BRIDGES IN MATHEMATICS 1

GRADE 1 SUPPLEMENT

Set C1 Geometry: 3-Dimensional Shapes

Includes

Skills & Concepts

- ★ recognize and represent shapes from different perspectives and orientations
- ★ describe geometric attributes of 3-dimensional shapes, and determine how they are alike and different

Published by The MATH LEARNING CENTER *Salem, Oregon*

P201304

Bridges in Mathematics Grade 1 Supplement
Set C1 Geometry: Fractions

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Prepared for publication on Macintosh Desktop Publishing system.
Printed in the United States of America.

P201304

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set C1 ★ Activity 1

ACTIVITY

Shape Detectives

Overview

The teacher shows pictures and examples of 7 different 3-dimensional shapes. Student pairs then hunt around the room to find more examples of each.

Skills & Concepts

- ★ recognize and represent shapes from different perspectives and orientations
- ★ describe geometric attributes of 3-dimensional shapes, and determine how they are alike and different

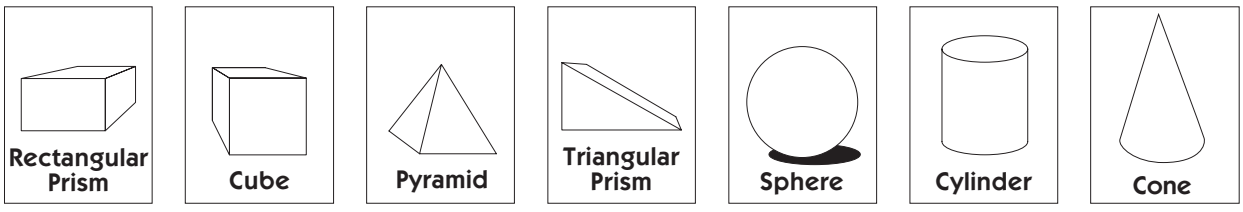
You'll need

- ★ Shape Cards (pages C1.4–C1.7, 1 copy, see Advance Preparation)
- ★ 3-Dimensional Shape Cards (see Advance Preparation)
- ★ one object to match each of the cards (see Advance Preparation)
- ★ polydrons (see Advance Preparation)
- ★ seven 12″ × 18″ pieces of construction paper, each a different color

Advance Preparation Run a copy of the Cone Shape Card on page C1.7, trim, and laminate. Add it to the set of six 3-Dimensional Shape Cards you'll find among your Bridges materials. If you can't find the 3-Dimensional Shape Cards, you can run 1 copy each of pages C1.4–C1.7 and trim and laminate them to create a full set. Find a cube, a small box, a can, and a ball in your classroom. Borrow a cone from the gym if necessary. You'll probably be able to find a triangular prism in your block corner, and you can build a pyramid with polydrons if you can't find anything else. You'll also want to divide your polydrons into smaller baskets and set them out on several tables in preparation for this lesson.

Instructions for Shape Detectives

1. Gather children to your discussion circle and tell them you are going to explore some new shapes today. Hold up the 3-Dimensional Shape Cards one by one along with the matching 3-D objects, as you name each shape and invite observations from the children.



Activity 1 Shape Detectives (cont.)

Note *In sharing observations, first graders are likely to talk about the faces of the objects, and will most likely refer to the sphere and cylinder as circles, the pyramid as a triangle, and so on. You'll want to be careful to use the correct terms consistently, drawing the distinction between a cube and a square, for instance, both to model the language of geometry accurately and to avoid future misconceptions.*

2. Once you've shared the cards and the objects, set 7 different colored sheets of construction paper in the middle of the circle and place a shape card on each. Hand out the objects to 7 different children around the circle. Then call on them one by one to place their object on one of the colored sheets, next to the card that names its shape, and explain why they're putting it there.

