Sorting Materials Three Ways

Teacher		**Class**	Grade 2
Subject	Science	**Topic**	Sorting materials by their properties
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn to describe materials by color, texture, hardness, and flexibility. They sort the same cubes three ways and share the patterns they found.

Curriculum links

- Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties [1]

Learning objectives

- Students will describe materials by color, texture, hardness, and flexibility.
- Students will sort objects by one observable property and explain groupings.
- Students will plan and test three sorting rules for the same set.

Success criteria

- I can use color and feel words to describe a material.
- I can sort objects by one property and tell why.
- I can try a new rule and share the pattern I found.

What students already know

Show a wood block and a metal key. Ask: What do you see and feel? Is the name of the thing the same as what it is made from? Listen for object versus material ideas.

Key words

material	what an object is made from, like wood, metal, or plastic [3]
property	something you can see or touch that tells what a thing is like [1][5]
texture	how a surface feels to your fingers, like smooth or rough [1]
hardness	if a thing keeps its shape or gets a dent when you push it [1][5]
flexibility	if you can bend a thing safely without it breaking [1]
pattern	the same trait you see again in many different objects [1]

Materials

- Sets of 8 same-size cubes in wood, plastic, and metal, one set per group
- Trays for sorting
- Science notebooks, pencils and crayons
- Slides 1-5, 7, 9-12 projected

Before the lesson

- Make sets of 8 same-size cubes in wood, plastic, and metal with a tray for each group
- Print Worksheet Task B and Worksheet Task A, one copy per student
- Load Slides 1-5, 7, 9-12 and check projector and screen

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- Printed Worksheet Task B and Worksheet Task A, one per student
- Whiteboard and markers, sample wood block and metal key
- Put science notebooks, pencils and crayons at group tables
- Place sample wood block, metal key, plastic spoon and cloth square at teaching table

Lesson outline

0–8 min **Starter** 8 min · Whole class

To spark curiosity about same-size cubes and recall object and material ideas.

YOU DO

1. Show Slide 1 Sorting Materials by What We See and read What is it made of?
2. Hold up two same-size cubes, one wood and one metal, for all to see without touching yet.
3. Show Slide 2 Today we will and read the three goals in simple words.
4. Lead a 2-minute turn-and-talk on what the thing is and what it is made from.

STUDENTS DO

1. Look closely at the cubes and tell a partner a prediction.
2. Share ideas about the thing you hold and what it is made from.
3. Show thumbs up if you can name one material like wood or plastic.

Say: These cubes all look the same size and shape. Do you think they are all the same? Let's test them. Today we will be material detectives and sort by what we see and feel.

Ask: These cubes are the same size. Does that mean they are the same material? (No, same size does not mean same material; they can feel, look, and weigh different even when size is the same [4].) · If I say spoon, am I naming the object or the material? (Spoon is the object you hold; plastic or metal is what it is made from [3].)

Check understanding: Use thumbs up if you can name a material. If many are unsure, quickly name spoon-plastic, block-wood, and key-metal on the board before moving on.

Support: Hold the real cubes close up and let students point to color and feel picture cards. **Stretch:** Ask students who are ready to predict which cube will feel heavier and what clue they used.

Use: Slides 1–2

8–20 min **Teaching** 12 min · Whole class

To model how to describe materials and sort by one property at a time.

YOU DO

1. Show Slide 3 How Scientists Sort and read the four steps with the class.
2. Show Slide 4 Object or Material and model: the object is a spoon and the material is plastic [3].
3. Show Slide 7 Words That Describe and model color, texture, hardness, and flexibility observations [1].
4. Show Slide 5 How Should We Sort First and take a vote for hard or soft, bendy or stiff, shiny or dull.

STUDENTS DO

1. Repeat the sentence frame: The object is __ and the material is __.
2. Vote with hands for which property to test first.
3. Help place demo items into hard or soft groups and say why.

Say: Scientists look closely and touch safely, then pick one property to test. An object is the thing you hold, like a spoon, and a material is what it is made from, like plastic. We describe by color, texture, hardness, and flexibility, then sort into groups that match.

Worked example: I sort four items by hardness. Step 1: pick one property, hardness. Step 2: feel each safely. Step 3: hard group gets wood block and metal key because they keep shape when pushed. Step 4: soft group gets cloth square and rubber band because they dent or squash. The pattern is that different objects can share the same feel [1][5].

Ask: What four things can we observe to describe a material? (Color, texture, hardness, and flexibility [1].) · Why do we sort by only one property at a time? (So groups match one rule and we can see the pattern clearly [1][4].) · A pencil has wood and metal parts. How should we group it? (It is made of more than 1 material, so it needs a both or more-than-one group [3].)

Check understanding: Hold up cloth and key for hard or soft vote with hands. If split, feel again together and name the property words before moving on.

Support: Use two floor hoops labeled object and material and have students place picture cards while naming feel words. **Stretch:** Ask students who are ready to name an object made of more than one material and tell its parts.

Use: Slides 3–5, 7

20–45 min **Main activity** 25 min · Groups

To plan and conduct sorting tests three different ways with the same cubes.

YOU DO

1. Give each group 8 cubes that are all the same size and shape but are made of different materials with a tray and science notebooks [4].
2. Model Sort 1 by look: shiny or dull, place cubes, draw groups, and label the property [4].
3. Challenge groups to plan Sort 2 and Sort 3 by a new property each time, like heavy or light [4].
4. Remind groups to draw each sort, label weight, color, texture, hardness, luster, and type of material, and get ready to share patterns [4].

STUDENTS DO

1. Work in groups to sort the 8 cubes in at least 3 different ways, each time by a different property [4].
2. Draw each grouping in science notebooks and label the property used.
3. Discuss what pattern the groups show and which cubes might be wood, plastic, or metal.

