



# Holyoke Public Schools Mathematics Curriculum Map Grade 2

## Shapes, Blocks, and Symmetry

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## Curriculum Maps

### GOALS:

1. To ensure that students are exposed to a rigorous curriculum in every school and every grade.
2. To have consistent instruction and assessment district wide.
3. To prepare students for the MCAS test.
4. To explain what is expected to be covered in each CMP or Investigations Unit.

### EXPECTATIONS:

The district's expectation is for students to successfully meet the Massachusetts Mathematics Standards. In order to help facilitate this, teachers are required to follow the curriculum maps. The successful implementation of these maps requires teachers to thoroughly read each lesson in the TE and work through the project and problems in the map and the text prior to planning their lessons. Work should be kept in the binder with the curriculum map. Working through the math is an essential part of lesson planning, as it helps the teacher to better understand the concept being taught and the students' possible misunderstandings.

### FEEDBACK TO STUDENTS:

Feedback needs to happen daily in the classroom. There are many ways to give feedback. Conferencing, observations, questions asked during your opening, work time and closing are all forms of feedback.

### MAP COMPONENTS:

1. GENERAL PROBING QUESTIONS
2. UNIT SPECIFIC PROBING QUESTIONS
3. GOALS OF UNIT, CONTENT STANDARDS, & PERFORMANCE STANDARDS
4. PROJECT- to be done at end of unit and kept in the portfolio.
  - o STUDENT MASTER – for project
5. INVESTIGATIONS:
  - o NOTEBOOK - includes: 3 Ring Binder, Bound Notebook, Portfolio
  - o ACCOUNTABLE TALK – using probing questions
5. ON-DEMAND ASSESSMENTS - to be done during teaching of unit.
  - o STUDENT MASTERS- for on-demand assessments.

# Mathematics

## Evidence of Learning Artifacts

<b>Artifact</b>	<b>K - 1</b>	<b>2 - 5</b>	<b>6 - 8</b>
<b><i>3 Ring Binder (3R)*</i></b>	<ul style="list-style-type: none"> <li>○ Student Work<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>○ Vocabulary</li> <li>○ Student sheets<sup>1</sup></li> </ul> <p style="text-align: center;"><b><u>All work should be dated and listed by investigation</u></b></p>	<ul style="list-style-type: none"> <li>○ Math books</li> <li>○ Vocabulary</li> <li>○ Core Problems<sup>1</sup></li> <li>○ Lab sheets</li> </ul> <p style="text-align: center;"><b><u>All work should be dated and listed by investigation</u></b></p>
<b><i>Marble Notebook (MNB)</i></b>	<ul style="list-style-type: none"> <li>○ Journal entries<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>○ Table of Contents</li> <li>○ Problem of the day</li> <li>○ Journal entries</li> <li>○ Class work</li> </ul> <p style="text-align: center;"><b><u>All work should be dated and listed by investigation in the Table of Contents</u></b></p>	<ul style="list-style-type: none"> <li>○ Table of Contents</li> <li>○ Work time</li> <li>○ Journal entries</li> </ul> <p style="text-align: center;"><b><u>All work should be dated and listed by investigation in the Table of Contents</u></b></p>
<b><i>Portfolio<sup>3</sup> (P)</i></b>	<ul style="list-style-type: none"> <li>○ On-demand tasks</li> <li>○ Projects</li> <li>○ Teacher anecdotal notes</li> </ul>	<ul style="list-style-type: none"> <li>○ On-demand tasks</li> <li>○ Reflections</li> <li>○ Projects</li> </ul> <p style="text-align: center;"><b><u>All work should be dated and listed by investigation</u></b></p>	<ul style="list-style-type: none"> <li>○ On-demand tasks</li> <li>○ Reflections</li> <li>○ Projects</li> </ul> <p style="text-align: center;"><b><u>All work should be dated and listed by investigation</u></b></p>

\* Folders may be used in place of binders for these grade levels

<sup>1</sup> Send home at the end of each unit

<sup>2</sup> Use grade level math journals

<sup>3</sup> All documents should be kept for the entire year

## Shapes, Blocks, and Symmetry Probing Questions for Accountable Talk

As students progress through this unit, they should be asked the following questions to assess their knowledge about two and three dimensional geometry.