Drew *I put this block here because it's a square.*

Teacher *Where do you see a square on that block, Drew?*

Drew *There's one on top, and another here, and another here. It's got lots of squares.*

Teacher *You're right. A cube has 6 square faces.*

3. After all 7 objects have been placed where they belong, explain that the children are going to be shape detectives today. You're going to send them out in pairs to look around the room for one or more of these 7 different shapes. Each time they find one, they'll bring it to the circle and set it on the piece of paper near the shape card that tells its name. Let them know that they have to stay with their partners, walk at all times, and move quietly, like good detectives. They can only bring one object to the circle at a time, and anything they bring has to fit on the paper. If they want, they can build one of the shapes with polydrons and bring their construction to the circle. (It's possible to build cubes, triangular prisms, rectangular prisms, and pyramids with polydrons, though you may have a few students who are convinced that they will be able to build a sphere.)

4. Send the children away from the circle, one pair at a time, complimenting the first few pairs on how quietly and carefully they're walking. (Detectives can't rush around, or they'll never find what they're looking for!)

5. After a short work period, call children back to the circle to view the group's discoveries and constructions briefly. You might take some time to discuss why it's so much easier to find examples of some of the shapes than others. Can children think of places they'd be more likely to find cones, pyramids, or spheres? Why are there so many rectangular prisms and cylinders in most classrooms?

Activity 1 Shape Detectives (cont.)

Extensions

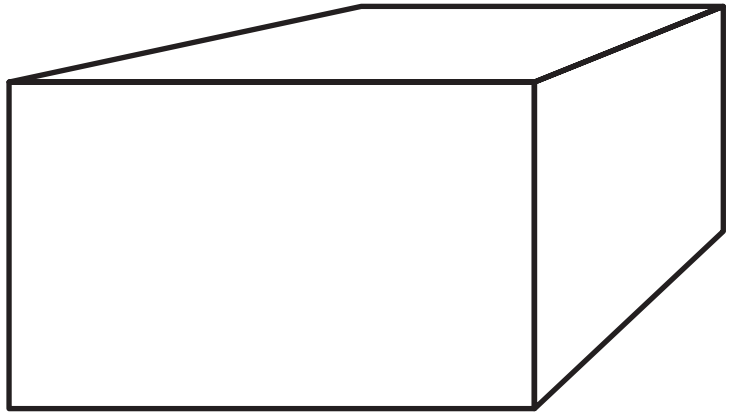
- If you're able to leave the mats with the cards and objects still on them for a few days, you may find that some children are interested in adding things or changing things around. Use the opportunity to continue modeling the correct names and talking with children about the attributes of each shape.
- Leave the shape cards on the mats, but remove all the objects from the mats and put them in a basket. Invite children to sort the objects back onto the correct mats.
- Ask students to bring things from home to place on the shape mats.

