
Grade 1

Cluster 3: Characteristics of Objects and Materials

Overview

In Grade 1, students are introduced to the concept of materials by exploring various objects in their immediate surroundings. Through these observations, students distinguish between objects and materials, learning that objects are made from materials with specific characteristics. They are also able to describe these characteristics clearly and precisely. By making objects from various materials, they begin to understand the connection between a material's characteristics and the specific purpose(s) for which the material is used.

PRESCRIBED LEARNING OUTCOMES

SUGGESTIONS FOR INSTRUCTION

Students will...

1-3-01 Use appropriate vocabulary related to their investigations of objects and materials.
 Include: characteristic, wood, metal, plastic, cloth, waterproof, absorbent, rigid, pliable, join, recycle.
 GLO: C6, D3

- Introduce, explain, use, and reinforce vocabulary throughout the cluster.
- **Science Words**
 Develop a class list of science words as the unit of study progresses. Post the list where it is easily visible so students can use it as a reference.

1-3-02 Explore and describe characteristics of materials using their sensory observations.
Examples: steel is hard, shiny, and cold, and makes a ringing noise when tapped...
 GLO: C2, D3

1-3-03 Distinguish between an object and the materials used to construct it.
Examples: chairs can be made of wood, metal, plastic, cloth, leather, wicker, or a combination of these materials...
 GLO: D3, E2

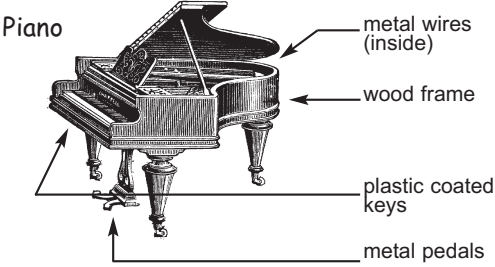
1-3-04 Identify materials that make up familiar objects.
Examples: a desk can be made up of wood, metal, and plastic...
 GLO: D3, E2

- **Investigation**
 Part 1) Have students work in cooperative groups to describe a variety of materials, using sensory characteristics such as colour, shape, texture, and temperature (link to Cluster 2, The Senses). Have students record their observations on a chart.

<u>Material</u>	<u>Characteristic</u>
steel	smooth, shiny, "tings", grey, long and narrow
plastic	smooth, light, flexible, red

Once the chart is completed, have each group review the characteristics to identify those that would stay the same for every sample of that same material. Guide students to eliminate things relating to shape and colour.
 Part 2) Have students add a column to the original chart, indicating different objects that can contain or be made up of the materials they observed (e.g., plastic can be found in chairs, rulers, jackets, etc.).

- **Scavenger Hunt: Observing and Identifying Materials**
 Go on a scavenger hunt to find objects in the school that are made up of several different materials. Have students draw the object and label the parts according to the materials from which they are made. Examples:



- **What's Inside?**
 Have students dissect discarded objects such as an old torn pair of ski pants, computer components, an old sneaker, a radio, etc. to discover what materials are inside. Have students glue each material onto heavy paper and label.

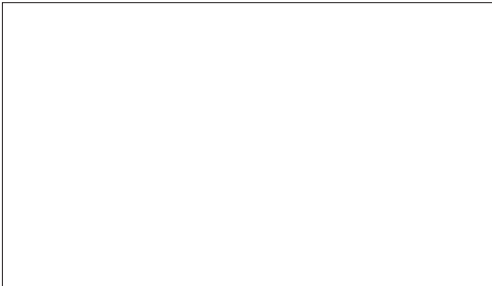
1-0-4e. Respond to the ideas and actions of others in building their own understandings. (ELA 1.1.2) GLO: C5, C7

1-0-4f. Work in cooperative partnerships and groups. (ELA 5.2.1) GLO: C7

1-0-4h. Follow given safety procedures and rules. GLO: C1

1-0-5a. Observe using a combination of the senses. GLO: C2

TEACHER NOTES



SUGGESTIONS FOR ASSESSMENT





















Wood, metal, plastic, cloth, and glass are examples of materials that are used to construct objects. The same type of object can be made from a variety of materials, e.g., a wooden baseball bat and an aluminum baseball bat. The characteristics of the materials determine their usefulness for a specific type of object, e.g., Why don't we see iron baseball bats?

