Holyoke Public Schools
Mathematics Curriculum Map
Grade 5

Decimals on Grids and Number Lines

Table of Contents

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.
    - STUDENT MASTER – for project
5. INVESTIGATIONS:
    - 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

Artifact	K - 1	2 - 5	6 - 8
3 Ring Binder (3R)*	o Student Work[1]	o Vocabulary o Student sheets[1] ***All work should be dated and listed by investigation***	o Math books o Vocabulary o Core Problems[1] o Lab sheets ***All work should be dated and listed by investigation***
Marble Notebook (MNB)	o Journal entries[2]	o Table of Contents o Problem of the day o Journal entries o Class work ***All work should be dated and listed by investigation in the Table of Contents***	o Table of Contents o Work time o Journal entries ***All work should be dated and listed by investigation in the Table of Contents***
Portfolio[3] ***(P)***	o On-demand tasks o Projects o Teacher anecdotal notes	o On-demand tasks o Reflections o Projects ***All work should be dated and listed by investigation***	o On-demand tasks o Reflections o Projects ***All work should be dated and listed by investigation***

[*] *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*

Decimals on Grids and Number Lines
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 fractions, decimals, percents, and the equivalents thereof; as well as understanding place value and the base-ten number system.

- *What strategy did you use to combine those two decimals?*
- *What similarities/differences did you notice when adding/subtracting decimals as compared to adding/subtracting whole numbers?*
- *What is the significance of the digits to the right of the decimal point?*
- *What is the importance of zero to the right of the decimal point?*
- *What is the importance of zero to the left of the decimal point?*
- *What is the importance of zero to the right of the digits after the decimal point?*

Ten Minute Math

Continue from previous units:

Ten Minute Math: "Practicing Place Value"
Ten Minute Math: "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, 30-31 for the 2 Ten Minute Math activities in this unit (Estimation and Number Sense and Practicing Place Value).

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 <….> 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 interpret decimal fractions to thousandths.
- Order decimals to thousandths.
- Add decimal fractions through reasoning about place value, equivalents, and representations.

Math Content Standards:

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 x 1000 + 7 x 100 + 2 x 10 + 4.
5.N.5 Identify and determine common equivalent fractions (with denominators 2, 4, 5, 10) and mixed numbers (with denominators 2, 4, 5, 10), decimals, and percents (through one hundred percent), e.g., 3/4 = 0.75 = 75%.
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.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: Decimals on Grids and Number Lines

End-of-Unit Project

GRADE: 5

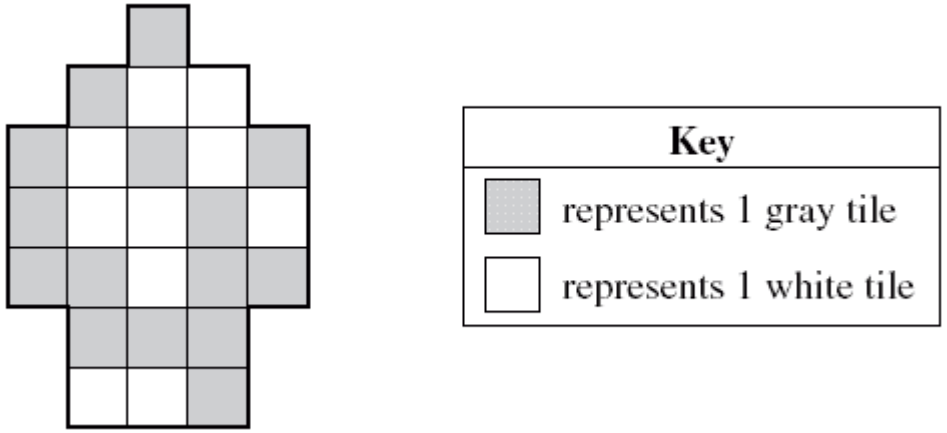
End-of-Unit Project (P)

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.

2005, Mathematics - Grade 6
Question 17: Open-Response
Reporting Category: Number Sense and Operations
Standard(s): 6.N.5

Shing made the design shown below using gray square tiles and white square tiles.



a. What fractional part of the whole design is made up of gray tiles? Write your answer as a fraction. Show or explain how you got your answer.
b. Write the fraction from part a. as a decimal. Show or explain how you got your answer.
c. Write the fraction from part a. as a percent. Show or explain how you got your answer.