Shape Cards page 1 of 4

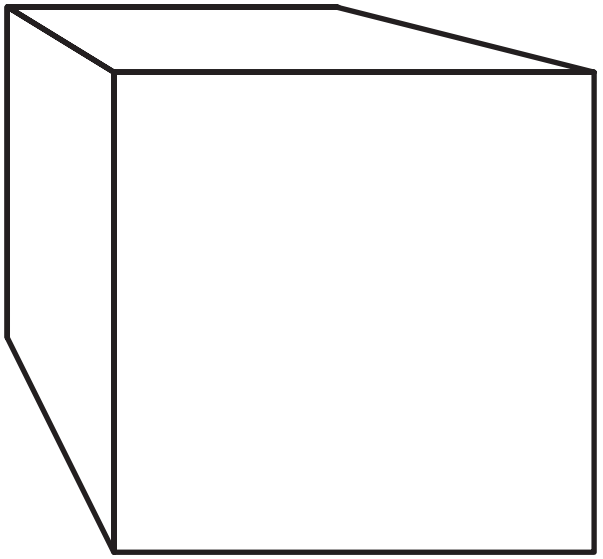
Triangular Prism

Pyramid

Shape Cards page 2 of 4



Rectangular Prism

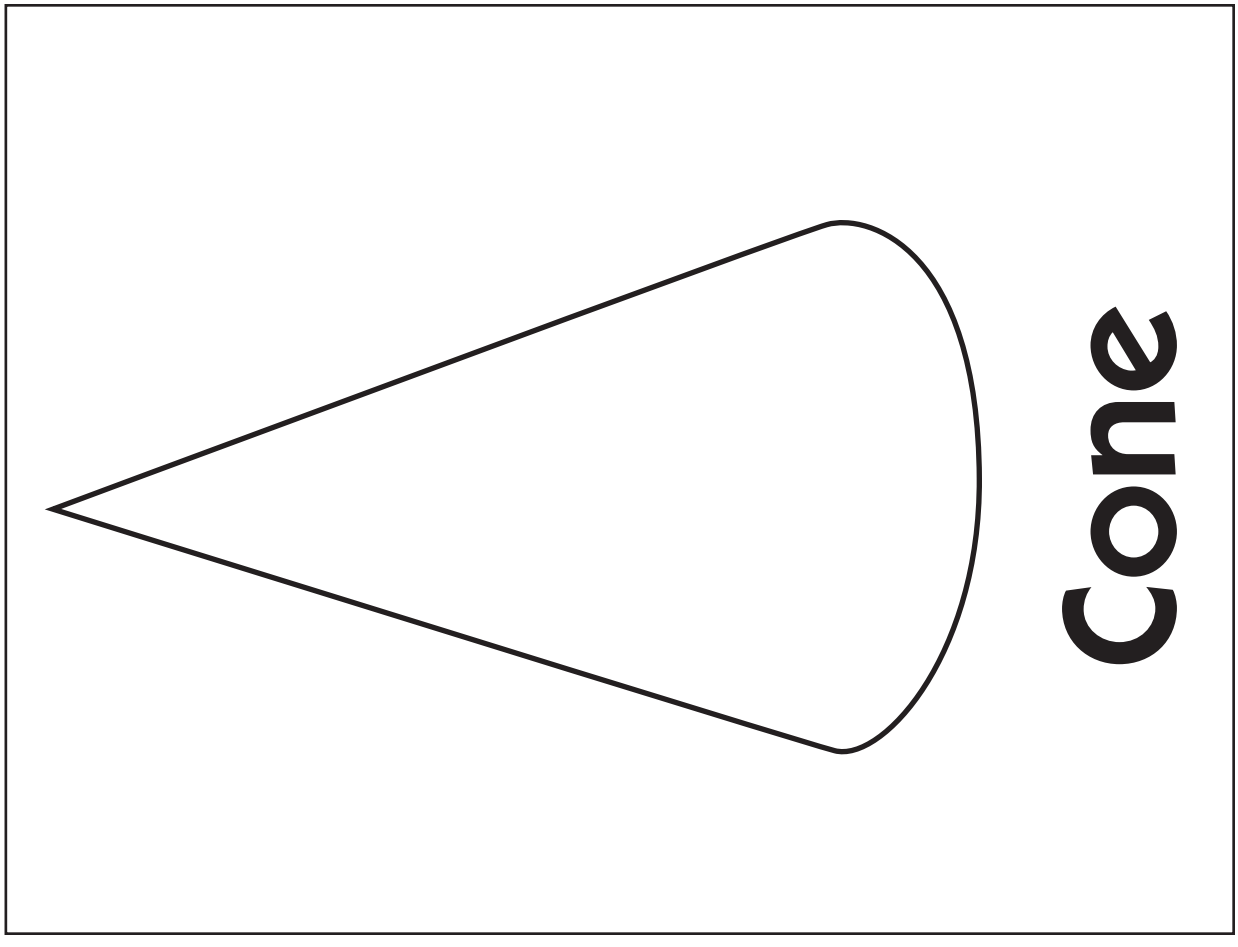


Cube

Cylinder

Sphere

Shape Cards page 4 of 4



Set C1 ★ Activity 2

ACTIVITY

Mystery Bag Sorting

Overview

The teacher pulls a collection of 3-dimensional objects out of a grocery sack, placing all the objects with flat faces (cubes and rectangular prisms) in one group and all the objects with curved surfaces (cylinders, spheres, and cones) in another. After several objects have been sorted, students predict the group in which each new object belongs as it comes out of the bag, trying to guess the teacher's sorting rule.

