



Holyoke Public Schools Mathematics Curriculum Map Grade K

What Comes Next?

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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 (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 (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>Portfolio³ (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

What Comes Next?

Probing Questions for Accountable Talk

As students progress through this unit, they should be asked the following questions to assess their knowledge about patterns, sequences and functions.

- *How did you know that?*
- *Can you show another way?*
- *What would happen if?*
- *Explain what methods/strategies you tried?*

Classroom Routines

Attendance: *Sessions: 1.1, 1.4, 2.2, 2.5, 2.10, 3.4*

Calendar: *Sessions: 1.3, 2.1, 2.4, 2.9, 3.3, 3.7*

Today's Question: *Sessions: 1.2, 1.5, 2.3, 2.6, 3.1, 3.5*

Patterns on the Pocket Chart: *Sessions: 2.7, 2.8, 3.2, 3.6*

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 outside of math class, occur in a regular rotation every 4-5 days, and support and balance the in-depth work of each curriculum unit.

Implementing Investigations in Grade K: Please review page 18, for the 4 Classroom Routines in this unit.

What Comes Next?: See tan box at the bottom of the page at the beginning of each session for specific questions 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:

- Copy, construct, and extend simple repeating patterns, such as AB, ABC
- Begin to identify the unit of a repeating pattern

Math Content Standards:

- (K.N.1) Count by ones to at least 20
- (K.P.1) Identifies attributes of objects
- (K.P.2) Sort and classify objects by attribute
- (K.P.3) Identify, reproduce, and extend patterns

Performance Standards:

- (M1b) Demonstrates understanding of the base ten number system
- (M3a) Describes, extends, and recognizes linear patterns
- (M3b) Builds patterns with concrete materials

UNIT: What Comes Next?

End-of-Unit Project

GRADE: K

<p style="text-align: center;">End-of-Unit Project (P)</p> <p>Student work should be placed in portfolio (P).</p> <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.</p>	<p>Sessions 3.4 – 3.7 Resource Binder: Unit 3, page M 4</p> <p>Children will create a “Pattern Path Book” (AB, AAB, ABB, ABC)</p> <ul style="list-style-type: none">▪ Review all 4 types of patterns▪ Children will create one “Pattern Path” for each type of pattern using a variety of media▪ Break each pattern into its units by drawing lines and label what pattern type they made, AB, AAB, ABB, ABC
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UNIT: WHAT COMES NEXT?
Investigation 1 (1.1 – 1.5) DAYS: 5
GRADE: K

<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> – observe, pattern, AB pattern, same, different, describe</p> <p><i>Work Time</i> – Student Sheets 18</p> <p><i>Journal Entries</i> – Inv. 1.8 Draw something in the classroom that has a pattern. Describe the pattern using pictures, numbers, and/or words.</p> <p><i>Reflection</i> – Draw 8 circles. Pick 2 colors of crayons and make an AB pattern. How do you know this is an AB pattern?</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 strategies do you use to figure out what is missing? Do you use an attribute to help you?</i> <i>How do you know what comes next?</i> <i>How do you know it is a pattern? Describe your 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: WHAT COMES NEXT?
Investigation 2 (2.1 – 2.10) DAYS: 10

GRADE: K

<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> – two-color counters, square tiles, ABB pattern, AAB pattern, ABC pattern, same, different (F)</p> <p><i>Work Time</i> – Student Sheets 19-21</p> <p><i>Journal Entries</i> – Inv. 2.10 Draw an ABB, AAB, or an ABC pattern. How do you know you have a pattern?</p> <p><i>Reflection</i> If you saw the following cubes laid out on a table yellow, blue, yellow, blue, yellow, blue, yellow, blue, yellow, blue, what would say that the color of the next two cubes would be? Use pictures, numbers, and/or words to explain your thinking.</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 style="text-align: center;"><i>How can you check to see if something has a repeating pattern? What would happen if the pattern kept going? What comes next? How would you describe the pattern? What attribute are you using? What are some other patterns you can make beside an AB pattern? How can you make sure the pattern you recorded matches the pattern you made? What strategy do you use when you “add on” to a 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: WHAT COMES NEXT?
Investigation 3 (3.1 – 3.7) DAYS: 7

GRADE: K

<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> – repeat, pattern unit</p> <p><i>Work Time</i> – Student Sheets 22-25</p> <p><i>Journal Entries</i> – Inv. 3.4 Draw an AB pattern. Break your pattern into pattern units using a line to show the units.</p> <p><i>Reflection</i> – Describe which of the following arrangements is a pattern. Use pictures, numbers, and/or words to explain why you think it is. red, orange, blue, yellow, pink, purple, white, black</p> <p style="text-align: center;">white, black, white, black, white, black, white, black</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 style="padding-left: 40px;"><i>Describe what unit repeats in this pattern?</i> <i>What strategy do you use to figure out how many units are in a pattern?</i> <i>Show how you can put back together a broken train, back into its pattern?</i> <i>What would come next in this pattern if we wanted to repeat this unit over and over again?</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 patterns, sequences and functions. It is written in MCAS form to give students the experience of answering an open-response question.

NAME: _____

DATE: _____

End-of-Unit Project

WHAT COMES NEXT?

- **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.**

Sessions 3.4 – 3.7

Resource Binder: Unit3, page M 4

Children will create a “**Pattern Path Book** “(AB, AAB, ABB, ABC).

