



Holyoke Public Schools Mathematics Curriculum Map Grade 5

Thousands of Miles,
Thousands of Seats

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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

Artifact	K - 1	2 - 5	6 - 8
<i>3 Ring Binder (3R)*</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 (MNB)</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

Thousands of Miles, Thousands of Seats **Probing Questions for Accountable Talk**

As students progress through this unit, they should be asked the following questions to assess their knowledge about problem situations that involve the number system to 100,000 and beyond, finding combinations of 3-, 4-, 5-digit numbers, and subtraction strategies.

What strategy did you use to combine...?

What strategy did you use to find the difference of ...?

Can you show another subtraction strategy in ...?

What similarities/differences did you notice when...?

Is the order of the addends in the expression important?

Can you demonstrate that strategy....on a number line?

Ten-Minute Math

Ten-Minute Math: Session 1.1, “Practicing Place Value”

Ten-Minute Math: Session 1.4, “Estimation and Number Sense: Closest Estimate”

Ten-Minute Math activities 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 5: Please review pages 24 -26, and 30-31 for the 2 Ten-Minute Math activities 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:

- Read, write, and sequence numbers up to 100,000
- Solve subtraction problems accurately and efficiently, choosing from a variety of strategies
- Demonstrate fluency with division problems related to the multiplication combinations to 12×12 (division facts)

Math Content Standards:

5.N.1 Demonstrate an understanding of (positive integer) powers of ten, e.g., 10^2 , 10^5 .

5.N.2 Demonstrate an understanding of place value through millions and thousandths.

5.N.3 Represent and compare large (millions) and small (thousandths) positive numbers in various forms, such as expanded notation without exponents, e.g., $9724 = 9 \times 1000 + 7 \times 100 + 2 \times 10 + 4$.

5.N.6 Find and position whole numbers, positive fractions, positive mixed numbers, and positive decimals on a number line.

5.N.7 Compare and order whole numbers, positive fractions, positive mixed numbers, positive decimals, and percents.

5.N.11 Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems.

5.N.12 Accurately and efficiently add and subtract whole numbers and positive decimals. Multiply and divide (using double-digit divisors) whole numbers. Multiply positive decimals with whole numbers.

5.N.14 Estimate sums and differences of whole numbers, positive fractions, and positive decimals. Estimate products of whole numbers and products of positive decimals with whole numbers. Use a variety of strategies and judge the reasonableness of the answer.

Performance Standards:

(M1a) Adds and subtracts whole numbers

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

(M1c) Estimates using landmark numbers

UNIT: Thousands of Miles, Thousands of Seats

End-of-Unit Project

GRADE: 5

**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.

The estimated populations of two New England states for the year 2003 are given below.

- New Hampshire: 1,287,687
- Maine: 1,305,728

A.) Which of the following numbers is greater than the estimated population of New Hampshire but less than the estimated population of Maine? Explain your thinking.

- A.** 1,291,012
- B.** 1,310,104
- C.** 1,267,805
- D.** 1,308,549

B.) Write one subtraction word problem and one addition word problem from the information in Part A.

C.) Solve the problems using two different strategies for each operation.

UNIT: THOUSANDS OF MILES, THOUSANDS OF SEATS

Investigation 1 (1.1 – 1.5)

DAYS: 5

GRADE: 5

<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>(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio</p> <p><i>Vocabulary</i> – million, billion, trillion. Review landmark numbers.(3R)</p> <p><i>Work Time</i> – Student Sheets 1 – 19(3R)</p> <p><i>Journal Entries</i> – (MNB) *Maximum 5 minutes</p> <p>Inv. 1.1 How did you know where to write your numbers on the 10,000 chart?</p> <p>Inv. 1.2 Describe how to find any number you are looking for on the 10,000 chart?</p> <p>Inv. 1.3 What strategies did you use when playing the game <i>Close to 1,000</i>?</p> <p>Inv. 1.4 What strategy did you use to estimate how much the sum or difference would be in an addition or subtraction problem?</p> <p>Inv. 1.5 Explain a situation where you would use numbers larger than 1,000,000?</p> <p><i>Reflection</i> – How did you use your knowledge of adding and subtracting multiples of 10, 100, 1000 to solve the related addition or subtraction problems?(P)</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>How did you know that? How can you use ...? Can you show another way? What convention did you use?</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: THOUSANDS OF MILES, THOUSANDS OF SEATS
Investigation 2 (2.1 – 2.5) DAYS: 5

GRADE: 5

<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>(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio</p> <p><i>Vocabulary</i> – subtracting in parts, adding up, subtracting back, subtracting by place, algorithm(3R)</p> <p><i>Work Time</i> – Student Sheets 20 - 45 (3R)</p> <p><i>Journal Entries</i> – (MNB) *Maximum 5 minutes</p> <p>Inv. 2.1 Describe a subtraction strategy. Explain your first step in solving a subtraction problem.</p> <p>Inv. 2.2 Give two reasons why it is important for your solutions to be clear and concise.</p> <p>Inv. 2.3 Explain one new subtraction strategy you used today and how it is different from what you have been using.</p> <p>Inv. 2.4 How are numbers broken apart to show regrouping?</p> <p><i>Reflection</i> – Solve 1000-485 using 2 different subtraction strategies. Explain your strategies.(P)</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>Can you demonstrate that strategy....on a number line?</p> <p>Can you solve the problem using a different strategy?</p> <p>How did you use your knowledge of adding and subtracting multiples of 10, 100, 1000 in this problem?</p> <p>What was your strategy?</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: THOUSANDS OF MILES, THOUSANDS OF SEATS

Investigation 3 (3.1 – 3.5)

DAYS: 5

GRADE: 5

<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>(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio</p> <p><i>Vocabulary</i> – (3R)</p> <p><i>Work Time</i> – Student Sheets 47 - 69 (3R)</p> <p><i>Journal Entries</i> – (MNB) *Maximum 5 minutes</p> <p>Inv. 3.1 What strategies from <i>Close to 1,000</i> also work for <i>Close to 7,500</i>?</p> <p>Inv. 3.2 How does place value help you solve problems?</p> <p>Inv. 3.3 When solving problems with large numbers, how do you decide where to start?</p> <p>Inv. 3.4 Show how you keep track of the steps in your strategy?</p> <p><i>Reflection</i> – Explain how using landmark numbers would make a problem easier to solve. Give an example. (P)</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>How could this problem be represented in a story? Can you solve the problem in a different way? How did you use your knowledge of place value and basic subtraction facts to solve the problem? How can you use addition in a subtraction problem?</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 the number system to 100,000 and beyond, finding combinations of 3-, 4-, 5-digit numbers, and subtraction strategies. 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.**

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B.) Write one subtraction word problem and one addition word problem from the information in Part A.

C.) Solve the problems using two different strategies for each operation.

On-Demand Assessments

(To be filed in portfolio)

Thousands of Miles, Thousands of Seats 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: THOUSANDS OF MILES, THOUSANDS OF SEATS

On-Demand Assessments

GRADE: 5

On-Demand Assessments (P)

Thousands of Miles,
Thousands of Seats
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 1.2, Assessment Checklist, M3*

Inv. 2: Resource Binder: Session 2.5, M15**

Inv. 3: Resource Binder: Session 3.5, End-of-Unit Assessment, M20**

*Assessment Checklist should be kept with tracking sheet.

****Please refer to the section in the Teacher's Unit Guide entitled, "Professional Development" for examples of student work for each assessment.**



Holyoke Public Schools

2007 - 2008

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