

## 2<sup>nd</sup> Grade - Lesson 1.1

### Classifying Objects Based on their Observable Properties

#### Objective

Students will develop an understanding that objects and materials have characteristics or properties. Students will be able to recognize similarities between the properties of certain objects and materials and will be able to group the objects based on these similarities.

#### Key Concepts

- Objects and materials have different characteristics or properties.
- The properties of materials include features such as color, size, and shape; whether they are rough or smooth, shiny or dull, hard or soft, and flexible or stiff.
- Another property of a material is what it's made of such as wood, metal, plastic, stone, or glass.
- Objects and materials can be sorted into groups based on the properties they have in common.
- Objects and materials can be grouped in different ways depending on the properties used to group them.

#### NGSS Alignment

- **NGSS 2-PS1-1**  
**Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.**

#### Summary

- Students are introduced to the idea that objects and materials have certain “properties” or “characteristics” that can be used to describe them.
- After working with a simulation to help students understand the meaning of properties and characteristics, students are given a variety of small common objects to sort based on observable properties.
- Working in groups, students sort objects and record their groupings on the Activity Sheet. Students are then guided to come up with different criteria for one more set of groupings.
- Students participate in a class discussion of the different properties used to make the groupings.

#### Evaluation

Download the [Student Activity Sheet](#) and distribute one per student when specified in the activity. The activity sheet will serve as the Evaluate component of the 5-E lesson plan.

#### Safety

This lesson uses common classroom or household materials that are considered nonhazardous. Follow all classroom safety guidelines. If doing this activity in a lab setting, students should wear properly fitting goggles. Wash hands after doing the activity.

**Materials for the demonstration**

- Shell, leaf, or pine cone
- Plastic container lid
- Coin
- Metal key

**Teacher preparation****Materials**

- Zip-closing plastic sandwich bags
- Copier paper
- Construction paper
- Aluminum foil

Cut the wax paper, plastic sandwich bag, copier paper, construction paper, and aluminum foil into approximately 5" x 5" squares.

**Materials for each group:**

- Birthday candle
- Crayon
- Wax paper (5" x 5")
- Plastic sheet (from zip-closing sandwich bag) (5" x 5")
- Plastic spoon
- Plastic ruler
- Copier paper (5" x 5")
- Construction paper (5" x 5")
- Popsicle stick
- Pencil
- Aluminum foil (5" x 5")
- Paper clip
- Rubber band
- Eraser

## ENGAGE

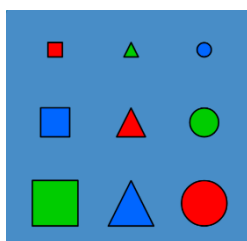
### 1. Introduce the terms “property” and “characteristic,” and lead the class in a “sorting” simulation.

Begin a discussion by telling students that scientists investigate, describe, and try to understand the things around us. For example, if scientists are studying a rock, they might start by describing the rock’s size, shape, and color. They would also try to find out how hard the rock is and whether it is rough or smooth and shiny or dull. All these words describing what the rock is like are called the “properties” or “characteristics” of the rock. To further illustrate this concept, show a shell, leaf, or pine cone and ask students to describe something special that they notice about the object. Using students’ responses, you can say “Yes, a *property* of the shell is that it is pink, or a *characteristic* of the leaf is that its edges are jagged, or a *property* of the pine cone is that it has many sections”, etc.



### 2. Have students participate in the sorting simulation to introduce and improve their understanding of the terms “properties” and “characteristics”.

Show the Simulation [Grouping Objects in Different Ways.](#)



Ask students to suggest a way of sorting the objects shown.

Help students realize that one way the objects can be sorted is by color, according to which ones are red, blue, or green. Explain that color is a “property” of an object. Explain that the objects can also be sorted by size, according to whether they are small, medium, or large. Explain that size is another property of an object. The objects can also be sorted by shape, according to whether they are a square, triangle, or circle. Explain that shape is also a property of an object.

After going through the simulation, explain that objects have other properties in addition to their size, shape, and color. Objects may be hard or soft, rough or smooth, shiny or dull, flexible or rigid, able to absorb water, or have other properties.

