



Holyoke Public Schools Mathematics Curriculum Map Grade 1

Color, Shape, and Number Patterns

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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: folder, 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

Artifact	K - 1	2 - 5	6 - 8
<i>folder</i> <i>(F)*</i>	<ul style="list-style-type: none"> ○ Student Work¹ 	<ul style="list-style-type: none"> ○ Vocabulary ○ Student sheets¹ <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>	<ul style="list-style-type: none"> ○ Math books ○ Vocabulary ○ Core Problems¹ ○ Lab sheets <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>
<i>Marble Notebook</i> <i>(MJ)</i>	<ul style="list-style-type: none"> ○ Journal entries² 	<ul style="list-style-type: none"> ○ Table of Contents ○ Problem of the day ○ Journal entries ○ Class work <p style="text-align: center;"><u>All work should be dated and listed by investigation in the Table of Contents</u></p>	<ul style="list-style-type: none"> ○ Table of Contents ○ Work time ○ Journal entries <p style="text-align: center;"><u>All work should be dated and listed by investigation in the Table of Contents</u></p>
<i>Portfolio</i> ³ <i>(P)</i>	<ul style="list-style-type: none"> ○ On-demand tasks ○ Projects ○ Teacher anecdotal notes 	<ul style="list-style-type: none"> ○ On-demand tasks ○ Reflections ○ Projects <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>	<ul style="list-style-type: none"> ○ On-demand tasks ○ Reflections ○ Projects <p style="text-align: center;"><u>All work should be dated and listed by investigation</u></p>

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

¹ Send home at the end of each unit

² Use grade level math journals

³ All documents should be kept for the entire year

Color, Shape, and Number Patterns

Probing Questions for Accountable Talk

As students progress through this unit, they should be asked the following questions to assess their knowledge about constructing, describing and extending repeating patterns.

What do you notice about this pattern?

Can you extend this pattern?

What is an AB, ABC, AABB, ABB pattern?

What numbers are associated with the A the B and/or the C, etc, in your pattern?

What strategy did you use to identify the next member of the pattern?

Classroom Routines

Start With/Get To *Sessions: 1.1, 1.2, 1.6, 2.2, 2.5, 2.6*

Morning Meeting *Sessions: 1.5, 1.8*

Quick Survey *Sessions: 1.3, 1.7, 2.3, 2.7*

Tell a Story *Sessions: 1.4, 2.1, 2.4*

Classroom Routines offer practice and review of key concepts at each grade level. After their initial introduction, these short activities, designed to take no longer than 10 minutes, support and balance the in-depth work of each curriculum unit.

Implementing Investigations in Grade 1: Please review pages 24-38 for the 4 routines in this unit.

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:

- Construct, describe, and extend a repeating pattern with the structure AB, ABC, AABB, or ABB
- Identify the unit of a repeating pattern for patterns with the structure AB or ABC
- Describe how various AB or ABC patterns are alike (e.g. how is red-blue pattern like a yellow-green pattern?)
- Determine what comes several steps beyond the visible part of an AB, ABC, AABB, or ABB repeating pattern
- Construct, extend, and describe a pattern that has a constant increase for the sequences 1, 3, 5...; 2, 4, 6...; 1 4, 7...; 2, 5, 8 ...; and 3, 6, 9...through counting and building

Math Content Standards:

- (2.N.5) Identify odd and even numbers and determine whether a set of objects has an odd or even number of elements.
- (2.P.1) Identify, reproduce, describe, extend, and create simple rhythmic, shape, size, number, color, and letter repeating patterns
- (2.P.4) Skip count by twos, fives, and tens up to at least 50, starting at any number.
- (2.P.5) Construct and solve open sentences that have variables, e.g., $\square + 7 = 10$.
- (2.M.1) Identify parts of the day (e.g., morning, afternoon, evening), days of the week, and months of the year. Identify dates using a calendar.

Performance Standards:

M3a Uses linear patterns to solve problems

M3b Builds iterations of simple non-linear patterns

M3c Uses the understanding that an equality relationship between two quantities remains the same as long as the same change is made to both quantities

UNIT: Color, Shape, and Number Patterns

End-of-Unit Project

GRADE: 1

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 7, M31,M32, M33, M34 - Resource Binder, “Resources Masters and Transparencies”

UNIT: COLOR, SHAPE, AND NUMBER PATTERNS

Investigation 1 (1.1 – 1.8)

DAYS: 9

GRADE: 1

<p>Evidence of Learning Artifacts</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>Vocabulary – repeating pattern, AB pattern, ABC pattern, ABB pattern, AABB pattern, unit</p> <p>Work Time – Student Sheets 1 –16</p> <p>Journal Entries –</p> <p>Inv. 1.2- In the following pattern, what will the next three colors be? red, blue, red, blue, red...</p> <p>Inv. 1.3 In the following pattern, what will be the 11th color? Yellow, green, green, yellow, green, green, yellow,...</p> <p>Inv. 1.6 In the following pattern, what will the 13th color be? Red, white, blue, red, white, blue, red, white...</p> <p>Reflection – Using 12 color connecting cubes create your own pattern. Predict what the 15th, 16th and 17th colors will be. Explain your thinking using pictures, numbers, and/or words.</p>
<p>Accountable Talk</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>What do you notice about this pattern?</i></p> <p><i>Can you extend this pattern?</i></p> <p><i>What is an AB, ABC, AABB, ABB pattern?</i></p> <p><i>What numbers are associated with the A the B and/or the C, etc, in your pattern?</i></p> <p><i>What strategy did you use to identify the next member of the pattern?</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: COLOR, SHAPE, AND NUMBER PATTERNS

