

Module on Geometric and Spatial Relationships

For third Grade

By

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**Adapted from: gecko mathematics, 2007, Edited by J. Grow-Maienza.
Adapted from Korean Mathematics (2001). Kirksville, MO: Truman State University.**

Korean Mathematics, 2001. Edited by J. Grow-Maienza, Kirksville, MO: Truman State University. Translated from Korean Ministry of Education, Arithmetic, Grades 1 -6. Seoul Korea: National Textbook MacMillan/McGraw-Hill, Grade 3, Volume 2. (2005). McGraw-Hill Education, a division of the McGraw-Hill Companies, Inc., Two Penn Plaza, New York, New York 10121.

Exploring Geometric Solids, written by: Marcy Gilbert, Edited by: Ann Wildman, Learning Resources, Inc. Vernon Hills, IL (U.S.A.)

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Missouri Grade Level Expectations covered in this module:

G1-A, Compare and analyze 2- dimensional shapes by describing their attributes (circle, rectangle, rhombus, trapezoid, and triangle)

G1 – C, Predict the results of putting together or taking apart 2 – and 3 – dimensional shapes

G3 – A, Determine if two objects are congruent through a slide, flip, or turn.

G3 – C, Identify lines of symmetry in polygons

Strand: Geometry

Grade Level: third grade

Concepts Included in Module:

Each student will:

- 1. Compare and analyze 2 – dimensional shapes circle, rectangle, rhombus, trapezoid, and triangle.**
- 2. Predict the results of putting together and taking apart of 2 and 3 – dimensional shapes.**
- 3. Use slides, flips, and turns to determine if 2 objects are congruent.**
- 4. Identify lines of symmetry of polygons.**

Rational for Concept selection (Brief statement of the basis for the selection of strand and concepts.)

This module was selected based upon classroom assessments and MAP data that indicated a need for additional strategies to develop these geometry skills in third grade students in my district.

Module Materials: Teacher checklist, class list, for each student or pair of students a small container (box or baggie) of 2 and 3-dimensional shapes, pattern blocks, shape templates, shape stamps and ink pads, small square and rectangular boxes, balls. Several sets of vocabulary flashcards and vocabulary concentration, construction paper, set of shape stamps and ink pads.

Pretest: Copy of test for each student. Have Station activities prepared so you can begin introducing activities as time allows. Teacher will read the test to the class. This should take about 30 minutes to complete. Assure students that this is not for a grade but rather will help you understand what they already know and what they need to learn.

Geometry Unit 1

Pre assessment

Name _____

1. Construct a 2- dimensional shape that has at least four sides in the space below. List at least three attributes of that shape.

(DOK 1 – G1A)

1. _____

2. _____

3. _____

2. Compare and contrast the attributes of a pyramid and a triangle. How are they the same? How are they different? (DOK 2 – G1A)

3. What 2- or 3- dimensional shapes would you use to draw the following picture? Name at least three shapes (DOK 1 G1A)

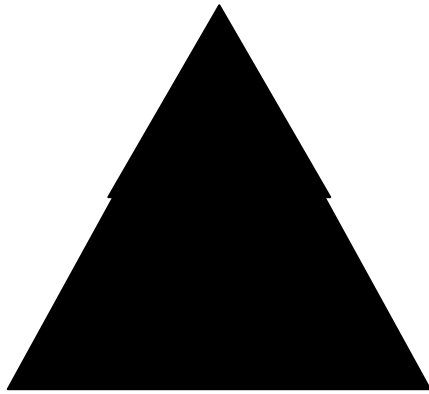


1.

2.

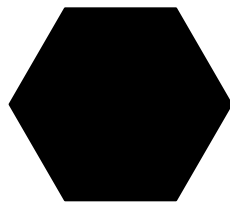
3.