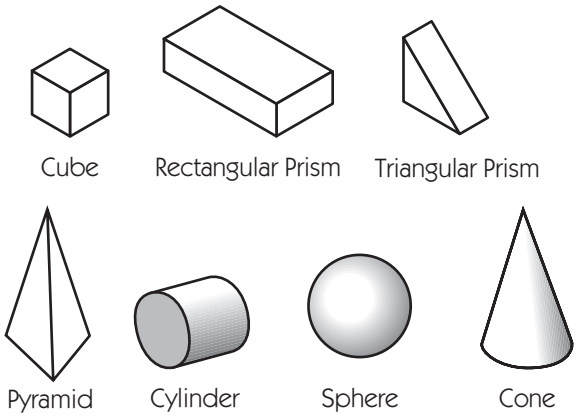
Skills & Concepts

- ★ recognize and represent shapes from different perspectives and orientations
- ★ describe geometric attributes of 3-dimensional shapes, and determine how they are alike and different

You'll need

- ★ 3-Dimensional Shape Cards, including Cone (see Set C1 Activity 1, Advanced Preparation)
- ★ grocery or gift sack containing 20–24 different 3-D objects (see Advance Preparation)
- ★ 2 pieces of 12″ × 18″ construction paper, one black and one white
- ★ triangular and square polydrons

Advance Preparation Place 2–4 examples of each of the shapes shown below in the sack. Look in your block corner, among your school supplies, and in the gym and the cafeteria to find the objects you need. If the Grade 3 teachers in your building are using *Bridges*, you might also borrow a set of geoblocks (which come in all these shapes) for this activity.



Instructions for Mystery Bag Sorting

1. Gather children to your discussion circle. Place the pieces of black and white paper in the circle where you can reach them and all the students can see them. Let the children know that these are your sorting mats. Then hold up the grocery sack and explain that you are going to pull out some things for them to see, one at a time. Each time you pull out a new object, you're going to place it on either the black or the white mat. Their job is to figure out how you're sorting the objects by watching very closely. Let them know that you're going to work in silence, and they'll need to be very quiet as well.

Activity 2 Mystery Bag Sorting (cont.)

2. Pull 4 or 5 objects out of the sack one at a time, placing those with all flat faces on one mat and those with curved surfaces on the other.

3. Pull the next object out of the sack, hold it up, and shrug your shoulders. Then motion for children to point to the mat they think it belongs on. After a few moments, place it on the correct mat. Repeat this with another object.

4. Pull another object out of the sack, hold it up, and motion for the children to indicate the mat of their choice by pointing. Before placing the object where it belongs, ask several children to explain their thinking.

> ***Teacher*** *Hunter, I see you're pointing to the white mat. Can you explain why you think my cone belongs there?*
>
> ***Hunter*** *Because it's white, so it goes on the white mat.*
>
> ***Teacher*** *Samantha, you're pointing to the black mat. Can you explain why?*
>
> ***Samantha*** *Because the cone has a pointy tip and so does the shape that looks like a tent on the black mat. I think they belong together.*
>
> ***Teacher*** *Oh, you mean the triangular prism here? You're right. It does look like a tent. Esteban, you seem to think my cone belongs on the white mat. Why is that?*
>
> ***Esteban*** *Because both things on the white mat are kind of round and so is the cone.*

5. Without commenting on any of the explanations, place the object on the correct mat. Some students may feel confirmed in their thinking, while others may still be puzzled as to how you're sorting the objects. Give them a few more clues by pulling another 3 or 4 objects out of the sack and placing them correctly, asking students to silently point to the mat they believe is correct each time.

6. Pull another object out, have students point to the mat they believe is correct, and ask a few to explain their reasoning this time. After the object has been placed correctly, continue to sort silently, as students point to one of the mats each time. If many still seem quite puzzled by the time you're down to the last few objects, ask for more explanations. You might also give them a few hints in the form of

Activity 2 Mystery Bag Sorting (cont.)

questions: "Am I sorting these objects by their color?" or, "Am I sorting these objects by the size—small and large?" or, "Am I sorting objects by their shape?"

7. When all the objects have been sorted onto the two mats, ask children to pair-share their observations, and then call on volunteers to share their thinking with the class. Toward the end of the discussion, confirm that you were sorting the objects by their surfaces. The objects on the black mat have no curved surfaces; only flat faces. The objects on the white mat have at least one curved surface. Pull out your 3-Dimensional Shape Cards and ask students to help you sort the cards the same way, setting them on or near mats. As you do, review the names of the shapes.