Explain that what an object is made from is also one of its properties. An object may be stone, wood, metal, cloth, plastic, glass, rubber, or something else.

### 3. Guide students to use different observations of properties to group a plastic lid, a coin, and a metal key in different ways.

Hold up a round plastic lid, a coin, and a key. Ask students to describe two or three of the properties of each object.

If students can’t come up with descriptive words, show them that the plastic lid is flexible. Show them that the coin and key are stiff by demonstrating that they are hard to bend. You could tap the coin and key on the table to show they make a similar sound. Tapping the lid makes a different sound.



Use the board to write down the objects and some of their properties.

Object	Properties
Lid	Round, Flexible, Smooth, Plastic
Coin	Round, Stiff, Bumpy, Metal
Key	Irregular shape, Stiff, Pointy, Metal

**Ask students:**

**Which of the three objects have similar characteristics and could be grouped together? Explain.**

**Expected results**

**Grouped by shape:** The coin and lid are both round. The key is an irregular shape.

**Grouped by stiffness:** The coin and key are both stiff. The lid is flexible.

**Grouped by material:** The coin and key are both metal. The lid is plastic.

**Give each student an [Activity Sheet](#).**

Students will record their observations and answer questions about the activity on the activity sheet.

## EXPLORE

### 4. Have students group different objects based on their characteristics.

**Question to investigate:**

Can you place different objects into groups based on their observable properties?

**Materials for each group**

- Birthday candle
- Crayon
- Wax paper
- Plastic sheet (from plastic bag)
- Copier paper
- Construction paper
- Plastic spoon
- Plastic ruler
- Popsicle stick
- Pencil
- Aluminum foil
- Paper clip
- Rubber band
- Eraser

**Teacher preparation:**

List the following properties on the board: **Shape, Flexibility, Material.**

**Note:** Considering time and student ability, have students group objects in two or three different ways and then record their groupings on the Student Activity Sheet.

For students with fine motor issues for whom writing is difficult, you may want to provide cut-out words that can be pasted in place on the student activity sheet.

### 1. Have students first group objects based on shape.

#### Expected results

**Long and skinny** – Birthday candle, crayon, plastic spoon, plastic ruler, Popsicle stick, pencil.

**Flat** – Wax paper, plastic bag, copier paper, construction paper, aluminum foil

**Not long and skinny or flat** – Paper clip, rubber band, eraser

Ask a couple of student groups to describe how they grouped the objects and then discuss their results.



### 2. Have students next group objects based on whether they are stiff or flexible.

#### Expected results

**Flexible** – Wax paper, plastic bag, copier paper, construction paper, plastic spoon, plastic ruler, aluminum foil, paper clip, rubber band, eraser

**Stiff** – Birthday candle, crayon, Popsicle stick, pencil

Have a couple of student groups describe how they grouped the objects and then discuss their results.

### 3. Have students finally group objects based on the material the object is made from.

#### Expected results

**Wax** – Candle, crayon, wax paper

**Paper** – Copier paper, construction paper

**Plastic** – Plastic bag, plastic spoon, plastic ruler

**Wood** – Popsicle stick, pencil

**Metal** – Aluminum foil, paper clip

**Rubber** – Rubber band, eraser

Have a couple of student groups describe how they grouped the objects and then discuss their results.

## EXPLAIN

### 4. Explain to students that if you use different characteristics to group objects, you will get different groupings.

Show students the photos of [dogs, cats, and cows](#).



Ask students:

- **What is one way to group these animals?**  
Based on their color.
- **What is another way to group these animals?**  
According to what kind of animals they are.

Explain to students that you could also group the animals according to size. Cows are largest, cats are smallest, and dogs are in the middle.

You could also group the animals according to whether they are farm animals or house animals. Dogs and cats are house animals and cows are farm animals.

## EXTEND

### 5. Give students a homework assignment to group some common household objects by their characteristics.

Give students an assignment such as the following:

When you go home today, write down or draw three different objects that have at least one property in common. The property can be any of the ones we've been talking about or a different one.

**Example:**

Properties: Hard, soft, shiny, dull, flexible, stiff, rough, smooth, or what the object is made from.

Pan, table, and brick – All hard

Pillow, sweater, and blanket – All soft