

How Can We Describe Solids?



Focus: Students explore and describe various solids, then group their descriptive words into categories (properties).

Specific Curriculum Outcomes

Students will be expected to:

- 23.0 explore properties of familiar liquids and solids [GCO 1/3]
- 12.0 communicate while exploring and investigating [GCO 2]
- 10.0 sequence or group materials and objects [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- describe a solid using words related to its properties
- group solids according to their properties

NOTES:

Attitude Outcome Statements

Encourage students to:

- recognize the role and contribution of science in their understanding of the world [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• Science Card 2 • IWB Activity 3 • BLM <i>Properties of Solids</i> • IWB Activity 4	• strips of paper • various small solids (e.g., cotton balls, sheets of tin foil, sheets of paper, plastic baggies, crayons, blocks of wood, erasers, drinking straws, modelling clay, gummy bears) • students' Science Folders • students' Science Journals • several chunks of modelling clay or chocolate • several mugs, shallow foam trays, and small baggies • kitchen scale	• Prepare sets of five items with different colours, shapes, sizes, textures, hardness, flexibility, and weight. You will need one set for every two students in the class.	• property • properties • texture • flexibility • weight

Safety

- Ensure students are not allergic to any substances being investigated.
- Remind students not to taste any solids they are exploring.

Science Background

- To identify, describe, and classify matter, we refer to its properties, or characteristics.
- The physical properties of matter include its colour, shape, size, texture (feel), hardness, flexibility (ability to bend), odour, and taste. Mass, volume, and density (the quantity of mass per unit of volume) are also physical properties of matter. These properties can be observed without changing the state of the matter.

Possible Misconceptions

- Students may find it easy to identify certain substances as solids or liquids, based on the physical properties they observe. Some matter (e.g., toothpaste, hair gel, playdough) may have properties of both solids and liquids, however, and thus be more difficult to classify. This is because liquid and solid are not opposite states of matter—all matter actually exists along a continuum.

ACTIVATE



Describing Solids

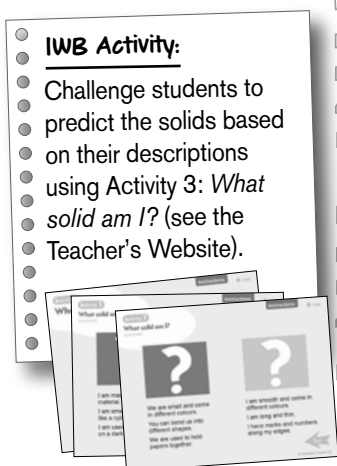
Ask students to describe each object shown on Science Card 2. If necessary, prompt them by asking:

- What does the object look like?
- What might the object feel like?

You may also provide samples of the objects shown to allow students to explore physical sensory learning objects.

On strips of paper, record any words students use that describe properties (e.g., blue, square, small, rough, hard, bendy, heavy).

Then, spread the word strips on a table or the floor and ask students how they might sort or group them (e.g., “blue” and “red” are both colours). Write the categories they generate on chart paper (colour, shape, size, texture, hardness, flexibility, weight), prompting as necessary. Explain that these categories are properties, or ways to describe how something feels or looks. By describing an object’s properties, we can tell someone else about the object even if we don’t know what it is. Add the words “property,” “properties,” “texture,” “flexibility,” and “weight” to the Word Wall.

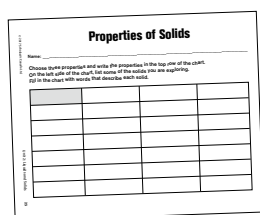


CONNECT

Observing Properties

Invite students to choose partners. Give each pair a small collection of various solids (e.g., items from the Curiosity Centre such as a cotton ball, tin foil, sheet of paper, plastic baggie, crayon, block of wood, eraser, drinking straw, modelling clay, gummy bear). Students can manipulate each solid and observe its colour, shape, size, texture, hardness, and flexibility.

Have each pair choose three properties from the chart paper and write them on the top row of *BLM Properties of Solids*. Then invite them to record several solids on the left side of the chart. Students then record three properties for several solids in their collection (e.g., the cotton ball is white, round, and soft). Have students store their completed BLMs in their Science Folders.



IWB Activity:

Students can sort solids using Activity 4: *Sorting solids* (see the Teacher's Website).



Sorting by Property

Have each pair of students join another pair and combine their objects. Then have the two pairs sort their objects according to various properties (e.g., all of the round objects, all of the flexible objects). Students can draw and label the groups of objects.

CONSOLIDATE



Properties of Solids Anchor Chart

Have students use their observations and their BLMs to generate points for a class Properties of Solids Anchor Chart (e.g., “solids have a colour, shape, and size”; “solids have a certain amount of hardness, roughness, and flexibility”). Record the Anchor Chart on chart paper or the IWB, and have students copy the chart into their Science Journals.

Provide pairs of students with chunks of modelling clay or chocolate. Ask:

- **Is this material a solid? How do you know?**

Invite students to transfer their chunks of modelling clay/chocolate from one container to another, such as from a mug to a shallow foam tray to a baggie. Ask:

- **What happens to this solid when you put it in a different container? Does its shape change, depending on the shape of the container?**
- **Can you change the shape of this solid?**

Invite students to change the shape of the modelling clay/chocolate by breaking it into pieces (e.g., crushing it inside a baggie). Ask:

- **When you break this solid apart, are all the pieces still modelling clay/chocolate? Are all the pieces still solids?**

Use a kitchen scale to weigh a large chunk of modelling clay/chocolate. Have students record the weight. Then invite a volunteer to break the chunk into smaller pieces, and weigh the pieces. Have students record the weight and observe that it is the same as the original weight. Ask a volunteer to break the pieces into even smaller pieces, and weigh them, noting that the weight is still the same.

Invite students to use their observations of the modelling clay/chocolate to add points to the class Anchor Chart, such as “solids do not change shape on their own” and “solids have a certain weight.” Make sure students add these points to the chart they have copied into their Science Journals. Invite students to record any questions they may have on the I Wonder Wall.



EXPLORE MORE

Barrier Game

Have pairs or small groups play a solids barrier game. Students/groups face one another, with a book standing between them, blocking their view of one another. Each side is given a set of the same four objects and a sheet of paper divided into four quadrants. One side places its objects on its sheet of paper, and then tells the other side which object should go where on its sheet of paper. The rule is that students must not use the names of the objects—they can only describe the objects' properties (e.g., “Put the blue, hard, rough solid in the top left corner. Put the red, flexible, smooth solid in the middle.”). Once both sides have their objects in the same places on their sheets of paper, they can switch roles and play again with different objects.

Note: If students need help with positional vocabulary, see the Unit 3: *Relative Position and Motion* Guide.

Properties of Solids

Name: _____

Choose three properties and write the properties in the top row of the chart.
On the left side of the chart, list some of the solids you are exploring.
Fill in the chart with words that describe each solid.