When students are observing the characteristics of materials, try to provide samples of materials and not objects (e.g., a small piece of steel, not a steel nail). This will make it easier for the students to focus on the characteristics of the material and not on the characteristics of the object.

In **Scavenger Hunt**, students should use common terms to identify the materials found in different objects (e.g., plastic, metal, wood, etc.). The emphasis is on the recognition of different materials and not on the precise identification of all the materials involved.

Self-Assessment (Observation Skills): Investigation

(Teachers may choose to read the items to students.)

Colour the correct face.			
1. I used these senses to explore the materials:		2. I looked at:	
sight	 	colour	 
hearing	 	texture	 
taste	 	temperature	 
touch	 	shape	 
smell	 	sound	 

Paper and Pencil Task: Observing and Identifying Materials

To assess knowledge of materials that make up familiar objects, have students use words and/or pictures to explain what they have discovered about materials for building.

Look for

- evidence that the student knows the difference between an object and the materials of its construction
- identification of different materials

PRESCRIBED LEARNING OUTCOMES
<i>Students will...</i>
<p>1-3-05 Explore to identify characteristics of common materials. <i>Examples: waterproof/absorbent, rigid/pliable...</i> GLO: D3</p> <p>1-3-06 Give examples that show how the same material can serve a similar function in different objects. <i>Examples: in gloves and boots, rubber is used to keep out water...</i> GLO: D3, E1</p>
<p>1-0-3d. Identify materials to be used, and explain their choices. GLO: C2, C3, C4</p> <p>1-0-4a. Follow simple directions while undertaking explorations. GLO: C2</p> <p>1-0-6b. Compare data using quantitative terms, and ask questions about the data gathered. (Math SP-IV.1.1) GLO: A1, A2, C2, C5</p> <p>1-0-7a. Propose an answer to the initial question based on their observations. GLO: A1, A2, C2</p>

SUGGESTIONS FOR INSTRUCTION

➤ **Investigation: Keeping out the Rain**

Tell students: “Red Riding Hood needs to decide which jacket to wear to visit her grandmother today because it is raining outside.” Ask: “Which fabric keeps out water the best?” Use a variety of fabric samples such as silk, cotton, nylon, or latex rubber. Stretch each material over a clear plastic cup and hold the fabric in place with rubber bands.

Have students predict how many drops of water can be put on each material before the water drips through. Have them record their predictions on a chart.

Have students work in pairs and use eyedroppers to place one drop of water at a time on each fabric. Students must count the number of drops utilized before the water drips through the fabric. Students should count to twenty-five before adding the next drop. Have students record their findings on a chart.

Have students test all materials in the same manner.

<u>Fabric</u>	<u>Prediction</u>	<u>Actual Count</u>
cotton	3	4

Have students recommend which fabric would be best for making Red Riding Hood’s raincoat and why.

Math Link: Sequence the fabrics from least absorbent to most absorbent.

➤ **Characteristics of Materials**

Provide a variety of objects for students to sort according to other characteristics, such as pliability, weight, and strength. Discuss these characteristics and invite students to suggest objects that fit each category.

➤ **Where Would You Find It?**

From the **Investigation: Keeping out the Rain**, students discovered that rubber works well to keep out water. Have students identify other objects in which rubber is used to perform a similar function, e.g., rubber boots, rubber gloves, etc.

TEACHER NOTES

SUGGESTIONS FOR ASSESSMENT

At this point, students go beyond sensory observations of materials and begin to identify more in-depth characteristics.

Have students use Blackline Master 1: Scientific Inquiry Recording Sheet: Grades 1 and 2.