UNIT: DECIMALS ON GRIDS AND NUMBER LINES
Investigation 1 (1.1 – 1.10) DAYS: 10

GRADE: 5

Evidence of Learning Artifacts Journal and Reflection questions should be posted and referred to at the beginning of the appropriate *Investigation*. Journal and Reflection entries need to be done in class as part of the closure and assessment	**(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio** ***Vocabulary*** – fraction, decimal, percent, equivalent, tenths, hundredths, thousandths, ten thousandths, number line, numerator, denominator (3R) ***Work Time –*** Student Sheets 1 – 42 (3R) ***Journal Entries*** – (MNB) *Maximum 5 minutes **Inv. 1.1** How do you know that 5 tenths and 50 hundredths are equal? **Inv. 1.2** How did you decide how much of the grid to shade? **Inv. 1.3** Describe your strategy for placing decimals in order on a number line. **Inv. 1.4** How do you compare decimals? **Inv. 1.7** How do you find the decimal equivalent for a fraction on the calculator? **Inv. 1.8** What is a repeating decimal? **Inv. 1.9** When finding decimal equivalents for fractions what patterns did you notice for ninths? ***Reflection*** – Explain the relationship among decimals, fractions, and percents? (P)
Accountable Talk 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.	*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:* How did you know that? What is the significance of the digits to the right of the decimal point? What similarities/differences did you notice among the fractions that convert to repeating decimals? Can you show a different strategy? *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.*

UNIT: DECIMALS ON GRIDS AND NUMBER LINES
Investigation 2 (2.1 – 2.8) DAYS: 8
GRADE: 5

Evidence of Learning Artifacts Journal and Reflection questions should be posted and referred to at the beginning of the appropriate *Investigation*. Journal and Reflection entries need to be done in class as part of the closure and assessment	**(3R) – 3 ring binder; (MNB) –marble notebook; (P) – portfolio** ***Vocabulary*** – place value (3R) ***Work Time –*** Student Sheets 43 - 66 (3R) ***Journal Entries*** – (MNB) *Maximum 5 minutes **Inv. 2.1** How did you decide which card to play? **Inv. 2.2** Why is place value so important when adding decimals? **Inv. 2.3** Explain the strategy you used to add decimals? **Inv. 2.4** In *Decimal Double Compare* how did you determine which pair of cards had the greater sum? **Inv. 2.5** Explain the strategy you used to get *Close to One*? **Inv. 2.6** Solve: 11 + 0.027 + 0.87 + 19.45 **Inv. 2.7** Does adding a zero to the decimal 0.4 change its value? Explain. ***Reflection*** – **a.** Give two decimal numbers that add up to 4.5. **b.** Create an addition story problem using the same decimals and solve it in 2 different ways. Show your work in numbers, pictures and words. (P)
Accountable Talk 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.	*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:* Can you solve the problem in a different way? Does your answer make sense? What was your strategy? *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.*

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 fractions, decimals, percents, and the equivalents thereof; as well as understanding place value and the base-ten number system. 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.**

2005, Mathematics - Grade 6
Question 17: Open-Response
Reporting Category: Number Sense and Operations
Standard(s): 6.N.5

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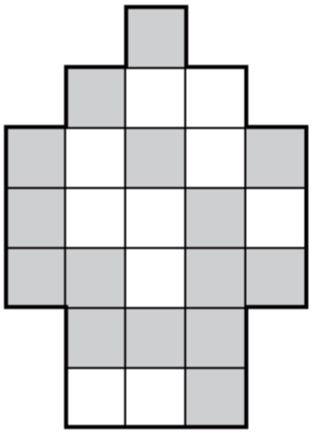
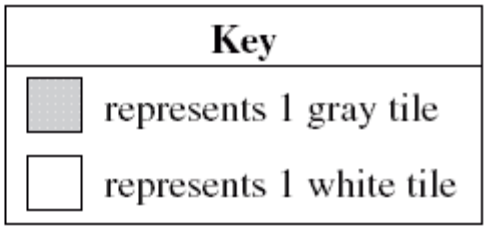




a. What fractional part of the whole design is made up of gray tiles? Write your answer as a fraction. Show or explain how you got your answer.
b. Write the fraction from part a. as a decimal. Show or explain how you got your answer.
c. Write the fraction from part a. as a percent. Show or explain how you got your answer.

Scoring Rubric for Project

4	The student response demonstrates an exemplary understanding of the Number Sense and Operations concepts involved in determining common equivalent fractions, decimals, and percents.
3	The student response demonstrates a good understanding of the Number Sense and Operations concepts involved in determining common equivalent fractions, decimals, and percents. Although there is significant evidence that the student is able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Sense and Operations concepts involved in determining common equivalent fractions, decimals, and percents. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates only a minimal understanding of the Number Sense and Operations concepts involved in determining common equivalent fractions, decimals, and percents.
0	The student response contains insufficient evidence of an understanding of the Number Sense and Operations concepts involved in determining common equivalent fractions, decimals, and percents to merit any points

2005 MCAS
Grade 6 Mathematics
Question 17 - Score Point 4

(A) There are $\frac{3}{5}$ gray tiles because there are 15 gray tiles and 25 tiles all togeter, so there are 15 out of 25 which is the same as $\frac{15}{25}$ and $\frac{15}{25}$ reduces to $\frac{3}{5}$

