



# Holyoke Public Schools Mathematics Curriculum Map Grade 4

How Many Packages? How Many  
Groups?

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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

- ACCOUNTABLE TALK – using probing questions
- 5. ON-DEMAND ASSESSMENTS - to be done during teaching of unit.
  - 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<br/>(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<br/>(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><br/>(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

## **How Many Packages? How Many Groups?**

### **Probing Questions for Accountable Talk**

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

- What strategies can you use for multiplication? Do they always work?
- What strategies can you use for division? Do they always work?
- How can you use landmark numbers to multiply and divide?
- How can you use/create story problems to help with solving multiplication and division problems?
- Why are multiplication clusters useful in solving problems?
- How are you sure you are making a reasonable estimate? What strategies did you use to estimate?
- How can making a picture help with division and multiplication problems?
- How can you be sure that your solution is written clearly, so that others can understand it?

### ***Ten Minute Math***

Ten Minute Math: Session 1.4, Counting Around the Classroom  
Session 1.1, 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 4: Please review pages 23, 24-34, for 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?

How Many Packages? How Many Groups?

HPS-8

# Goals, Content Standards, & Performance Standards

## Unit Goals:

- Multiply 2-digit numbers efficiently
- Solve division problems with 1-digit and small 2-digit divisors by using at least one strategy efficiently

## Math Content Standards:

- (4.N.7) Recognize classes to which a number may belong, and identify the numbers in those classes. Use these in the solution of problems.
- (4.N.8) Select, use, and explain various meanings and models of multiplication and division of whole numbers. Understand and use the inverse relationship between the two operations.
- (4.N.10) Select and use appropriate operations to solve problems
- (4.N.11) Know multiplication facts through  $12 \times 12$
- (4.N.12) Add and subtract and multiply accurately and efficiently
- (4.N.13) Divide up to a three-digit whole number with a single-digit divisor accurately and efficiently. Interpret any remainders.
- (4.N.14) Demonstrate in the classroom an understanding of and the ability to use the conventional algorithm for multiplication.
- (4.N.15) Demonstrate in the classroom an understanding of and the ability to use the conventional algorithm for division.

## Performance Standards:

- (M1a) Adds, subtracts, multiplies, and divides whole numbers, with and without calculators; that is,
- multiplies by using repeated addition, counts by multiples, combines things that come in groups, makes arrays, uses area models
  - divides by putting things into groups, sharing equally
  - analyzes problem situations and contexts in order to figure out when to add, subtract, multiply, and divide
  - solves arithmetic problems by relating addition, subtraction, multiplication, and division to each other

# UNIT: How Many Packages? How Many Groups?

## End-of-Unit Project

GRADE: 4

### 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.

Ms. Terrell needs 234 tiles for a new kitchen floor.

- a. The tiles come in boxes of 12 tiles each. It is not possible to buy part of a box. How many boxes of tiles will Ms. Terrell need to buy to have enough to cover the floor? Show and explain how you got your answer.
- b. One box of tiles costs \$22. **Estimate** the amount that Ms. Terrell will have to spend on the tiles she needs. Explain how you got your answer.

**UNIT: How Many Packages? How Many Groups?**  
**Investigation 1 (1.1 – 1.5)                      DAYS: 5**

|  |   |
|--|---|
| <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><b>(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio</b></p> <p><i>Vocabulary</i> – estimate, multiplication, landmark, multiple, cluster, factor (3R)</p> <p><i>Work Time</i> – Student Activity Book pgs. 1-18 (3R)</p> <p><i>Journal Entries</i> – (MNB) *Maximum 5 minutes</p> <p><b>Inv. 1.1</b> What strategies can you use to find the closest estimate?</p> <p><b>Inv. 1.2</b> How does breaking a multiplication problem apart help you to solve the problem?</p> <p><b>Inv. 1.3</b> How can cluster problems help you to solve multiplication problems?</p> <p><b>Inv. 1.4</b> None, due to assessment.</p> <p><b>Inv. 1.5</b> Describe the strategy you used when solving two-digit multiplication problems.</p> <p><b>Reflection</b> – Write a story problem for <math>33 \times 51</math>. Solve your story problem, and explain your solution (P)</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>How did you know that?<br/>         How can you use ...?<br/>         Can you show another way?<br/>         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: How Many Packages? How Many Groups?  
Investigation 2 (2.1 – 2.5)                      DAYS: 5