Observation Checklist: Keeping out the Rain

The student

- follows directions to conduct investigation
- makes predictions
- records predictions
- works cooperatively
- shares responsibilities with group member(s)
- collects data accurately
- records the collected data
- compares the data (the number of drops)
- arrives at an answer based on observations

Science Journal Entry: Keeping out the Rain

Ask students: What jacket would you tell Little Red Riding Hood to wear?

Explain your choice.

Look for

- reference to the investigation
- reference to some form of rubber, plastic, or latex

PRESCRIBED LEARNING OUTCOMES
<i>Students will...</i>
<p>1-3-07 Test and evaluate the suitability of materials for a particular function.</p> <p><i>Examples: test mitts made of different materials to evaluate their ability to keep hands warm and dry...</i></p> <p>GLO: C3, D3</p>
<p>1-0-1a. Ask questions that lead to explorations of living things, objects, and events in the immediate environment. (ELA 3.1.2, 3.1.3) GLO: A1, C2, C5</p> <p>1-0-1b. Make predictions based on classroom experiences. GLO: A1, C2</p> <p>1-0-5e. Record observations using drawings and tally charts. (ELA 4.1.2., 4.2.5; Math SP-II.1.1) GLO: C2, C6</p>
<p>1-3-08 Evaluate and describe the usefulness of common objects for a specific task.</p> <p><i>Examples: compare usefulness of a toothbrush, hairbrush, toilet brush, or paintbrush for cleaning a sink...</i></p> <p>GLO: B1, C3, C4, D3</p>
<p>1-0-5c. Estimate and measure the passage of time using non-standard units, and compare the duration of activities. (Math SS-VI.1.1) GLO: C2, C3, C5</p> <p>1-0-5d. Select an appropriate non-standard unit, and estimate and measure length. (Math SS-I.1.1) GLO: C2, C3, C5</p> <p>1-0-7d. Connect new experiences and information with prior knowledge. (ELA 1.2.1) GLO: A2</p>

SUGGESTIONS FOR INSTRUCTION

➤ **Investigating Materials for Warmth**

Setting the Context: Tell students that the mother of the “Three Little Kittens” is trying to decide what type of mittens to buy for all her children.

Ask the students what type of mittens they wear on a cold winter day. Challenge them to try and come up with a way to find out which mittens are warmest. An investigation such as the following should result:

Sample Investigation

Collect mittens made from a variety of materials, e.g., homemade, wool mittens; polyester, fibre-filled mittens; leather mittens; etc. Obtain four pairs in each category. Prepare a freezer bag of ice for each student. Before each trial, record class predictions about which material will prove the warmest. Have students who are wearing the same type of mittens hold the ice until their hands feel cold. Use a stopwatch to measure the time it takes for each student to feel cold. Record this information on a chart.

<u>Material</u>	<u>Prediction (What works best?)</u>	<u>Results</u>
wool	_____	_____
leather	_____	_____
polyester, fibre-fill	_____	_____

➤ **Investigation: The Best Tool for the Job**

- Have students work together to use a series of different brushes to scrub small sections of the classroom, hallway floor, desk, or table.
- Have students decide which brush is most suited to the task and have them justify their decision.
- Ask students to think of examples of other objects or tools that come in a variety of shapes and sizes. Discuss reasons why there are so many variations.

➤ **Guest Speaker**

Invite a painter, or another person who uses different-sized brushes in his/her work. Have the guest show students why different-sized brushes are important.

TEACHER NOTES

SUGGESTIONS FOR ASSESSMENT

If undertaking this unit during the winter, students may take turns wearing different mittens out for recess as part of this investigation. Ensure that students are respectful of each other's belongings throughout this activity and that they don't take risks during extreme cold weather.

Science Journal Entry: Materials for Warmth

Tell students: You need a new pair of mittens for winter. What kind will you buy? Explain why.

Look for

- reference to the investigation
- suitable selection

For **Investigation: The Best Tool for the Job**, cover an area with tempera paint or a similar substance that cleans easily with soap and water in order to provide a substance for scrubbing.

Paper and Pencil Task: The Best Tool for the Job

Match the brush to the place where it is used.