4. What 2 –dimensional shapes would you put together to make the following figure. . (DOK 1 G1C)



Answer: _____

5. What two dimensional shapes would result in the following figure?



Answer: _____

6. What 3 dimensional object would you get if you combined 6 rectangles with opposite sides congruent? (DOK 1 G1C)

Answer: _____

7. What 2- dimensional shape, besides a square would have 4 equal sides, 4 vertices, and 4 angles. (DOK 1 G1A)

Answer: _____

8. What 3- dimensional net has 2 circular bases, and 1 rectangular face? (DOK 1 G1A)

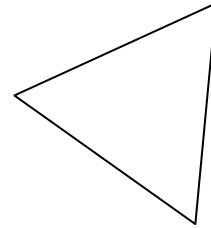
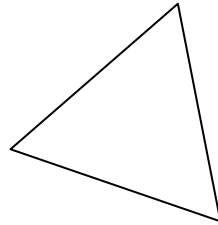
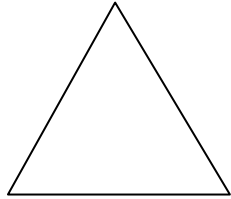
Answer: _____

9. What shape is the result of putting together 1 square and 4 equal triangles? (DOK 2 G1C)

Answer: _____

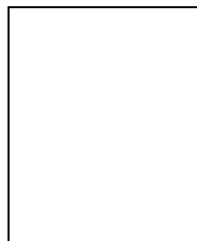
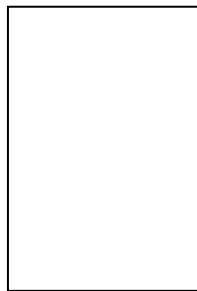
10. Compare and contrast the attributes of a trapezoid and rectangle. How are they alike? How are they different? (DOK 2 G1A)

11. Are the following objects congruent? Justify your answer.
(DOK 1 G3A)



Answer

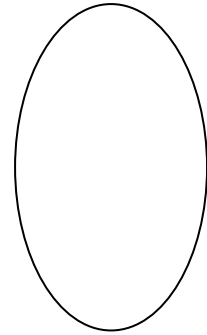
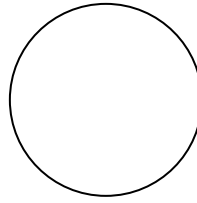
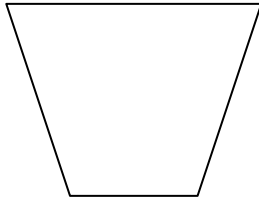
12. Are the following objects congruent? Justify your answer.
(DOK 1 G3A)



Answer

13. Are the following objects congruent? Justify your answer.

(DOK 1 G3A)



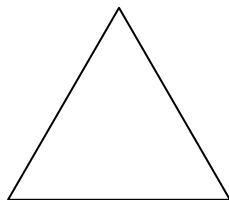
Answer:

14. Are the capital letters G and Q symmetrical? (DOK 1 G3C)

Answer: _____

How do you know?

15. Show the lines of symmetry in the triangle below. (DOK 2 G3C)



16. Construct a square below. Draw in the lines of symmetry.

(DOK 2 G3C)

Day 2 – Activity 1

Items needed: small rectangular boxes, construction paper, pencils.

Geometry Activity One: Exploring the attributes of geometric shapes. Distribute a small box and large piece of construction paper to each student. They will also need a crayon, pencil, or marker to trace around the box and label it.

1. Trace the bottom of the box shape onto your paper. Label it A.
2. Trace the top of the box shape onto your paper. Label it B.
3. Trace the side of the box shape onto your paper. Label C
4. Trace the other side of the box shape onto your paper. Label D.
5. Trace one end of the box shape onto your paper. Label it E.
6. Trace the other end of the box shape onto your paper. Label it F.

Now look at shapes A and B. What can you tell me about those two shapes? (Give students think time. Have students share their

thoughts with a shoulder partner. Then allow time for several responses in the whole group.) Look at shapes C and D. What can you tell me about those two shapes? (Once again give students think time, share with a partner, and then whole group responses.) Look at shapes E and F. (Give students think time. Have students share their thoughts with a shoulder partner. Then allow time for several responses in the whole group.)