*How do you create (combine and decompose) this polygon using different shapes?*

*What patterns do you notice?*

*How did you solve that problem?*

*How can tell if this polygon is symmetrical?*

*How can you tell if two polygons are congruent?*

*What did you notice about the number of sides and the name of the polygon?*

### ***Classroom Routines***

Classroom Routines:

Quick Images- Sessions 1.5, 2.3, 2.6, 3.1, 3.5

What Time Is It?- Sessions 1.4, 2.2, 2.5, 2.9, 3.3

Today's Number- Sessions 1.1, 1.2, 2.1, 2.4, 2.7, 3.2, 3.4

How Many Pockets?- 1.3, 2.8

Classroom Routines occur at regular intervals, perhaps during morning meeting, or at another convenient time. These short activities, designed to take no longer than **10 minutes**, support and balance the in depth work of each curriculum unit. After their first introduction in a math session, **they are intended for use outside of math time**. Some teachers use them to bring the whole class together just before or after lunch or recess or at the beginning or end of the day.

Implementing Investigations in Grade 2: Please review page 25- 40 for Classroom Routines.

## Additional Probing Questions for Accountable Talk

The teacher's role in probing for understanding is to ask questions that will:

- Clarify student understanding
- Get at the objective of the lesson
- Go deeper into the mathematics
- Uncover misconceptions and misunderstandings
- Compare and contrast

The students' role is to be an active participant by:

- Explaining their strategies
- Asking clarifying questions to teacher and other students
- Being active listeners
- Using the language of mathematics

When probing for understanding the teacher and students can use one or more of these suggested questions:

- Why are you using  $< >$ ?
- What are the ways you could  $< >$ ?
- What else do you know?
- How do you know that?
- Can you show that?
- What convention did you use here?
- What can you do if you do not know?
- What standard does this work apply to?
- Is this always true?
- How does this connect to other mathematics we have learned?
- What is the same and what are the differences between  $< >$ ?
- Can you back that up?
- Where is the math in your sketch?
- What does the answer mean?
- Does the answer make sense?
- Could you have used another operation to solve this task?
- Can you give examples?
- Can you say it another way?
- What's the math?
- Tell me about the task in your own words?
- What are you trying to find?
- How did you make your estimate?
- Will your answer be an over-estimate or an under-estimate? Why?
- I noticed that you used  $< \dots >$  to help you understand the task. Can you show us what you did and tell us how it helped you?
- Where do you see  $< >$  in your  $<$ model, diagram, number line, chart, etc. $>$ ?
- How can we see  $< >$  in your  $<$ model, diagram, number line, chart, etc. $>$ ?
- You have used a representation that is different from others that I've seen. Can you show us your  $<$ model, diagram, number line, chart, etc. $>$ , and tell us how it helped you?
- How did you decide to solve the task? Why did you choose that method?
- Did you try any method that didn't work?
  - Tell us what you tried.
  - Why didn't it work?
  - Would it ever work?

# Goals, Content Standards, & Performance Standards

## Unit Goals:

- Identify the number of sides of a polygon
- Identify the number of rows and the number of squares in each row in an array
- Identify rectangles as four-sided shapes with four right angles
- Identify the number of faces on a rectangular prism and show which faces are congruent
- Make a symmetrical picture based on an image provided
- Demonstrate fluency with addition combinations: doubles combinations to  $10 + 10$

## Math Content Standards:

(2.N.7) Demonstrate an understanding of various meanings of addition and subtraction, e.g., addition as combination (plus, combined with, more); subtraction as comparison (how much less, how much more), equalizing (how many more are needed to make these equal), and separation (how much remaining).

(2.N.9) Know addition facts (addends to ten) and related subtraction facts, and use them to solve problems.

(2.G.1) Describe attributes and parts of two- and three-dimensional shapes, e.g., length of sides, and number of corners, edges, faces, and sides.

(2.G.2) Identify, describe, draw, and compare two-dimensional shapes, including both polygonal (up to six sides) and curved figures such as circles.

(2.G.3) Recognize congruent shapes.