- | | |
|-------------|----------------|
| toothbrush | hair |
| scrub brush | painting easel |
| hairbrush | a mouth |
| paintbrush | a floor |

PRESCRIBED LEARNING OUTCOMES
<i>Students will...</i>
<p>1-3-09 Describe ways that materials can be joined.</p> <p><i>Examples: gluing, stapling, taping, interlocking, buttoning...</i></p> <p>GLO: C3, D3</p>
<p>1-0-4f. Work in cooperative partnerships and groups. (ELA 5.2.1) GLO: C7</p> <p>1-0-6a. Construct, with guidance, concrete-object graphs and pictographs using 1:1 correspondence. (Math SP-III.2.1) GLO: C2, C6</p> <p>1-0-7e. Describe, in a variety of ways, what was done and what was observed. <i>Examples: concrete materials, drawings, oral language...</i> (ELA 4.1.2, 4.1.3) GLO: C6</p>
<p>1-3-10 Use the design process to construct a useful object by selecting, combining, joining, and shaping materials.</p> <p><i>Examples: pencil holder, crayon box, desk organizer...</i></p> <p>GLO: C3, D3</p>
<p>1-0-1c. Recognize a practical problem in a given context. GLO: C3</p> <p>1-0-3a. Brainstorm, with the class, possible solutions to a practical problem, and reach consensus on a solution to implement. (ELA 1.1.3, 3.1.3) GLO: C3, C7</p> <p>1-0-3b. Create, with the class, a plan to solve a problem or meet a need. Include: identify simple steps to follow. (ELA 1.2.3) GLO: C3, C7</p> <p style="text-align: right;">(continued)</p>

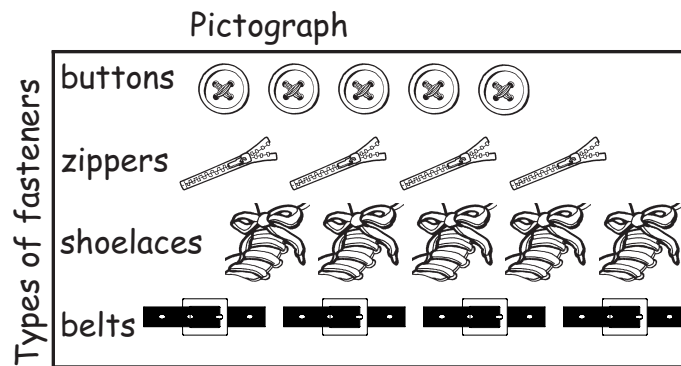
SUGGESTIONS FOR INSTRUCTION

➤ **Wearing Fasteners**

Ask students: “How many fasteners are you wearing today?”

Have students draw pictures of themselves fully dressed. Have them label all of the fasteners they are wearing, e.g., laces, buttons, snaps, Velcro, etc. Show students how to develop these drawings into pictographs. Interpret the pictographs in a variety of ways.

Divide students into groups. Students will create a group pictograph that shows the type and numbers of their fasteners based on the fasteners identified in their pictures.



➤ **All Stuck Up**

Have students investigate to discover the best fastener for attaching buttons to a medium-weight paper in a button collage. Include different types of glue (white glue, glue stick); as well as tape; blunt plastic needles and thread; paper clips; etc. Ensure that students follow proper safety procedures.

➤ **Designing a Portable Supplies Container**

Say to students: “We have been talking about ways that materials can be joined. Today, we are going to use our knowledge of fasteners and joining materials to construct an object that is useful for carrying pencils, scissors, crayons, and glue. What could we make to carry these supplies to another room?”

- Have students follow the design process to construct and test their supplies container.
- Ensure that students follow safety procedures and rules for handling materials and tools.

(continued)

TEACHER NOTES

A pictograph is a graph that uses symbols to represent data. (See “Teacher Information: Graphs,” in *Grades 5-8 Mathematics: A Foundation for Implementation.*)

SUGGESTIONS FOR ASSESSMENT

Peer Assessment (Group Work): Wearing Fasteners

How Well Did We Work Together?

Yes or No? (Teachers may choose to read these items to the class.)