What can you tell me about all six sides? What is the shape name of the box? What can you tell me about the opposite sides of a rectangular prism? Look around the room, name objects in the room that have a rectangular prism shape? Share with a shoulder partner.

In your math journal tell about the activity we did today. Tell about what you did. What did you learn today in math about rectangles and rectangular prisms? In 5 minutes we will share what we have learned. Be sure to include the names of objects in the room that have the same shape.

Homework: Students will look for objects at home and make a list of five things to share in class tomorrow.

Adapted from: gecko mathematics, 2007, Edited by J. Grow-Maienza. Adapted from Korean Mathematics (2001). Kirksville, MO: Truman State University.

Korean Mathematics, 2001. Edited by J. Grow-Maienza, Kirksville, MO: Truman State University. Translated from Korean Ministry of Education, Arithmetic, Grades 1 -6. Seoul Korea: National Textbooks Inc. 1993.

Day 3 Three dimensional shapes

Have students get out their math manipulative boxes. Students will work with a partner:


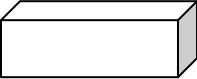

Introduce 3 dimensional shape vocabulary words (3-dimensional, rectangular prism, cylinder, edge, face, cube, vertex, cone, base, pyramid, sphere, and net). Show vocabulary and definitions on the smart board. Students will work with their partner to find 3 dimensional shapes and their parts from shapes in their boxes as you read each vocabulary word and talk about their meanings.

Students will continue to work with a partner to fill in the following chart comparing 3 dimensional figures.

(Scan this and put it on the smart board. Explain how to fill in. Do a couple together.)

Walk around the room with clipboard. Use a class list, checklist, or informal notes as you talk to students to see that they understand what they should be doing. Have students check their answers with chart on page 503 of the student textbook. Give students 5 minutes to work together. (Give additional time if needed) Then have students share their results with their classmates.

Names _____

Compare 3- Dimensional Figures					
Figure	Name	Number of curved sided	Number of flat faces	Number of Edges	Number of Vertices
					
					
	Sphere				
					
	cone				
	pyramid				

Adapted from Macmillan/McGraw-Hill published 2005

Students should write a journal reflection on something that they did or learned in math class today.

Homework PB (practice book) lesson 23.1

Day 4 Three-Dimensional shapes out of paper

Have students get out their math manipulative boxes. Students will work with a partner:

“Shaping Up” activity from Exploring Geometric Solids

Allow 5 minutes for students to complete activity. Then have students share what they found in the classroom. Walk around as students are working on this activity with a class list, checklist, or informal notes to check for understanding.

Pass out a net for students to work with. Have them try to figure out on their own what shape can be made with the net. Then have students share with a partner. Select a few students to share what they have discovered with the rest of the group. (Students who have difficulty with this activity may benefit from R 23.1 Students who finish early may work on E23.1) Students should write a journal reflection on something that they did or learned in math class today.

Homework Leveled Problem solving

Day 5– Comparing the attributes of 3 dimensional objects

Have students get out their math manipulative boxes. Students will work with a partner:

“Shaping Up” activity from Exploring Geometric Solids – Students will choose 4 geometric solids and trace their bases. They answer the following questions: “What shape did you find? And where do you find those shapes in your classroom?”

Allow 5 minutes for students to complete activity. Then have students share what they found in the classroom. Walk around as students are working on this activity with a class list, checklist, or informal notes to check for understanding.

As students finish their “Shaping Up” activity, have partners get “Matching Madness” concentration game, or “Odd One Out” activity. (Have enough concentration games so each pair can play this activity.) When all students have finished “Shaping Up” activity. Select a few to share with the class.

Teach students how to play “Odd One Out.” The caller will select 3 or 4 solid shapes from the math manipulative box. Students will then compare their attributes. Students will choose the shape that does not belong with the rest and give their reasoning. Students should write a journal reflection on something that they did or learned in math class today.