(2.G.4) Identify shapes that have been rotated (turned), reflected (flipped), translated (slid), and enlarged. Describe direction of translations, e.g., left, right, up, down.

(2.G.5) Identify symmetry in two-dimensional shapes

(2.G.6) Predict the results of putting shapes together and taking them apart.

(2.G.7) Relate geometric ideas to numbers, e.g., seeing rows in an array as a model of repeated addition.

(2.M.3) Compare the length, weight, area, and volume of two or more objects by using direct comparison.

## Performance Standards:

**M1a** Adds, subtracts whole numbers, with and without calculators

**M1b** Demonstrates understanding of the base ten place value system and uses this knowledge to solve arithmetic tasks

**M2b** Visualizes and represents two dimensional views of simple rectangular three dimensional shapes

**M2d** Uses many types of figures and identifies the figures by their properties

**M2f** Extends and creates geometric patterns using concrete and pictorial model

Shapes, Blocks, and Symmetry

# UNIT: Shapes, Blocks, and Symmetry

## End-of-Unit Project

GRADE: 2

### **End-of-Unit Project (P)**

Student work should be placed in portfolio (P).

The project is the culminating assessment which will allow students to apply what they learned in the unit. It is written in MCAS form to give students the experience of answering an open-response question.

End-of-Unit Assessment: Unit 2, M42, M43, M44, M45 from Resource Binder, “Resources Masters and Transparencies”

**\*Assessment Checklist should be kept with tracking sheets**

# UNIT: SHAPES, BLOCKS, AND SYMMETRY

Investigation 1 (1.1 – 1.5)

DAYS: 6

GRADE: 2

<p><b>Evidence of Learning Artifacts</b></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><i>Vocabulary</i> – polygon, geometry, two-dimension shape, three-dimensional shape, face, sort</p> <p><i>Work Time</i> – Student Sheets 1-11</p> <p><i>Journal Entries</i> – *Maximum 5 minutes</p> <p><b>Inv. 1.1</b> Describe what a polygon is and name at least two polygons.</p> <p><b>Inv. 1.3</b> Explain a strategy you used to sort your geoblocks.</p> <p><b>Inv. 1.5</b> Describe two combinations of shapes you used to fill the yellow hexagon.</p> <p><i>Reflection</i> – What are two <i>similarities</i> and two <i>differences</i> between two and three dimensional shapes?</p>
<p><b>Accountable Talk</b></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</i></p> <p><i>How do you create (combine and decompose) this polygon using different shapes?</i></p> <p><i>What patterns do you notice?</i></p> <p><i>How did you solve that problem?</i></p> <p><i>How can tell if this polygon is symmetrical?</i></p> <p><i>How can you tell if two polygons are congruent?</i></p> <p><i>What did you notice about the number of sides and the name of the polygon?</i></p> <p><i>These are some recommended questions that you might use. Others can be found be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

# UNIT: SHAPES, BLOCKS, AND SYMMETRY

Investigation 2 (2.1 – 2.9)

DAYS: 10

GRADE: 2

<p><b>Evidence of Learning Artifacts</b></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><i>Vocabulary</i> – angle, right angle, rectangle, quadrilateral, area, rectangular prism</p> <p><i>Work Time</i> – Student Sheets 12-29</p> <p><i>Journal Entries</i> – *Maximum 5 minutes</p> <p><b>Inv. 2.2</b> What did you notice about the number of sides a polygon has to its number of angles?</p> <p><b>Inv. 2.4</b> Draw the rectangle that follows this riddle: This rectangle has 12 tiles and 3 rows.</p> <p><b>Inv. 2.6</b> Show the different rectangles that you can make by using 16 tiles.</p> <p><b>Inv. 2.8</b> When talking about 3-dimensional shapes, describe what a face is.</p> <p><i>Reflection</i> – Describe at least two similarities and two differences between squares and rectangles</p>
<p><b>Accountable Talk</b></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</i></p> <p><i>How do you create (combine and decompose) this polygon using different shapes?</i></p> <p><i>What patterns do you notice?</i></p> <p><i>How did you solve that problem?</i></p> <p><i>How can tell if this polygon is symmetrical?</i></p> <p><i>How can you tell if two polygons are congruent?</i></p> <p><i>What did you notice about the number of sides and the name of the polygon?</i></p> <p><i>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

