Extensions

Challenge the class to physically change other items. Blow up a balloon with a small amount of air. How can we physically change this balloon? (Add more air, let the air out, or pop the balloon.)

Real-World Applications

- List items made from wood.
- List items found or used at the beach.
- What states of matter are these items?
- How could they be changed physically?

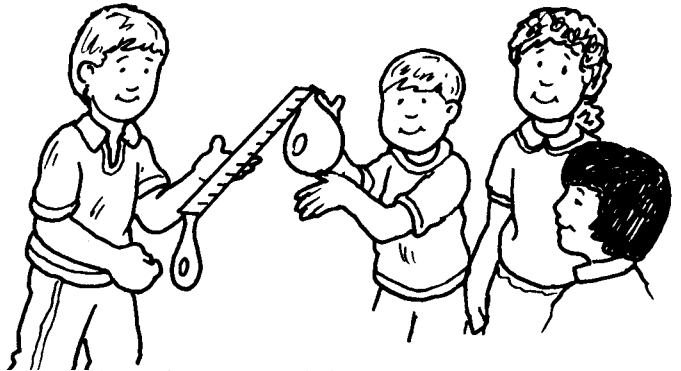
Does Air Have Weight?

Gearing Up

Obtain a helium-filled balloon. Release the balloon in the classroom for the students to observe. Ask the students to propose why the balloon floated to the ceiling. Helium appears to have no weight. Does air have weight? How can we find out? Discuss and listen to students' proposals.

Process Skills Used

comparing
observing
making a model
controlling variables
communicating



Directions for the activity:

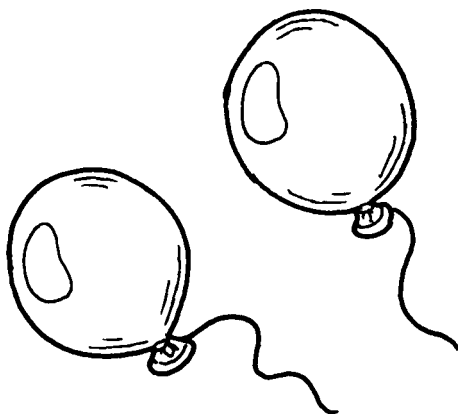
Demonstrate for the students how a ruler can act like a balance scale by balancing the ruler on two fingers. Tell the students that they will tape a balloon on each end of the ruler and compare the mass of each balloon. One balloon will be empty and the other will be filled with air. Students should complete the activity sheet as they work.

Guided Discovery

Background information for the teacher: The helium in the balloon is less dense than the air surrounding the balloon so the helium-filled balloon rises. The density of the air inside an air-filled balloon is the same as the air outside the balloon. The latex balloon itself is heavy enough to drag the balloon down to the ground. In today's discovery, the students will observe that air does have weight when they compare an empty balloon with an air-filled balloon.

Materials needed for each group:

two identical balloons
tape
ruler



Responding to Discovery

Drop two different-sized inflated balloons to see if the one with more air will fall faster than the one with less air. Discuss whether this experiment will prove anything.

Applications and Extensions

Have the students propose a discovery that will prove that air has weight.

Real-World Applications

- What makes a hot-air balloon rise and fall?