Say: Pick one property, like hardness. Sort and draw your groups in your notebook. Try again with a new property two more times. Be ready to share what pattern you found in each sort.

Worked example: Sort 1 by look. Step 1: pick shiny or dull. Step 2: check each cube in light. Step 3: shiny group has 3 metal cubes, dull group has wood and plastic cubes. Step 4: draw two circles, sketch cubes inside, and write Sorted by look: shiny or dull underneath.

Ask: What is your sorting rule right now and how do you test it? (One property only, for example dull vs shiny by looking, or heavy vs light by hefting in hand [4].) · What pattern do you see across your groups? (Different cubes share similar traits, for example shiny cubes feel heavy and hard [1][4].)

Check understanding: Walk group to group with a checklist for three labeled drawings. If a group used the same rule twice, prompt them to pick a new word from the board.

Support: Start with only 4 cubes and one choice at a time, such as shiny or dull, then add the rest [4]. **Stretch:** Ask groups to predict which cube is wood, plastic, or metal and explain what clues they used.

Use: Slide 9

45–55 min **Share and apply** 10 min · Whole class

To compare results, name patterns, and apply property ideas to new items.

YOU DO

1. Invite two groups to show one sort and name the similar properties that different materials share [1].
2. Show Slide 10 Did you know and read: Glass starts as sand! Sand is heated very hot until it melts into smooth glass.
3. Show Slide 11 What could this be and read: Looks like glass, but you can squeeze it. What is it? A plastic cup. It looks like glass but bends.
4. Hand out Worksheet Task B and have pairs sort each clue with wood, fabric, or both, noting wood is usually strong and can bend [5].

STUDENTS DO

1. Present one sort, point to groups, and tell the rule and pattern found.
2. Compare shiny, heavy, and hard groups and add classroom objects that would fit.
3. Complete Worksheet Task B with a partner by placing each clue with wood, fabric, or both.

Say: Look for patterns in what your groups share. Glass is hard and clear but breaks easily, while plastic can look like glass but bends. Now use clues to decide if wood, fabric, or both fit.

Ask: Glass is made from sand heated very hot. Why can a plastic cup bend when glass cannot? (Glass is hard and very fragile while plastic can bend safely; properties tell what a material is like [5].) · Many types of wood can float but stone sinks. What does that tell us? (Materials behave in different ways, so we test and group by what we observe [5].)

Check understanding: Ask each pair to hold up Task B for wood or fabric. If answers differ, ask what evidence from feel or bend they used and retest the clue.

Support: Offer two Task B choices at a time and model properties help us describe what a material is like [5].
Stretch: Have students redesign the item for a different job and tell what property would need to change.

Use: Slides 10–11, Worksheet Task B

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55–60 min **Plenary** 5 min · On their own

To return to goals and check each student can name rule and pattern.

YOU DO

1. Show Slide 12 Exit ticket and read the three starters aloud.
2. Hand out Worksheet Task A and read the statement together.
3. Have each student write agree or disagree starting with I claim and using one observation as evidence.

STUDENTS DO

1. Complete Worksheet Task A on their own using evidence from cube sorts.
2. Share exit line with a neighbor if time allows.

Say: Think about your sorting work today. Write I sorted by and name your property. Then write one pattern you found and one question you still have.

Ask: What property did you sort by and what pattern did you find? (For example, I sorted by hard or soft; all metal cubes were hard and shiny [1][4].) · Is a block an object or a material? (Block is the object; wood or plastic is the material it is made from [3].)

Check understanding: Collect Task A and Slide 12 lines. If many cannot name a property, reteach color, texture, hardness, flexibility with samples tomorrow.

Support: Provide sentence starters for color, texture, hardness, and flexibility so all can explain their vote [1].
Stretch: Invite students to move one object to a different group on paper and defend the new placement.

Use: Slide 12, Worksheet Task A

Common mistakes

Mistake	How to spot it	How to fix it
Mixing up object names and material names, such as saying the material is spoon	Groups sort by spoons or cups instead of metal, plastic, wood products, and rubber [3]	Practice the frame: The object is a spoon and the material is plastic, and sort by kind of material not object type [3]
Thinking same size and shape means same material	Students say all 8 cubes must be the same because they look alike	Heft and feel again to show all cubes are the same size and shape but are made of different materials with different weight and luster [4]
Using more than one property at once or naming color as material	Groups put red plastic and red wood together and say red is the material	Reset to one rule at a time and recall observations could include color, texture, hardness, and flexibility, but color alone does not tell material [1]

Support

- Start with only 4 cubes and one choice at a time, such as shiny or dull, then add the rest [4].
- Provide picture word bank for smooth, rough, bendy, stiff, shiny, and dull and let students point while describing [1].

Stretch

- Ask groups to predict which cube is wood, plastic, or metal and explain what clues they used.
- Challenge early finishers to re-sort the same set a fourth way and name the new pattern they found [4].

For the LSE or teaching assistant

Stay with focus group using 4 cubes only. Narrate feel words, scribe notebook drawings if needed, and keep them on one property rule at a time.

Check for understanding

Question	Answer
What property did you use to sort? Name color, texture, hardness, or flexibility.	Any one observed property, for example I sorted by hard or soft feel [1].
What pattern did different materials share in your groups?	Similar traits grouped together, for example heavy, shiny cubes were metal [1][4].
A cup is on the table. Is cup the object or the material? What is it made from?	Cup is the object; the material is what it is made from, like plastic, glass, or paper [3].

Homework

Find 2 objects at home made from different materials and tell a grown-up one property of each.

Sources

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