

# Kindergarten: Shape and Space (3-D Objects and 2-D Shapes)

**Enduring Understanding:** Objects can be sorted by similarities.

Shapes can be described and compared using their attributes.

**Essential Question(s):** How are the objects alike?

In which ways can the objects be sorted?

What is the sorting rule?

How can 3-D objects be described?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
<p><b>K.SS.2</b> Sort 3-D objects using a single attribute. [C, CN, PS, R, V]</p>	<ul style="list-style-type: none"><li>→ Sort a set of familiar 3-D objects using a single attribute, such as size or shape, and explain the sorting rule.</li><li>→ Determine the difference between two pre-sorted sets by explaining a sorting rule used to sort them.</li></ul>
<p><b>K.SS.3</b> Build and describe 3-D objects. [CN, PS, V]</p>	<ul style="list-style-type: none"><li>→ Create a representation of a 3-D object, using materials such as playdough and building blocks, and compare the representation to the original 3-D object.</li><li>→ Describe a 3-D object, using words such as “big,” “little,” “round,” “like a box,” and “like a can.”</li></ul>

## PRIOR KNOWLEDGE

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Students have had no formal instruction with these concepts.

## BACKGROUND INFORMATION

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Sorting and classifying are basic concepts that help students organize and understand their surroundings. Through sorting and classifying experiences students come to understand that objects can be grouped in different ways. This supports part-part-whole understanding (e.g., 8 can be grouped as 7 and 1 or 5 and 3).

In order to sort students need to identify attributes such as colour, shape or size. This is the basis of patterning.

**Note:** Support sorting by providing defined areas for grouping (e.g., paper plates or yarn circles).

## MATHEMATICAL LANGUAGE

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**Sorting:** Colour words, informal vocabulary for shape (round, flat, pointy, like a box, like a can, etc.), vocabulary for size (big, small, heavy, light, long, short, etc.), sort, classify, group, the same as, different

**3-D Objects:** big, little, round, “like a box”, “like a can”, ball, flat, etc.

## LEARNING EXPERIENCES

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### Assessing Prior Knowledge

Give students a small collection of objects that can be sorted by one attribute (e.g., unifix cubes that can only be sorted by colour). Ask them to sort them or to put them into groups. Ask them to explain their sorting rule.

If successful, give them a small number of pattern blocks and have them sort them. Ask them to explain their sorting rule.

### Observation Checklist

Students are able to

- sort objects by colour
- sort objects by shape
- explain their sorting rule

3-D objects refers to objects in the environment not to the set of 3-D objects typically purchased as math materials.

- **Sort a set of familiar 3-D objects using a single attribute, such as size or shape, and explain the sorting rule.**
- **Determine the difference between two pre-sorted sets by explaining a sorting rule used to sort them.**

- Students should have many sorting and classifying experiences using a wide variety of objects.
- **What's My Rule?:** Sort a set of attribute (logic) blocks into two groups. Have students guess your sorting rule. Select a student to resort the objects. Have students guess their sorting rule.
- **Student Sort:** Sort students in different ways and have students guess the rule (e.g., boys/girls; wearing jeans/not wearing jeans; dark hair/not dark hair; wearing red/not wearing red; etc. ).
- **Where Does It Belong?:** Sort a set of objects into two groups leaving some objects out of the sort. Hold up one of the objects and ask students to identify where it belongs. Have students justify their choice.

Attribute blocks can be sorted by colour, shape, size, and thickness.

**Note:** Students at this level may not be ready to sort by thickness.

**Note:** Connect sorting to the measurement activities.



### Assessing Understanding

Give students a small group of attribute blocks.

1. Have them sort them and then state their sorting rule.
2. Ask them to re-sort the set and then state their new sorting rule.
3. Sort a set of objects into two groups. Have students identify the sorting rule. Hold up another one of the sorted objects and ask them to identify where it should go.

