Lab: Changing Shape

FOR THE TEACHER

Summary
In this lab students will analyze the physical properties of different materials in order to investigate their elasticity. They will learn how to differentiate between objects that can easily change shape and those that cannot. Also they will see that some objects can change shape, but can also return to their original shape. As the students learn about material properties, they will also determine what materials can be recycled.

Grade Level
Elementary School

Objectives
By the end of this lab, students should be able to
- Explain the meaning of physical property, using elasticity as an example.
- Analyze and compare physical properties of different materials.
- Record data based on their observations.
- Understand that materials are made from different components and understand that those components can affect its ability to be reused or recycled.

Chemistry Topics
This lab supports students’ understanding of
- Physical Properties
- Physical Change
- Observations

Time
Teacher Preparation: 15 minutes
Lesson: 45 – 60 minutes

Materials (one of each item per group)
- Pen spring
- Plastic wrap
- Popsicle stick
- Aluminum foil
- Metal
- Fabric
- Twig
- Sand
- Rock
- Clay
- Rubber band
- Balloon
- Cardboard
- Other/optional

Safety
- Always wear safety goggles when handling chemicals in the lab.
- Students should wash their hands thoroughly before leaving the lab.
- When students complete the lab, instruct them how to clean up their materials and dispose of any chemicals.

Teacher Notes
- Introduce the lab is to talk about how some materials can change shape while others cannot. The pre-lab questions are a good way to have students brainstorm about materials that change shape and for what reason.
- If students are not familiar with the term physical property, introduce that to students. Use examples of physical properties, and then inquire about the property “elasticity”. Question
students to see how they can test a material for its elastic behavior.

- The teacher can guide the students throughout a discussion about some clothes they are wearing that are elastic, and the purpose of them being elastic. Some answers can be clothes fit better when they are elastic because they stretch to my body shape.

- It is recommended that students are put into groups of 2-4.

- Provide each group with the same materials—consider organizing these into bins prior to the lab, for each group to use. If you are limited on materials, having one of each object for the entire class can work. In this case, manage the materials so that each group rotates through analyzing each object; this means each group is working with a different object at the same time.

- Additional materials or alternative materials can be used in place of those suggested in this lab.

- After all students have recorded their findings for all objects/materials, the class can have a discussion about their results. The teacher can also introduce the importance of recycling and discuss what types of materials can be recycled.

- Optional: depending on the age of the students, this video may be helpful to show before beginning the lab. Also this background information about elasticity may be helpful.

**FOR THE STUDENT**

**Lesson**

**Changing Shape**

**Background**

Elasticity is the tendency of a material to return to its original shape after it has been stretched or compressed. Different materials have different amounts of elasticity, some return to its original shape and others do not.

**Pre-lab Questions**

Discuss the following question with your group:

1. In your own words explain the meaning of a *physical property*.

2. What types of materials do you know of that will not stretch? List at least 5 items.

3. What does all of the items listed in question #1 have in common?

4. List materials/objects that you can think of that can be stretched and still go back to their original shape.

5. What does all of the items listed in question #4 have in common?

**Objective**

You will investigate different materials, and compare the physical property, elasticity.

**Materials**

- Pen spring
- Plastic wrap
- Popsicle stick
- Aluminum foil
- Metal
- Fabric
- Twig
- Sand
- Rock
- Clay
- Rubber band
- Balloon
- Cardboard

**Safety**

- Always wear safety goggles when handling chemicals in the lab.
• Wash your hands thoroughly before leaving the lab.
• Follow the teacher’s instructions for cleanup of materials and disposal of chemicals.

Procedure
1. You will be given one item at a time.
2. When you have the object, attempt to stretch it, squish it, bend it and move it around.
3. If your object does not stretch at all, record a check mark under “did not change shape” in the data table below.
4. If your object changes shape, record a check mark under “changed shape” in the data table below.
5. If the object changed shape and then goes back to its original shape, also record a check mark under “changed shape and but returned” in the data table below.
6. Under “other observations” you can write down what kind of changes you observed. For example: how did the shape change? How much did it stretch? Was it difficult to stretch the object?
7. Think about whether the object/material can be reused/recycled. Record either “yes” or “no” in the data table below. If you are not sure, record your best guess and discuss with your group members.
8. Repeat the procedure for all of the objects.

Data
Record your data in the table provided on the following page.

Analysis
1. What are the similarities between all of the materials that changed shape?

2. Do you think that the physical properties a material determines if the material can be recycled? Explain!

3. How did you determine which materials could be recycled?
<table>
<thead>
<tr>
<th>Material/Item</th>
<th>Did not change shape</th>
<th>Changed shape</th>
<th>Changed shape and returned</th>
<th>Other observations</th>
<th>Can we reuse/recycle this material? (Yes-No)</th>
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