



Holyoke Public Schools

Grade 7

Comparing and Scaling

Table of Contents

HOLYOKE PUBLIC SCHOOLS	ERROR! BOOKMARK NOT DEFINED.
CURRICULUM MAPS OUTLINE	6
Map Goals:	6
Expectations:	6
Feedback To Students:	6
Map Components:	6
MATHEMATICS EVIDENCE OF LEARNING ARTIFACTS	8
ACCOUNTABLE TALK	9
Probing Assessment Questions	9
Probing Questions – Teacher’s Role	9
Probing Questions – Student’s Role	10
Probing Questions - Suggestions	10
GOALS, CONTENT STANDARDS, & PERFORMANCE STANDARDS	12
Unit Goals:	12
Math Content Standards:	12
Performance Standards:	14

INVESTIGATION 1: RATIO, PROPORTION, AND PERCENT	15
INVESTIGATION 2: COMPARING RATIOS, PERCENTS, AND FRACTIONS	16
INVESTIGATION 3: COMPARING AND SCALING RATES	17
INVESTIGATION 4: MAKING SENSE OF PROPORTIONS.....	18
APPENDIX 1 UNIT PROJECT	19
Unit Project Scoring Guide	19
Central Middle School Fall Festival Attendance.....	20
Student Work: Question #29 - Score Point 4.....	21
Student Work: Question #29 - Score Point 3.....	22
Student Work: Question #29 - Score Point 2.....	23
Student Work: Question #29- Score Point 1.....	24
APPENDIX 2 VOCABULARY	25
Investigation 1:	25
Investigation 2:	25
Investigation 3:	25
Investigation 4:	25
APPENDIX 3 JOURNAL ENTRIES.....	26
Investigation 1:	26

Investigation 2:	26
Investigation 3.....	26
Investigation 4.....	27
APPENDIX 4 REFLECTIONS	28
MMR1	28
MMR2	28
MMR3	28
MMR4	28
APPENDIX 5 ON DEMAND TASKS	29
HPS Mathematics Scoring Rubric.....	30
Investigation 1.....	31
Investigation 2.....	32
Investigation 3.....	33
Investigation 4A.....	34
Investigation 4B	35
NOTES	36

Curriculum Maps Outline

Map 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.
5. STUDENT MASTER – for project
6. INVESTIGATIONS
7. NOTEBOOK - includes: 3 Ring Binder, Bound Notebook, Portfolio

8. ACCOUNTABLE TALK – using probing questions
9. ON DEMAND ASSESSMENTS - to be done during teaching of unit.
10. STUDENT MASTERS- for on-demand assessments.

Mathematics Evidence of Learning Artifacts

Artifact	K - 1	2 – 5	6 - 8
<i>3 Ring Binder</i> <i>(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</i> <i>(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>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

Accountable Talk

Probing Assessment Questions

As students progress through this unit, they should be asked the following questions to assess their specific knowledge of the unit.

When quantities have different measurements, how can they be compared?

When can division be used?

Why is a ratio a good means of comparison?

How can a ratio be scaled up or down?

How does rounding affect the numbers used in a ratio?

What is the relationship between ratios and similar figures?

How can ratios be used in daily life to find unknown quantities or inaccessible measurements?

How can we use proportions to solve problems?

Probing Questions – Teacher’s Role

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*

Probing Questions – Student’s Role

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*

Probing Questions - Suggestions

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:

Analyze comparison statements made about quantitative data

Use ratios, fractions, differences, and percents to form comparison statements in a given situation

Judge whether comparison statements make sense and are useful.

See how forms of comparison statements are related (for ex. a percent and a fraction comparison)

Make judgments about which statements are most informative or best reflect a particular point of view.

Decide when the most informative comparison is the difference between two quantities and when it is a ratio between pair of quantities.

Scale a ratio, rate, or fraction to make a larger or smaller object or population with the same relative characteristics of the original.

Represent related data in tables.