1. We shared the work. _____
2. We took turns. _____
3. We listened to each other. _____
4. We solved our own problems. _____
5. We worked until the job was completed. _____
6. We helped each other. _____

Design Process Checklist

The student

- understands the problem
- contributes to class brainstorming for solutions
- contributes to the creation of a plan
- contributes to the development of criteria
- identifies materials to be used
- explains the choice of materials
- constructs a useful object tests the object
- identifies and makes improvements to the object
- proposes a solution to the problem
- works cooperatively assumes group responsibilities
- presents his/her object to the group

PRESCRIBED LEARNING OUTCOMES

SUGGESTIONS FOR INSTRUCTION

Students will...

1-0-3c. Develop, as a class, limited criteria to evaluate an object or device based on its function. GLO: C3, C7

1-0-3d. Identify materials to be used, and explain their choices. GLO: C2, C3, C4

1-0-4b. Construct an object or device to solve a problem or meet a need. GLO: C3

1-0-4c. Test, with guidance, an object or device with respect to pre-determined criteria. GLO: C3, C5

1-0-4d. Identify and make improvements to an object or device with respect to pre-determined criteria. GLO: C3

1-0-7b. Propose a solution to the initial problem. GLO: C3

1-0-8b. Recognize that tools are developed in response to human needs. GLO: A3

Criteria for the investigation could include the following:

- able to accommodate 10 pencils, 2 pairs of scissors, 3 packs of crayons, 1 container of glue
- able to be lifted (some type of handle)
- sturdy (doesn't fall apart)
- attractive

Have students use Blackline Master 3: Design Process Recording Sheet: Grades 1 and 2.

1-3-11 Demonstrate ways to reduce, reuse, and recycle materials during classroom learning experiences.

GLO: B5, D3

➤ **What's for Lunch?**

Have students check their own lunch kits (or a sample provided by the teacher) to see which materials can be reused or recycled. Have students suggest ways that non-recyclable materials could be reduced. Have students check their lunch kits on the following day. Ask students: Have you reduced the amount of non-recyclable materials in your lunch?

1-0-1c. Recognize a practical problem in a given context. GLO: C3

1-0-3a. Brainstorm, with the class, possible solutions to a practical problem, and reach consensus on a solution to implement.(ELA 1.1.3, 3.1.3) GLO: C3, C7

1-0-9d. Take the time to measure with care. GLO: C5

➤ **Tracking Classroom Waste**

For a week, have students keep track of how much waste is discarded in the classroom each day. Record data on a class chart.

<u>Materials</u>	<u>Monday</u>	<u>Tuesday</u>
paper	3 full garbage cans	2 1/2 garbage cans
plastic	5 drink/pudding cups	4 pudding cups
cans	3 pop cans	0 pop cans
other		

As a class, brainstorm ways to reduce classroom waste.

➤ **Reduce, Reuse, Recycle**

Have students use scraps of materials left from classroom learning experiences to create a collage or a sculpture. Materials could include scraps of construction paper, egg cartons, fabric scraps, wooden scraps, styrofoam, etc. Have students develop titles for their work, e.g., Robbie the Recycler, Garbage Helpers, etc. Look for examples of visual art to guide this learning experience.

TEACHER NOTES




SUGGESTIONS FOR ASSESSMENT




Peer Assessment: Design Presentation




Colour in the face that shows how you feel.

The speaker (name) _____

1. spoke clearly   

2. spoke so everyone could hear   

3. told all about his/her object   

4. kept the interest of the group   

I liked _____

Next time _____

It is important for teachers to note that it is not always possible for students to have control over or a say in what goes into their lunch. Children should not be made to feel embarrassed if the amount of non-recyclable materials has not changed.

Self-Reflection: Entire Cluster

Have students complete the self-reflection at the end of the learning experiences for this cluster.

**Characteristics of Objects and Materials
Self-Reflection**

1. Three things that I learned are:

1) _____

2) _____

3) _____

2. I liked _____

3. I didn't like _____

4. I would like to learn more about _____

NOTES