Extensions

- Repeat this activity with other attributes. Here are a few examples:
  - objects that have triangular faces and objects that don't
  - objects that have rectangular faces (including cubes) and objects that don't
  - objects that have 6 faces and objects that don't
- Leave the collection of objects and the shape cards out for children to sort on their own. Other attributes by which they might sort include: shapes that roll and shapes that slide; shapes that have square faces, rectangular faces, triangular faces, or circular faces; shapes you can stack and shapes you can't; and so on.
- Bring 3-dimensional shapes from home to put in your mystery sack. You'll find that students are even more engaged when the objects you're pulling out of the sack come from the teacher's house.

Set C1 ★ Activity 3

ACTIVITY

Shape Walk

Overview

Students hunt for 3-dimensional shapes in the gym, library, or on a walk around the school, keeping a record of their discoveries as they go.

Skills & Concepts

★ recognize and represent shapes from different perspectives and orientations

★ describe geometric attributes of 3-dimensional shapes, and determine how they are alike and different

You'll need

★ Shape Walk Record Sheet (page C1.16, class set)

★ 3-Dimensional Shape Cards, including Cone (see Set C1 Activity 1, Advanced Preparation)

★ clipboards (optional, class set)

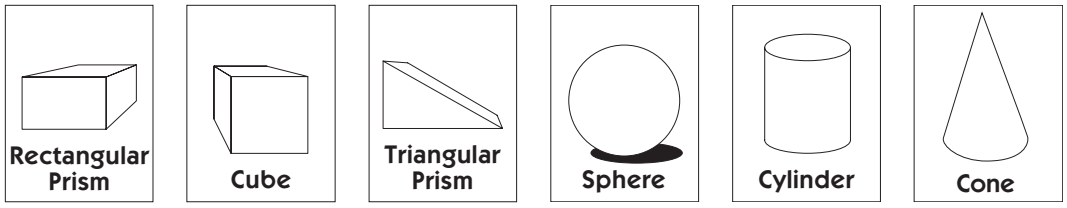
★ camera (optional)

★ *Cubes, Cones, Cylinders & Spheres* by Tana Hoban (optional)

Advance Preparation Walk around your school before you conduct this activity to find a good variety of 3-dimensional shapes. One of the best locations we've found is the gym, set up for obstacle course day, but this varies from one school to another. Children will get more out of the experience if they are able to talk with an adult, so you'll want to invite several parent volunteers or other adults along with you, and you may even want to divide your students into small groups before you leave the classroom.

Instructions for Shape Walk

1. Gather children to your discussion circle and show the shape cards that illustrate the rectangular prism, triangular prism, cube, sphere, cone, and cylinder.



2. Review the names of these shapes and explain to children that you're going to take a walk around the school (or whatever location you've decided is best) to look for these shapes. Do they think they can find examples of each of these shapes on your walk?

> ***Bianca*** *It's good that we're going to the gym. There are lots of balls in there that are round like that one shape on your card.*

Activity 3 Shape Walk (cont.)

Teacher *The sphere? Yes, you're right that we should find plenty of those in the gym. Does anyone see another shape we might find on our walk?*

Maria *Maybe that little slide will be out—you know, the one that the little kids use? It looks like that triangle shape on your card.*