Look for patterns in tables that will allow predictions to be made beyond the tables.

Write an equation to represent the pattern in a table of related variables.

Apply proportional reasoning to solve for the unknown part when one part of two equal ratios is unknown.

Set up and solve proportions that arise in applications.

Recognize that constant growth in a table is related to proportional situations.

Connect a unit rate to the equation describing a situation.

Math Content Standards:

(7.N.2) Use ratios and proportion in the solution of problems involving unit rate, scale drawings, and reading of maps.

(7.N.7) Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1).

(7.P.1) Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g., compounding

(7.N.6) use the inverse relationship of addition and subtraction, and of multiplication and division, to simplify computation problems, e.g., multiplying by $\frac{1}{2}$ or .5 is the same as dividing by 2.

Performance Standards:

- (M4a) Collects, organizes and displays data with tables, charts and graphs that are appropriate, i.e. consistent with the nature of the data*
- (M4d) Makes conclusions and recommendations based on data analysis*
- (M1f) Uses ratios and rates to express “part-to-part” and, “whole-to-whole” relationships, and reasons proportionately to solve problems involving equivalent fractions, equal ratios, or constant rates, recognizing the multiplicative nature of these problems in the constant factor of change.*
- (M2j) Reasons proportionately with measurements to interpret maps and to make smaller and larger scale drawings.*
- (M3c) Analyzes tables, graphs, and rules, to determine functional relationships.*

Investigation 1: Ratio, Proportion, and Percent

Objectives Investigations 1.1 - 1.3	Pacing: 4 days
<p style="text-align: center;"><i>Evidence of Learning Artifacts</i></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><u>Vocabulary</u>^{2:} Appendix 2, Investigation 1</p>
	<p><u>Core Problems</u>^{2:} Comparing and Scaling, Investigation 1 ACE Problems #1,2, 34, 4,5,7,9,10</p>
	<p><u>Work Time</u>^{1:} Comparing and Scaling, Problems 1.1 - 1.3</p>
	<p><u>Journal Entries</u>^{1:} Appendix 3, Inv #1.1,1.2,1.3</p>
	<p><u>On Demand Tasks</u>^{3:} Appendix 5, Investigation 1</p>
	<p><u>Mathematical Reflection</u>³ Appendix 4, MMR1:</p>
<p style="text-align: center;"><i>Accountable Talk</i></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>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:</p> <ul style="list-style-type: none"> ○ How did you know that? ○ How can you use ...? ○ Can you show another way? ○ What convention did you use? <p>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.</p>

1. Marble Note Book
2.3 Ring Binder
3. Portfolio

Investigation 2: Comparing Ratios, Percents, and Fractions

Objectives Investigations 2.1 – 2.3	Pacing: 5 days
<p style="text-align: center;">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>Vocabulary²: Appendix 2, Investigation 2</p>
	<p>Core Problems²: Comparing and Scaling , Investigation 2 ACE Problems 1-3,9,10, 4,5,22, 6-8,21,24</p>
	<p>Work Time¹: Comparing and Scaling, Problems 2.1 – 2.3</p>
	<p>Journal Entries¹: Appendix 3, Inv 2.1 – 2.3</p>
	<p>On Demand Tasks³: Appendix 5, Investigation 2</p>
	<p>Mathematical Reflection³ Appendix 4, MMR2:</p>
<p style="text-align: center;">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>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:</p> <ul style="list-style-type: none"> ○ How did you know that? ○ How can you use ...? ○ Can you show another way? ○ What convention did you use? <p>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.</p>