Investigation 2 (2.1 – 2.7)

DAYS: 8

GRADE: 1

<p>Evidence of Learning Artifacts</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> – triangle, square, trapezoid, hexagon</p> <p><i>Work Time</i> – Student Sheets 17-41</p> <p><i>Journal Entries</i> –</p> <p>Inv. 2.1 If I start with 2 pennies in a jar, and add 2 pennies each day for 3 days, how many pennies will be in the jar?</p> <p>Inv. 2.4 Create an AB pattern, using triangles and squares</p> <p>Inv. 2.6- Name any two things that you can tell me about the members of a pattern?</p> <p><i>Reflection</i> – Create an AB pattern. What are five numbers that are associated with the A and what are five numbers that are associated with the B.</p>
<p>Accountable Talk</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>What do you notice about this pattern?</i></p> <p><i>Can you extend this pattern?</i></p> <p><i>What is an AB, ABC, AABB, ABB pattern?</i></p> <p><i>What numbers are associated with the A the B and/or the C, etc, in your pattern?</i></p> <p><i>What strategy did you use to identify the next member of the pattern?</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>

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 constructing, describing and extending repeating patterns. 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.

Problem 1: What Comes Here?

1. What comes here?





Circle the right shape:  



2. What comes here?



Circle the right shape:  



3. What comes here?





Circle the right shape:   



4. What comes here?



Circle the right shape:  



End-of-Unit Assessment (page 2 of 4)

Problem 2: Make a Pattern

Make a repeating pattern with the pattern block cutouts.

1. Glue it on this paper.

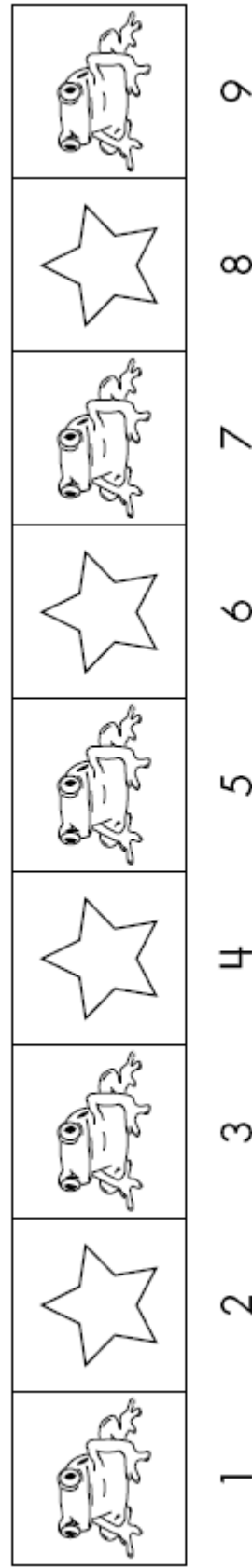
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2. Now glue down the unit of your pattern, the part that repeats.

(

End-of-Unit Assessment (page 3 of 4)

Problem 3: A Number Strip Pattern



1. What numbers are under the frog?

_____, _____, _____, _____, _____

2. What numbers are under the star?

_____, _____, _____, _____, _____

If the pattern continues:

3. Will the 17th picture be a frog? _____

4. What picture will be in the 14th box? _____

5. Will the 20th picture be a star? How do you know? _____

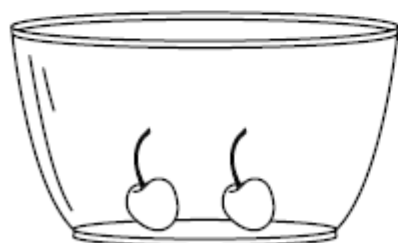
Problem 4: Thelma's Cherries

Thelma starts with 2 cherries.

Every day Thelma picks 3 cherries from the tree.

She needs 26 cherries to make a pie.

On what day will she have 26 cherries?
How do you know?



START



Day 1



Day 2

On-Demand Assessments

(To be filed in portfolio)

Color, Shape, and Number Patterns 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: COLOR, SHAPE, AND NUMBER PATTERNS

On-Demand Assessments

GRADE:

<p style="text-align: center;">On-Demand Assessments (P)</p> <p style="text-align: center;"><u>Color, Shape, and Number Patterns</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><i>Inv. 1:</i> Resource Binder: Session 1.7, M16*, Session 1.8, M17</p> <p><i>Inv. 2:</i> (no On-Demand)</p> <p>*Assessment Checklists should be kept with tracking sheets.(if there is an assessment that we are asking them to use</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>
--	---

Name _____

Date _____



Assessment:

Make a Repeating Pattern

1. Make a repeating pattern with 12 cubes.
Color it in here.

1	2	3	4	5	6	7	8	9	10	11	12

2. Color in the unit of your pattern.

--	--	--	--

3. What color will cube 15 be? _____
4. What color will cube 20 be? _____
5. How do you know what color cube 20 will be?



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