- Review all 4 types of patterns.
- Children will create one “**Pattern Path**” for each type of pattern using a variety of media.
- Break each pattern into its units by drawing lines and label what pattern type they made, **AB, AAB, ABB, ABC.**

On-Demand Assessments

(To be filed in portfolio)

What Comes Next? 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: WHAT COMES NEXT?
On-Demand Assessments

GRADE: K

**On-Demand
Assessments (P)**

What Comes Next?
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.

Inv. 1: Resource Binder: Session 1.5, Assessment Checklist Unit3 M3*

Inv. 2: None

Inv. 3: Resource Binder: Sessions 3.6-3.7, Assessment Checklist Unit3 M3*
Sessions 3.1-3.7, Assessment Checklist Unit3 M17)*

*Assessment Checklists should be kept with tracking sheets.

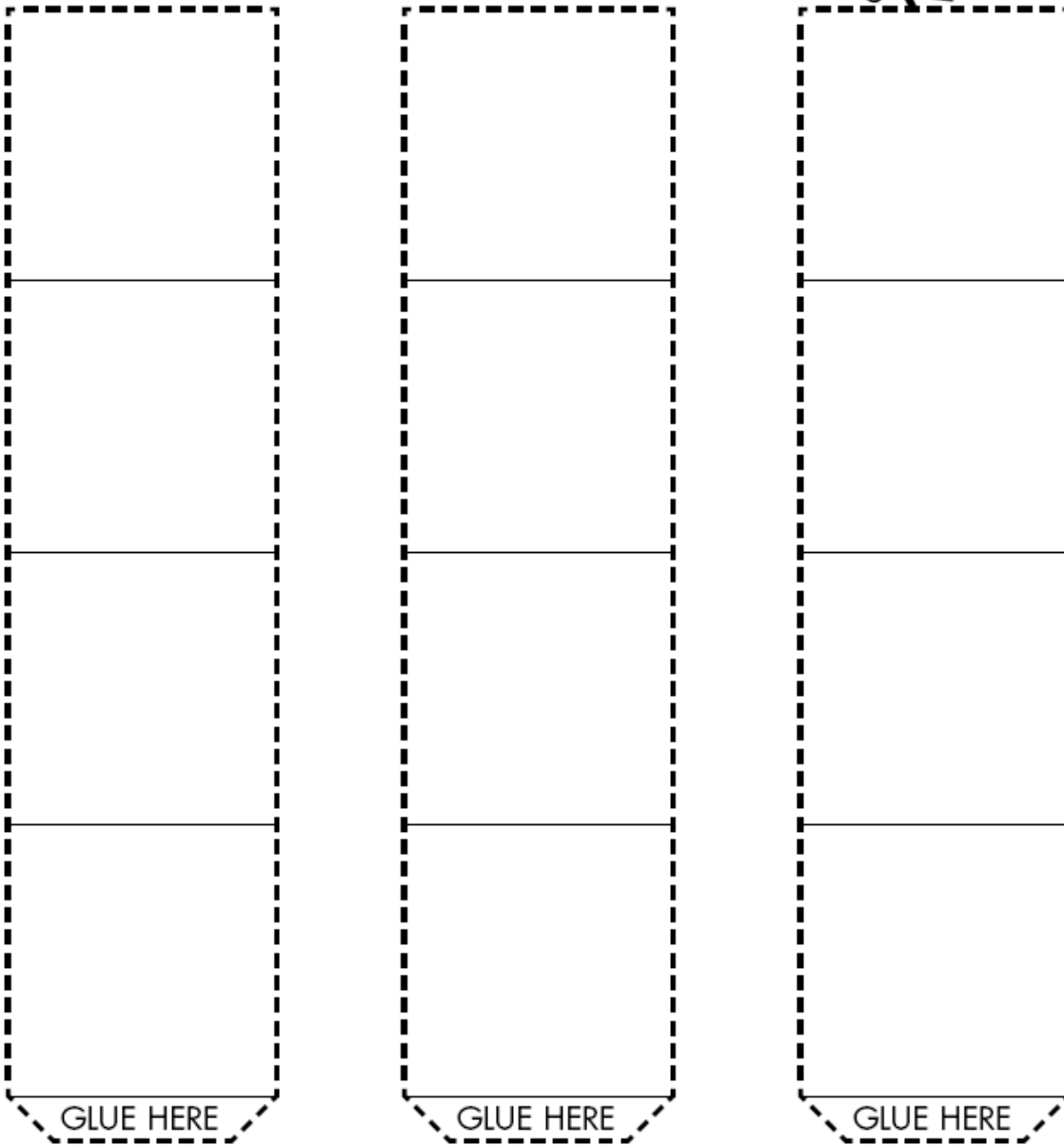
Name _____

Date _____

What Comes Next?

Pattern Paths

Copy on card stock to make a Pattern Path for each student. Cut along the outside lines and glue the paths end to end. If possible, laminate the paths.



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M4 Unit 3

Sessions 2.1, 2.2, 2.3, 2.6, 2.7, 2.8, 2.10



Assessment Checklist: Identifying the Unit of a Pattern

Student	Breaks a pattern into units	Constructs a pattern from a known unit	Notes

Sessions 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7

Unit 3

M17



Assessment Checklist: Repeating Patterns

Student	Kinds of patterns students construct	Copy/extend a pattern type	Notes

Sessions 1.5, 3.6, 3.7

Unit 3





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