1. Marble Note Book

2.3 Ring Binder

3. Portfolio

Investigation 3: Comparing and Scaling Rates

Objectives Investigations 3.1 – 3.4	Pacing: 6 days
<p style="text-align: center;">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>Vocabulary²: Appendix 2, Investigation 3</p>
	<p>Core Problems²: Comparing and Scaling, Investigation 3 ACE Problems #1-3,9,10, 4,5,22, 6-8,21,24</p>
	<p>Work Time¹: Comparing and Scaling, Problems 3.1 – 3.4</p>
	<p>Journal Entries¹: Appendix 3, Inv. 3.1 – 3.4</p>
	<p>On Demand Tasks³: Appendix 5, Investigation 3</p>
	<p>Mathematical Reflection³ Appendix 4, MMR3:</p>
<p style="text-align: center;">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>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:</p> <ul style="list-style-type: none"> ○ How did you know that? ○ How can you use ...? ○ Can you show another way? ○ What convention did you use? <p>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.</p>

1. Marble Note Book

2.3 Ring Binder

3. Portfolio

Investigation 4: Making Sense of Proportions

Objectives Investigation 4.1 – 4.3	Pacing: 6 day
<p style="text-align: center;">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>Vocabulary²: Appendix 2, Investigation 4</p>
	<p>Core Problems²: Comparing and Scaling, Investigation 4 ACE Problems #1,2,15-17,3-5,25,26,14</p>
	<p>Work Time¹: Comparing and Scaling, Problem replace 4.1 – 4.3</p>
	<p>Journal Entries¹: Appendix 3, Inv 4.1 – 4.3</p>
	<p>On Demand Tasks³: Appendix 5, Investigation 4</p>
	<p>Mathematical Reflection³ Appendix 4, MMR4:</p>
<p style="text-align: center;">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>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:</p> <ul style="list-style-type: none"> ○ How did you know that? ○ How can you use ...? ○ Can you show another way? ○ What convention did you use? <p>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.</p>

1. Marble Note Book

2. 3 Ring Binder

3. Portfolio

<i>Project</i>¹	<p>The project is the culminating assessment, which will allow students to apply what they learned about the use of ratio, proportion, and percent. It is written in MCAS form to give students the experience of answering an open-response question.</p> <p>The unit project is called ‘<i>Central Middle School Fall Festival Attendance</i>’ and the student handout for the project can be found in Appendix 1</p>
Student work should be placed in portfolio	

Appendix 1 Unit Project

1. portfolio

Unit Project Scoring Guide

Score	Description
<u>4</u>	ates an exemplary understanding of the Data Analysis, Statistics, and Probability concepts and problem solving with a circle graph. The student finds a missing percent of the circle graph, the graph, converts percents to fractions, and uses proportional reasoning to find actual cents.
<u>3</u>	The student response demonstrates a good understanding of the Data Analysis, Statistics, and Probability concepts involved in interpreting data and problem solving with a circle graph. Although there is significant evidence that the student recognizes and applies the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
<u>2</u>	The student response demonstrates a fair understanding of the Data Analysis, Statistics, and Probability concepts involved in interpreting data and problem solving with a circle graph. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
<u>1</u>	The student response demonstrates a minimal understanding of the Data Analysis, Statistics, and Probability concepts involved in interpreting data and problem solving with a circle graph.
<u>0</u>	The student response contains insufficient evidence of an understanding of the Data Analysis, Statistics, and Probability concepts involved in interpreting data and problem solving with a circle graph to merit any points.

NAME: _____

DATE: _____

Central Middle School Fall Festival Attendance

- 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.