Homework: Bring in a list of 5 things from homes that are shaped like a rectangular prism.

Day 5 – Describing and Matching Faces

Have students get out their math manipulative boxes. Students will work with a partner: Give students a description and see if they can find the solid that fits the description. For instance “I have 6 faces and they are all squares.” (Cube) “I have 5 faces; one is a square and all the others are triangles.” (Pyramid) After a couple of examples have students work with their partners to play “Matching Faces.” Students will take turns giving clues and answering. Walk around as students are working on this activity with a class list, checklist, or informal notes to check for understanding.

This would be a good time to pull those students aside who were marked unsure on check list and notes taken that week, and give extra support or quiz for understanding.

Give students a net with which to work. Have them work on their own (3-5 minutes). Then work with a partner. Give assistance to those who still don't have it. Select a few students to share with the group.

Students should write a journal reflection on something that they did or learned in math class today.

Power Standard	Student skills/objectives	GLE	Big Ideas	Essential Questions
<p>Describe and analyze 2- and 3-dimensional shapes according to their attributes.</p>	<p>1. Compare and analyze 2- and 3-dimensional shapes.</p>	<p>G1A</p>	<p>Shapes can be described and analyzed by their various attributes.</p>	<p>How can shapes be composed and decomposed to make other shapes?</p>
	<p>2. Predict the result of putting together and taking apart 2- and 3-dimensional shapes.</p>	<p>G1C</p>	<p>Shapes can be composed and decomposed to create other shapes.</p>	
	<p>3. Use slides, flips, and turns to determine if shapes are congruent.</p>	<p>G3A</p>	<p>Shapes can still be congruent even if you slide, flip, or turn it.</p>	<p>Does sliding, flipping, or turning a shape change the shape?</p>

	4. Identify lines of symmetry.	G3C	Lines of symmetry divide shapes into two equal parts	
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Geometry Unit 1

Post assessment

Name _____

1. Use a template to create a drawing of a 2- dimensional shape.
List at least three attributes of that shape.

1. _____

2. _____

3. _____

2. What 2- or 3- dimensional shapes would you use to construct the following picture? Name at least three shapes.



1. _____ 2. _____

3. _____

3. Draw the results of putting together a trapezoid and a square.

4. What 3 dimensional object would you get if you combined 6 squares? _____

5. What 2- dimensional shape would have 3 sides, 3 vertices, and 3 angles? _____

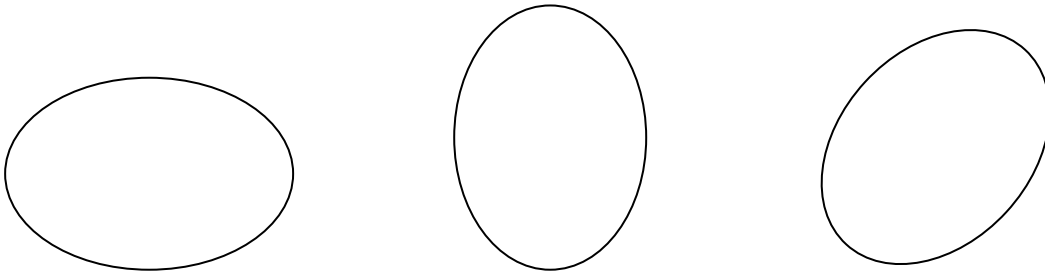
6. What 2- dimensional shape has 4 equal sides, 4 vertices, and 4 equal angles? _____

7. What 3 – dimensional shape is the result of putting together 4 equal triangles, and 1 square? _____

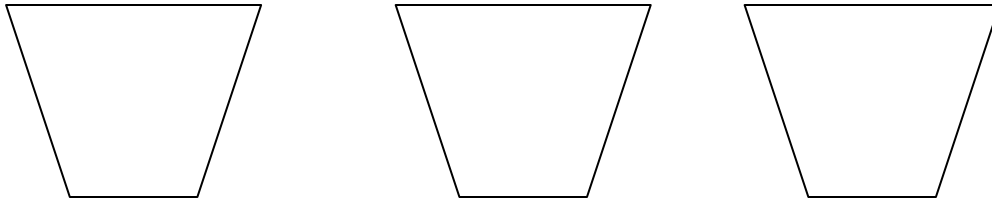
8. How are the attributes of a rhombus, square, and rectangle alike?