# UNIT: SHAPES, BLOCKS, AND SYMMETRY

Investigation 3 (3.1 – 3.5)

DAYS: 6

GRADE: 2

<p><b>Evidence of Learning Artifacts</b></p> <p>Journal and Reflection questions should be posted and referred to at the beginning of the appropriate <i>Investigation</i>.</p> <p>Journal and Reflection entries need to be done in class as part of the closure and assessment</p>	<p><i>Vocabulary</i> – symmetry, line of symmetry, symmetrical</p> <p><i>Work Time</i> – Student Sheets 30 - 41</p> <p><i>Journal Entries</i> – *Maximum 5 minutes</p> <p><b>Inv. 3.1</b> Name three items that are symmetrical. Why do you think they are symmetrical?</p> <p><b>Inv. 3.3</b> How did you determine the line of symmetry in a polygon?</p> <p><i>Reflection</i> – How is doubling used in symmetry?</p>
<p><b>Accountable Talk</b></p> <p>To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.</p>	<p><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</i></p> <p><i>How do you create (combine and decompose) this polygon using different shapes?</i></p> <p><i>What patterns do you notice?</i></p> <p><i>How did you solve that problem?</i></p> <p><i>How can you tell if this polygon is symmetrical?</i></p> <p><i>How can you tell if two polygons are congruent?</i></p> <p><i>What did you notice about the number of sides and the name of the polygon?</i></p> <p><i>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

# **End-of-Unit Project**

**Student work should be placed in portfolio (P).**

**The project is the culminating assessment which will allow students to apply what they learned about two and three dimensional geometry. It is written in MCAS form to give students the experience of answering an open-response question.**

**NAME:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

## **End-of-Unit Project**

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all work (diagrams, tables, and computations) on your answer sheet.**
- **If you do the work in your head, explain in writing how you did the work.**

### **Make a Rectangle**

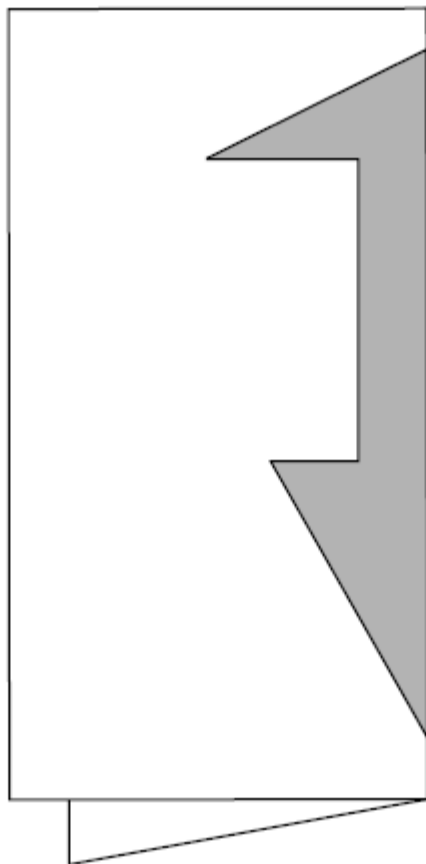
- 1.** Make a rectangle using 18 color tiles. Draw it on grid paper.

Cut out your rectangle and tape it in this space.

- 2.** Describe your rectangle. Include how many rows and how many tiles are in each row.

## Complete the Shape

The picture on the folded paper is symmetrical. Draw what the picture will look like when the paper is unfolded.