2006, Mathematics - Grade 7

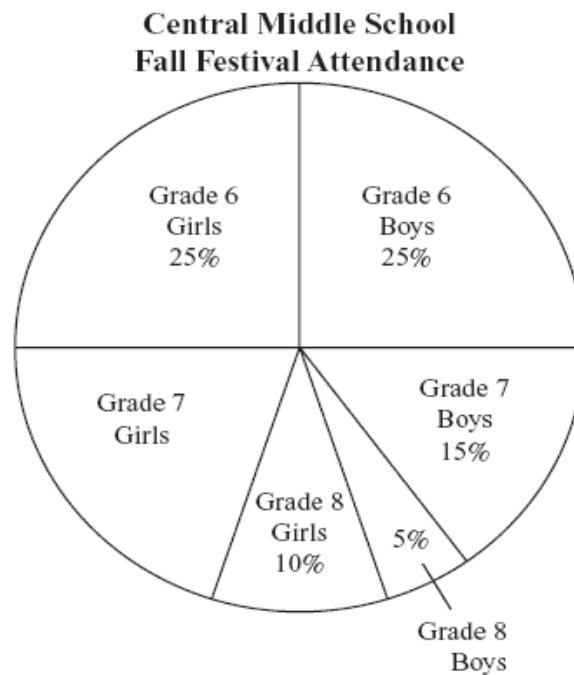
Question 29: Open-Response

Reporting Category: Data Analysis, Statistics, and Probability

Standard(s): 7.D.1



The circle graph below shows the student attendance at the Central Middle School Fall Festival.



- What percent of the students who attended the Fall Festival were grade 7 girls? Show or explain how you got your answer.
- What part of the students attending the Fall Festival were girls? Write your answer as a **fraction**. Show or explain how you got your answer.
- There were 32 grade 7 girls who attended the Fall Festival. What was the total number of students who attended the Fall Festival? Show or explain how you got your answer.

2006 MCAS Grade 7 Mathematics

Student Work: Question #29 - Score Point 4

⑨ 20% of grade 7 girls went to the fall festival. I found this out by adding $15 + 5 + 10 = 30$. Then subtracting $50 - 30 = 20$. So 20% of 7th grade girls went to the fall festival. I got the 15, 5, and 10 from the rest of the half a circle. When half was already taken up by Grade 6 I knew all I had to do is add and subtract from 50%.

⑩ $\frac{55}{100} = \frac{11}{20}$ of the students attending the fall festival were girls.

I added all the girls percents and then got 55% were girls. $\frac{55}{100} = \frac{11}{20}$. $\frac{11}{20}$ of the students were girls.

$$\begin{aligned} \text{⑪ } \frac{7^{\text{th}} \text{ grade girls}}{\text{percent}} &= \frac{x}{100} \\ \frac{32}{20} &= \frac{x}{100} & 20x &= 100(32) \\ & & \frac{20x}{20} &= \frac{3200}{20} \\ & & x &= 160 \end{aligned}$$

160 students were at the festival.

2006 MCAS Grade 7 Mathematics

Student Work: Question #29 - Score Point 3

a) Grade 7 girls - who attended 20%
You add all percents up then you subtract by

100.

b.) 60% percent were girls cause you add all girl percents to the percent that's missing for Grade 7 girls and you get 60%.

c.) $\left. \begin{array}{l} 20\% - 32 \text{ people} \\ 20\% - 32 \text{ people} \\ 20\% - 32 \text{ people} \\ 20\% - 32 \text{ people} \\ 20\% - 32 \text{ people} \end{array} \right\} = 100\%$
160 people attended

the Fall Festival. Because what you do is take the 20% from the 7 Grade girls and take 32 people, then what you do is take 4 other 20%'s and keep adding 32 people then eventually you have 160 people like I did above.

2006 MCAS Grade 7 Mathematics

Student Work: Question #29 - Score Point 2

a.) 20% of the students who attended the fall festival were seventh grade girls. I found this out by adding all of the other percentages together and subtracting them all by 100.

b.) 55% of the students who attended the fall festival were girls. I found this out by adding all of the girl percentages together.

c.) 152 people attended the Fall Festival I figured this out by relating the numbers to their percentages.

2006 MCAS Grade 7 Mathematics

Student Work: Question #29- Score Point 1

A.) 20% because if you add the grade 7 and 8 boy percentage together it is 20% and that is the same shape as the grade 7 girls.

B.) $\frac{183}{55}$ Because if you add all the girls percentages up it = 55% and you divide that by 3 because there were 3 sets of girl grades that went to the Festival.

C.) 139 students attended the festival and I figured out this problem by using guess and check.