How are they different? _____

9. Are the following objects congruent? Why or Why not?

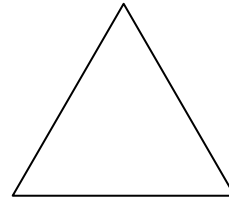
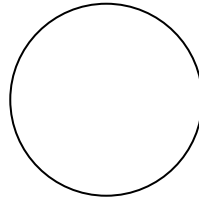
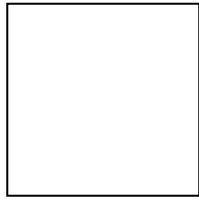


9. Are following objects congruent? Why or why not?



-

10. Are the following objects congruent? Why or Why not?



-

11. Are the capital letters G and R symmetrical? _____

How do you know? _____

12. Construct a rectangle and show the lines of symmetry.

13. Construct a trapezoid and show the lines of symmetry.

14. Compare the attributes of a cone and a cylinder. How are they the same? _____

How are they different? _____

Power Standard	Student skills/objectives	GLE	Big Ideas	Essential Questions
<p>Describe and analyze 2- and 3-dimensional shapes according to their attributes.</p>	<p>1. Compare and analyze 2- and 3-dimensional shapes.</p>	<p>G1A</p>	<p>Shapes can be described and analyzed by their attributes.</p>	<p>How can shapes be analyzed and described?</p>
	<p>2. Predict the result of putting together and taking apart 2- and 3-dimensional shapes.</p>	<p>G1C</p>	<p>Shapes can be composed and decomposed to make other shapes.</p>	<p>How are shapes composed and decomposed?</p>
	<p>3. Use slides, flips, and turns to determine if shapes are congruent.</p>	<p>G3A</p>	<p>2 objects can be congruent even if we flip, turn, or slide them.</p>	<p>How can shapes be congruent when they are flipped, turned, or slid?</p>
	<p>4. Identify lines of symmetry</p>	<p>G3C</p>	<p>Lines of symmetry divide polygons into 2 equal parts</p>	<p>Why are polygons that are divided equally symmetrical?</p>

<u>Vocabulary</u>	<u>Assessments</u>	<u>Lessons</u>	<u>Workstations</u>
<p>2-dimensional</p> <p>3-dimensional</p> <p>attributes,</p> <p>Circle, square, rectangle, rhombus, trapezoid, triangle, sphere, rectangular prism, cylinder, pyramid, congruent, flip/reflection, slide/ translation, turns/ rotations, symmetry</p>	<p>Pre-test</p> <p>Post-test</p> <p>Student work samples</p> <p>PB</p> <p>Teacher checklists and observations.</p>	<p>Rectangles, rectangular boxes,</p> <p>23.1, 23.2, 23.3, 23.4, 23.5, 23.6, 23.7, Extra practice p 520, Review p 521, 24.1, 24.2, 24.3, 24.4, Extra Practice, p 540, Review p 541.</p>	<p><i><u>Exploring Geometric Solids</u></i></p> <p>Vocabulary Concentration</p> <p>Pattern Blocks</p> <p>Attribute Blocks</p> <p>Shape Shuffle</p> <p><i>Super Mind</i></p> <p><i>Mighty Mind Challenger</i></p> <p>\</p> <p><i>Tangram shapes</i></p> <p><i>Shape Cover-Up</i></p> <p><i>Sides and Corners</i></p> <p><i>Symmetrical Designs</i></p>