## Doubles Combinations

$4 + 4 = \underline{\quad}$

$9 + 9 = \underline{\quad}$

$3 + 3 = \underline{\quad}$

$6 + 6 = \underline{\quad}$

$1 + 1 = \underline{\quad}$

$7 + 7 = \underline{\quad}$

$5 + 5 = \underline{\quad}$

$2 + 2 = \underline{\quad}$

$10 + 10 = \underline{\quad}$

$8 + 8 = \underline{\quad}$



# **On-Demand Assessments**

**(To be filed in portfolio)**

## **Shapes, Blocks, and Symmetry Investigations**

**In class individualized On-Demand tasks assess knowledge of mathematical facts, operations, concepts, and skills, and their efficient application to problem solving. The results of these different forms of assessment provide rich profiles of students' achievements in mathematics and serve as the basis for identifying curricula and instructional approaches to best develop their talents.**

# UNIT: SHAPES, BLOCKS, AND SYMMETRY

## On-Demand Assessments

### GRADE: 2

<p><b>On-Demand Assessments (P)</b></p> <p><u>Shapes, Blocks, and Symmetry</u> Investigations</p> <p>In class individualized On-Demand tasks assess knowledge of mathematical facts, operations, concepts, and skills, and their efficient application to problem solving. The results of these different forms of assessment provide rich profiles of students' achievements in mathematics and serve as the basis for identifying curricula and instructional approaches to best develop their talents.</p>	<p><u>Inv. 1:</u> (No on-demand for Investigation 1)</p> <p><u>Inv. 2:</u> Resource Binder: Session 2.7 M30 Session 2.9 M31</p> <p><u>Inv. 3:</u> (No on-demand for Investigation 3)</p> <p>*Please refer to the section in the Teacher's Unit Guide entitled, "Professional Development" for examples of student work for each assessment.</p>
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# Assessment Checklist: Sorting Shapes by Number of Sides

**M22**

Unit 2

Session 2.1

Student	Sorts All 3-Sided Shapes	Sorts All 4-Sided Shapes	Sorts All Shapes with More Than 4 Sides Can Count the Number of Sides	What Was Challenging?

Name \_\_\_\_\_

Date \_\_\_\_\_


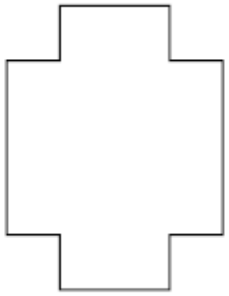

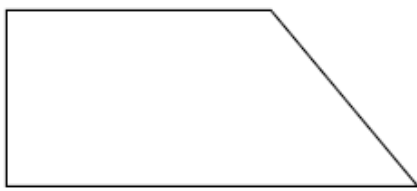
Shapes, Blocks, and Symmetry



# Assessment: Is It a Rectangle?

Is it a rectangle?

Why or why not?

<p><b>1.</b></p> 	
<p><b>2.</b></p> 	
<p><b>3.</b></p> 	
<p><b>4.</b></p> 	

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Name \_\_\_\_\_

Date \_\_\_\_\_

**Shapes, Blocks, and Symmetry**



## Assessment: Faces of a Geoblock

How many faces are on your block? \_\_\_\_\_

Draw all of the faces on your block.

Show which faces are the same.



# Holyoke Public Schools

## Mathematics Scoring Rubric

### Score point 4:

The response shows a **comprehensive** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has **completed the task(s) correctly**, using mathematically sound procedures. It contains **clear, complete explanations** and/or **adequate work required**.

### Score point 3:

The response shows a **general** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has **completed the task(s)**, using mathematically sound procedures. It contains **complete explanations** and/or **adequate work required**.

### Score point 2:

The response shows a **basic** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It addresses **most aspects of the task(s)**, using mathematically sound procedures. It may contain a correct solution but provides **incomplete procedures, reasoning and/or explanations**. It may reflect **some misunderstandings** of the underlying mathematical concepts and/or procedures.

### Score point 1:

The response shows a **minimal** understanding of the mathematical concepts and/or procedures embodied in the task(s). It addresses **some elements of the task(s) correctly** but reaches an **inadequate solution and/or provides reasoning that is faulty or incomplete**. It exhibits **multiple flaws related to a misunderstanding of important aspects** of the task(s), **misuse** of mathematical procedures, or faulty mathematical reasoning. It reflects a **lack of essential understanding** of the underlying mathematical concepts. It may contain a correct numerical answer but the **required work is not provided**.

### Score point 0:

The response is **completely incorrect, irrelevant, or incoherent**, or contains a correct response arrived at using an **obviously incorrect procedure**.

# NOTES