Appendix 2 Vocabulary

Investigation 1:

- *ratio, percent, fractions, numerator, denominator, quantity*

Investigation 2:

- *scaling up, scaling down*

Investigation 3:

- *rate, unit rate, variables, independent variable, dependent variable, equation*

Investigation 4:

- *proportion*

Appendix 3 Journal Entries

Investigation 1:

Investigation 1.1:

How are the 60% and the 3 to 2 statement related?

Investigation 1.2:

How are the 60% and the 3 to 2 statement related?

Investigation 1.3:

How is a ratio different from a percent and from a fraction?

Investigation 2:

Investigation 2.1

If you were going to serve juice to 50 people, how many batches would you have to make if each person gets $\frac{1}{2}$ cup of juice? What are different strategies you might use to answer this question?

Investigation 2.2

What happens to the fraction when you add 1 to both the numerator and the denominator?

Investigation 2.3

What is an efficient method of finding a ratio equivalent to a given ratio? How do you choose what to multiply or divide by?

Investigation 3

Investigation 3.1

Describe any patterns you see in your rate table?

Investigation 3.2

Describe any patterns you see in your rate table?

Investigation 3.3

How do the dependent and the independent variables show up in an equation?

Investigation 3.4

How is labeling the quantities in division helpful?

Investigation 4

Investigation 4.1

If you know two shapes are similar, how do you use that information to find the values of two sets of corresponding parts when the value of one is missing?

Investigation 4.2

When you were finding ratios, rates, and unit rates in earlier problems, you had to be careful about the measurement units and labels for the quantities. Why?

Investigation 4.3

Describe your strategy for solving problems involving proportional reasoning.

Appendix 4 Reflections

MMR1

Give an example of a situation using each concept to compare 2 quantities:

- a. ratio
- b. percent
- c. fraction
- d. difference

MMR2

- a. Explain how you would scale up the ratio 10 boys to 14 girls to find equivalent ratios.
- b. Explain how you would scale down the ratio 10 boys to 14 girls to find equivalent ratio?

MMR3

How would you construct a rate table for green pepper prices at the two vegetable stands? Explain what the entries in the table tell.

MMR4

Write a problem that can be solved using the following proportion:

Sora rides her bike at a speed of 12 miles per hour

Now, write at least two different proportions for the problem you created. Show that the answer to the problem is the same no matter which proportion you use.

Appendix 5 On Demand Tasks

CMP2: Comparing and Scaling

<p><i>On-Demand Tasks</i></p> <p><u><i>Additional Practice & Skills Workbook</i></u></p> <p><u><i>Assessment Resources</i></u></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><u><i>After Inv. 1</i></u> <i>Additional Practice and Skills Workbook #1-6 pg 42</i></p> <p><u><i>After Inv. 2</i></u> <i>Additional Practice and Skills Workbook #1-14 pg 47</i></p> <p><u><i>After Inv. 3</i></u> <i>Additional Practice and Skills Workbook #1-8 pg 52</i></p> <p><u><i>After Inv. 4</i></u> <i>Additional Practice and Skills Workbook #1-8 pg 52</i> <i>CMP Assessment Resources p. 61 #11 - 13</i></p>
---	---