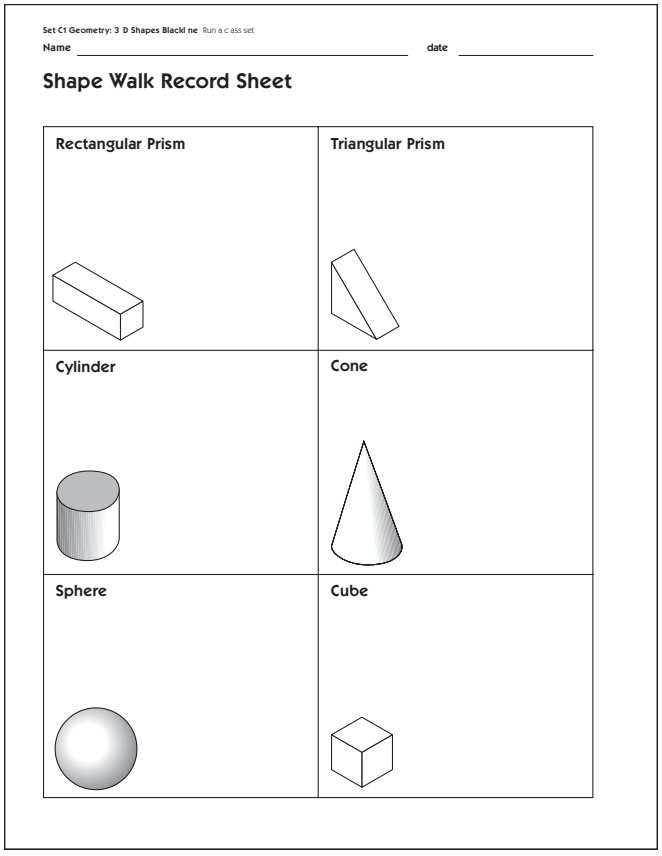
Teacher *Oh, the triangular prism. Yes, we may have to look really hard to find those.*

Danny *I think we can find lots of those box shapes.*

Teacher *Rectangular prisms do look like boxes. Where do you think we'll find them?*

Michelle *Everywhere! Even our whole school is shaped like a big box.*

3. Give each student a copy of the Shape Walk Record Sheet, along with a pencil and a clipboard (if you have clipboards). Ask children to write their name on their sheet, and explain that they'll get to use pictures, numbers, and/or words to record some of their discoveries along the way. Some of them, for instance, might want to keep a tally of how many times they see a cylinder on the walk. Others might prefer to draw pictures of some of the things they see under the matching shapes and use their best-guess spelling to label their sketches.



Set C1 Geometry: 3 D Shapes Blackl ne Run a c ass set

Name _____ date _____

Shape Walk Record Sheet

Rectangular Prism	Triangular Prism
Cylinder	Cone
Sphere	Cube

4. Depending on the number of adult helpers you've been able to recruit, organize the students into small groups and set out on your walk. If you have a digital camera, you might want to serve as a roaming photographer, or ask one of the other adults to do so instead of supervising a group.

Activity 3 Shape Walk (cont.)

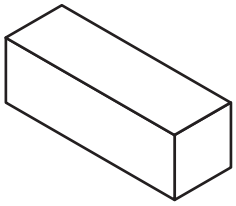
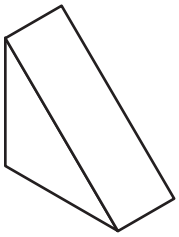
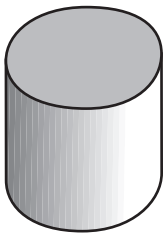
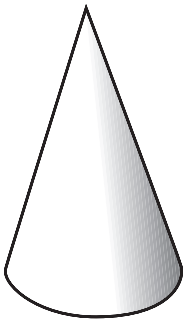
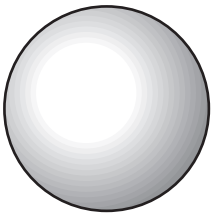
5. When you return to the classroom, spend a few minutes talking about the things you saw. Which shapes were easiest to find? Which were most challenging? Let students take their record sheets home to share with their families.

Extensions

- Make a class chart or book showing some of the things students saw on the walk. Either could be illustrated with photos if you had a camera along with you. You might even post some to your class web site for families to view, along with text composed by the class.
- Share *Cubes, Cones, Cylinders, & Spheres* with your class either before or after you take your shape walk. In this wordless book, photographer Tana Hoban identifies four 3-dimensional shapes before showing each in contexts that may be familiar to most children (alphabet blocks, ice cream cones) as well as contexts a child might encounter on a trip to the city, country or even Fantasy Land (traffic cones, bales of hay, a castle).

NAME _____ **DATE** _____

Shape Walk Record Sheet

Rectangular Prism 	**Triangular Prism** 
Cylinder 	**Cone** 
Sphere 	**Cube**