GRADE: 4

|  |   |
|--|---|
| <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><b>(3R) – 3 ring binder; (MNB) –marble notebook; (P) – portfolio</b></p> <p><i>Vocabulary</i> – (3R)</p> <p><i>Work Time</i> – Student Activity Book pgs. 19-35 (3R)</p> <p><i>Journal Entries</i> – (MNB) *Maximum 5 minutes</p> <p><b>Inv. 2.1</b> Why does changing one of the factors to a multiple of 10 make the problem easier?</p> <p><b>Inv. 2.2</b> What strategies did you use for creating a multiplication cluster?</p> <p><b>Inv. 2.3</b> What strategy could you use to help you find factors in the game Factor Bingo?</p> <p><b>Inv. 2.4</b> What strategies did you find most useful for solving multiplication problems? Why?</p> <p><b>Inv. 2.5</b> None, due to assessment</p> <p><i>Reflection</i> – Show 2-3 strategies to solve <math>53 \times 21</math>. One strategy must be a cluster. (P)</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>How did you know...?</p> <p>Can you solve the problem in a different way?</p> <p>Does your answer make sense?</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: How Many Packages? How Many Groups?  
Investigation 3 (3.1 – 3.6)                      DAYS: 6

GRADE: 4

|  |   |
|--|---|
| <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><b>(3R) – 3 ring binder; (MNB) –marble notebook; (P) – portfolio</b></p> <p><i>Vocabulary</i> – divisor, division, remainder, dividend, quotient</p> <p><i>Work Time</i> – Student Activity Book pgs. 37-55 (3R)</p> <p><i>Journal Entries</i> – (MNB) *Maximum 5 minutes</p> <p><b>Inv. 3.1</b> What strategy did you use for figuring out how many groups you could make?</p> <p><b>Inv. 3.2</b> What strategies can you use for solving larger division problems?</p> <p><b>Inv. 3.3</b> Describe the relationship between multiplication and division.</p> <p><b>Inv. 3.4</b> How can multiple towers help you to solve division problems?</p> <p><b>Inv. 3.5</b> What are some things you can do with a remainder in a story problem?</p> <p><b>Inv. 3.6</b> None, due to assessment</p> <p><i>Reflection</i> – Solve <math>350 \div 11</math> using at least two different strategies. Be sure to show all of your work. (P)</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 style="padding-left: 40px;">How did you know...?</p> <p style="padding-left: 40px;">Can you solve the problem in a different way?</p> <p style="padding-left: 40px;">Does your answer make sense?</p> <p style="padding-left: 40px;">What was your strategy?</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 multiplication and division. 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.**

Ms. Terrell needs 234 tiles for a new kitchen floor.

- a. The tiles come in boxes of 12 tiles each. It is not possible to buy part of a box. How many boxes of tiles will Ms. Terrell need to buy to have enough to cover the floor? Show and explain how you got your answer.
  
- b. One box of tiles costs \$22. Estimate the amount that Ms. Terrell will have to spend on the tiles she needs. Explain how you got your answer.

# On-Demand Assessments

(To be filed in portfolio)

## How Many Packages? How Many Groups? 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: How Many Packages? How Many Groups?

## On-Demand Assessment

GRADE: 4

### On-Demand Assessments (P)

How Many Packages?  
How Many Groups?  
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 1.4, M18\*\*; Student Activity Book pgs. 14-15

**Inv. 2:** Resource Binder: Session 2.5, M19\*

**Inv. 3:** Resource Binder: Session 3.6, M21, M22\*

\*Assessment Checklists should be kept with tracking sheets.

**\*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