HPS Mathematics Scoring Rubric

Score	Description
<u>4</u>	The response shows a <u>comprehensive</u> understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has <u>completed the task(s)</u> correctly, using mathematically sound procedures. It contains <u>clear, complete explanations</u> and/or <u>adequate work required</u> .
<u>3</u>	The response shows a <u>general</u> understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has <u>completed the task(s)</u> , using mathematically sound procedures. It contains <u>complete explanations</u> and/or <u>adequate work required</u> .
<u>2</u>	The response shows a <u>basic</u> understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It addresses <u>most aspects of the task(s)</u> , using mathematically sound procedures. It may contain a correct solution but provides <u>incomplete procedures, reasoning and/or explanations</u> . It may reflect <u>some misunderstandings</u> of the underlying mathematical concepts and/or procedures.
<u>1</u>	The response shows a <u>minimal</u> understanding of the mathematical concepts and/or procedures embodied in the task(s). It addresses <u>some elements of the task(s)</u> correctly but reaches an <u>inadequate solution and/or provides reasoning that is faulty or incomplete</u> . It exhibits <u>multiple flaws related to a misunderstanding of important aspects</u> of the task(s), misuse of mathematical procedures, or faulty mathematical reasoning. It reflects a <u>lack of essential understanding</u> of the underlying mathematical concepts. It may contain a correct numerical answer but <u>the required work is not provided</u> .
<u>0</u>	The response is <u>completely incorrect, irrelevant, or incoherent</u> , or contains a correct response arrived at using an <u>obviously incorrect procedure</u> .

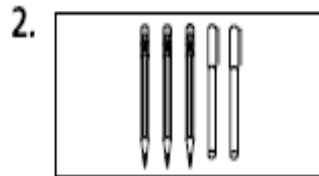
NAME: _____

DATE: _____

Investigation 1

- 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.

Write three ratios that each diagram can represent.



The table at the right shows the results of a survey. Write a ratio for each comparison.

3. *Tacos to Pizza*

4. *Pizza to Tacos*

5. *Tacos to the total*

6. *Pizza to the total*

Which Meal Do You Want for the Party?

Tacos	Pizza
###	### ##
###	###

NAME: _____ DATE: _____

Investigation 2

Find the value that makes the ratios equal.

1. 4 to 10, 2 to \square

2. 51 to 18, \square to 6

3. $\frac{12}{12}, \frac{\square}{20}$

4. $\frac{15}{7}, \frac{\square}{21}$

5. $\frac{28}{56}, \frac{\square}{14}$

6. 36 to 12, \square to 1

Find the value that makes each sentence correct.

7. $\frac{4}{5} = \frac{\square}{15}$

8. $\frac{8}{\square} = \frac{4}{15}$

9. $\frac{3}{2} = \frac{21}{\square}$

10. $\frac{\square}{5} = \frac{32}{20}$

11. $\frac{7}{8} = \frac{\square}{32}$

12. $\frac{5}{4} = \frac{15}{\square}$

13. 8 to 12 = \square to 6

14. 9 : 12 = 3 : \square

NAME: _____

DATE: _____

Investigation 3

Write the unit rate for each situation.

1. travel 250 miles in 5 hours
2. earn \$75.20 in 8 hours
3. read 80 pages in 2 hours
4. type 8,580 words in 2 hours 45 minutes
5. manufacture 2,488 parts in 8 hours
6. 50 copies of a book on 2 shelves
7. \$30 for 6 books
8. 24 points in 3 games

NAME: _____

DATE: _____

Investigation 4A

Solve each proportion for the missing value.

1. $\frac{k}{8} = \frac{14}{4}$

2. $\frac{u}{3} = \frac{10}{5}$

3. $\frac{14}{6} = \frac{d}{15}$

4. $\frac{5}{1} = \frac{m}{4}$

5. $\frac{36}{32} = \frac{n}{8}$

6. $\frac{5}{30} = \frac{1}{x}$

7. $\frac{t}{4} = \frac{5}{10}$

8. $\frac{9}{2} = \frac{v}{4}$

9. $\frac{x}{10} = \frac{6}{4}$

10. $\frac{8}{12} = \frac{2}{b}$

11. $\frac{v}{15} = \frac{4}{6}$

12. $\frac{3}{18} = \frac{2}{s}$

NAME: _____

DATE: _____

Investigation 4B

For Exercises 11–13, use the map below.



11. What would be the approximate driving time to travel from Seattle to New York at an average speed of 55 miles per hour?
12. An airplane averages 500 miles per hour. Choose two cities on the map, and find out how long would it take this plane to fly between them.
13. How far is it from your city to Chihuahua, Mexico?

NOTES