### Observation Checklist

Students are able to

- sort a collection of objects using one attribute
- state the sorting rule
- re-sort a set of objects in another way
- identify the sorting rule of a pre-sorted set
- identify the placement of an additional object

- **Create a representation of a 3-D object, using materials such as modelling clay and building blocks, and compare the representation to the original 3-D object.**
- **Describe a 3-D object, using words such as “big,” “little,” “round,” “like a box,” and “like a can.”**

- Gather a collection of small 3-D objects from the classroom. Have students select one of the objects and make a model of it using playdough or plasticine. Have them compare their model with the actual object. Ask, “Is your model the same as the object? How do you know?”

Although students are using informal vocabulary, teachers should model correct terminology.

Mix up the original objects and the student models.

Have students see if they can match the models to the original objects.

- Have students bring in a collection of ‘food stuff’ containers. Use this collection for sorting, building with, and exploring 3-D objects. **Note:** The containers can also be used for some of the measurement activities.
- Show students a group of objects – cans, cones, balls, boxes, etc. Have them sorted into groups. Ask students to describe the objects in each group.
- **I Spy:** Give students a clue to a particular 3-D object in the classroom and have them guess which object you have selected (e.g., “I spy with my little eye something that is like \_\_\_\_\_.”). Hold up an object. Are students guessing objects that are similar in shape?

### Integrating Measurement into Kindergarten Routines and Centres

CENTRE	SUGGESTED ACTIVITIES
Arts and Crafts	The creation of 3-D structures can be expressed by providing students with a rich variety of paper, writing tools, plasticine/playdough, paper rolls, and similar craft items. Draw pictures of various 3-D objects and constructions.
Sand	Build sandcastles and different shape patterns in the sand.
Block/Construction	Have both commercial and non-commercial objects for building and constructing. Sorting blocks by shape.
House/Theme	Use food stuff containers.
Technology	Use drawing software to make shapes and pictures.

## POSITIONAL LANGUAGE

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Although there are no specific outcomes related to positional language in the curriculum it is important for students to develop these skills.

At this level, students describe the world in relation to themselves. Because of this egocentricity, positional language should be developed, beginning with comparison of self to others and of self to objects. Proceed to make comparisons of objects to self, and then object to object.

## LEARNING EXPERIENCES

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- Model positional language in everyday activities – lining up, finding things, calendar work, gym activities . . .
- Use objects to explore and foster student understanding of positional language: “The car is in front of that truck. Now Joel is driving it over the bridge . . .”
- **Play *Simon Says*:**
  - “Simon says stand outside our circle but beside the teacher’s desk.”
  - “Simon says step over the triangle.”
  - “Simon says put the pencil between the two crayons.”
- Have a student take a teddy bear and position it so it is visible to the group. Ask other students to describe where the bear is.  
Examples: “The bear is between the bookshelf and the chair.” “It is under the ceiling.”
- **Play *Twenty Questions*:** Use cubes to count the number of questions students ask to identify an object.  
Example:  
Teacher says “I am thinking of an object on our bulletin board.” Students ask, “Is it over the \_\_\_\_\_?” (Students will likely need modelling of the types of Yes/No questions expected.)

## PUTTING THE PIECES TOGETHER

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### Investigation: Kindergarten Town/City

Materials: classroom objects  
food stuff containers, paper rolls  
playdough, plasticine  
scissors, glue, paper, tape, etc.

Tell students that they are going to design/make a model of a Kindergarten Town/City. Brainstorm buildings and structures they would like to have in their town or city.

Have students work in small groups. Designate a specific area in the classroom for each group. A large piece of cardboard or tag can be used to define the dimensions of the construction.

As students are working, talk to them about their constructions and particular 3-D objects.

Have each group present their constructions. Ask them to take turns describing the 3-D objects used. Encourage the use of measurement vocabulary as well especially vocabulary related to length/height.



#### Observation Checklist

Students are able to

- identify objects used in the construction
- describe an object using informal (formal) vocabulary



# KINDERGARTEN MATHEMATICS

Bibliography