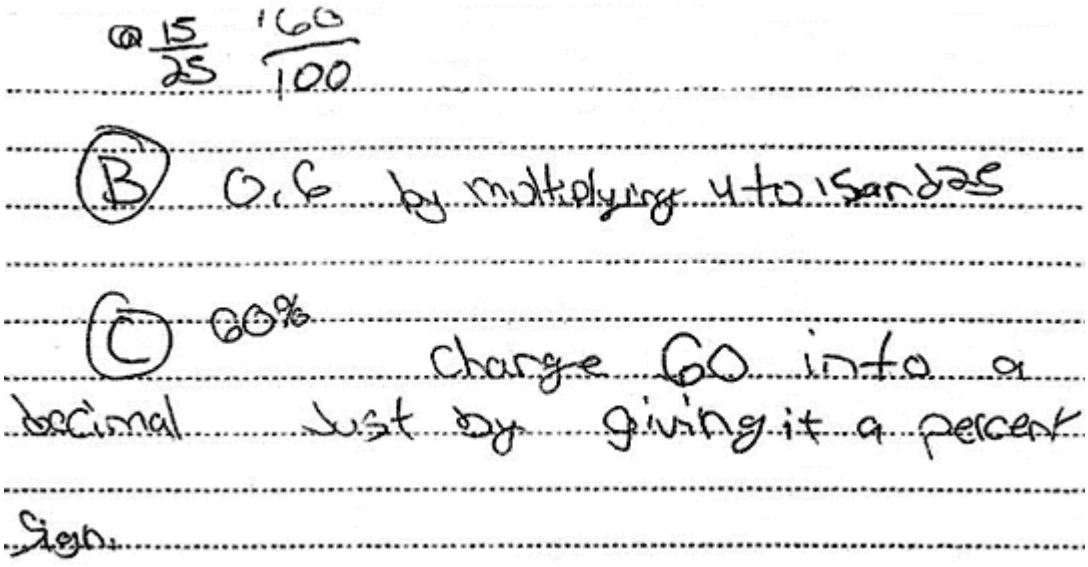
(B) In order to convert a fraction to a decimal you need to divide the numerator by the denominator in this case would be $3 \div 5 = 0.6$.

$$5\overline{)3.0} \quad 0.6$$
$$-30$$
$$0$$

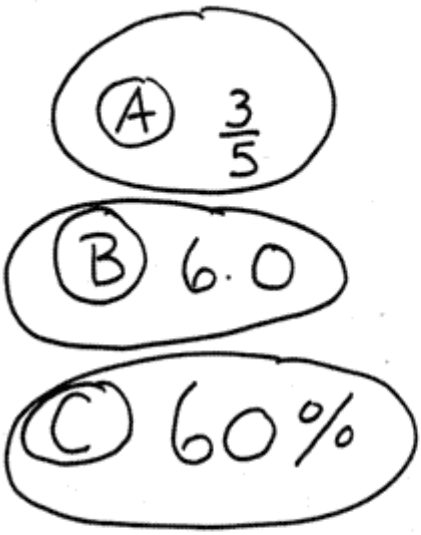
(C) In order to convert a fraction to a percent you need to chang $\frac{3}{5}$ to $\frac{\square}{100}$. That equals $\frac{60}{100}$ and $\frac{60}{100} = 60\%$.

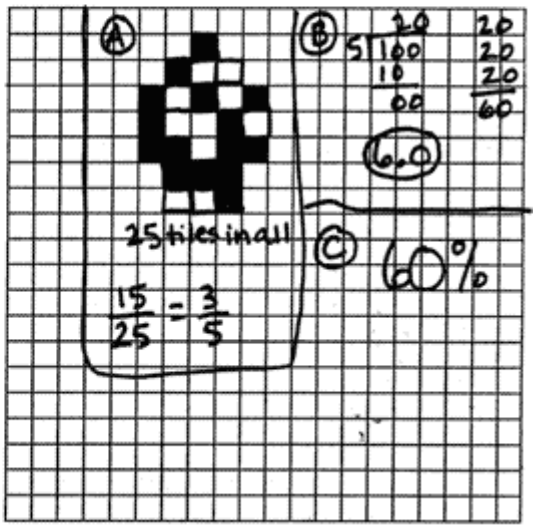
$$\frac{3}{5} = \frac{\square}{100} = \frac{60}{100}$$
$$\times 100$$
$$3 \quad 5\overline{)300} \quad 60$$
$$300 \quad -30$$
$$-0$$
$$0$$

2005 MCAS
Grade 6 Mathematics
Question 17 - Score Point 3



2005 MCAS
Grade 6 Mathematics
Question 17 - Score Point 2





2005 MCAS
Grade 6 Mathematics
Question 17 - Score Point 1

(a) The fraction part of the whole design is $\frac{15}{25}$. I counted all of the squares. Then I counted gray tiles.

(b) The fraction from part a as a decimal is 15.25. Because I counted the gray tiles first. There were 15. Then I counted all of them and that equaled 25.

(c) The fraction from part a as a percent is 25%. Because its the denominator.

On-Demand Assessments

(To be filed in portfolio)

Decimals on Grids and Number Lines
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: DECIMALS ON GRIDS AND NUMBER LINES

On-Demand Assessments

GRADE: 5

On-Demand Assessments (P) <u>Decimals on Grids and Number Lines</u> 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.	***<u>Inv. 1:</u>*** Resource Binder: Session 1.10, M20* ***<u>Inv. 2</u>:*** Resource Binder: Session 2.8, M27-M28* ***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