



# Holyoke Public Schools

## Grade 7

### Moving Straight Ahead

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# 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
<b>3 Ring Binder</b>  <b>(3R)*</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>Marble Notebook</b>  <b>(MNB)</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>Portfolio<sup>3</sup></b>  <b>(P)</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

# 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.

- *Do the variables in the problem have a linear relationship to each other?*
- *What patterns in the problem suggest that it is linear?*
- *How can the linear pattern be represented in a problem, a table, in a graph, or with an equation?*
- *How do changes in one variable affect changes in a related variable?*
- *How are these changes captured in a table, graph, or equation?*
- *How can tables, graphs, and equations of linear relationships be used to express and answer questions?*

## **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  $\langle \ \rangle$ ?*

*What are the ways you could  $\langle \ \rangle$ ?*

*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  $\langle \ \rangle$ ?*

*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  $\langle \dots \rangle$  to help you understand the task. Can you show us what you did and tell us how it helped you?*

*Where do you see  $\langle \ \rangle$  in your  $\langle$ model, diagram, number line, chart, etc. $\rangle$ ?*

*How can we see  $\langle \ \rangle$  in your  $\langle$ model, diagram, number line, chart, etc. $\rangle$ ?*

*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:

*Recognize problem situations in which 2 or more variables have a linear relationship to each other.*

*Construct tables, graphs, and symbolic equations that express linear relationships.*

*Translate information about linear relations given in a table, graph, or an equation to one of the other forms.*

*Understand the connections between linear equations and the patterns in the tables and graphs of those equations; rate of change, slope, and y- intercept.*

*Solve linear equations.*

*Solve problems and make decisions about linear relationships using information given in tables, graphs and symbolic expressions*

*Use tables, graphs, and equations of liner relations to answer questions*

## Math Content Standards:

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

*7.P.3 Create and use symbolic expressions for linear relationships and relate them to verbal, tabular, and graphical representations.*

*7.P.4 Solve linear equations using tables, graphs, models, and algebraic methods.*

*7.P.5 Identify describe, and analyze linear relationships between two variables. Compare positive rate of change, e.g.,  $y - 3x + 1$ , to negative rate of change, e.g.,  $y = -3x + 1$*

*7.P.6 Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate.*

## Performance Standards:

*M3b Represents relationships with tables, graphs in a coordinate plane in verbal or symbolic rules.*

*M3c Analyzes tables, graphs, and rules to determine functional relationships.*

*M3d Find solutions for unknown quantities in linear equations and in simple equations and inequalities.*

# Investigation 1: Walking Rates

<p><b><u>Objectives</u></b> Investigations 1.1 -- 1.4</p>	<p><b><u>Pacing:</u></b> 6 days</p>
<p style="text-align: center;"><b><i>Evidence of Learning Artifacts</i></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><u>Vocabulary</u><sup>2</sup>:</b> <a href="#">Appendix 2</a>, Investigation 1</p>
	<p><b><u>Core Problems</u><sup>2</sup>:</b> Moving Straight Ahead, Investigation 1 ACE Problems: # 1,2,3,4,5,6,8, 10,12,14</p>
	<p><b><u>Work Time</u><sup>1</sup>:</b> Moving Straight Ahead, Problems 1.1 -- 1.4</p>
	<p><b><u>Journal Entries</u><sup>1</sup>:</b> <a href="#">Appendix 3</a>, Inv 1.1 -- 1.4</p>
	<p><b><u>On Demand Tasks</u><sup>3</sup>:</b> <a href="#">Appendix 5</a>, Investigation 1</p>
<p><b><u>Mathematical Reflection</u><sup>3</sup></b> <a href="#">Appendix 4</a>, MMR1:</p>	
<p style="text-align: center;"><b><i>Accountable Talk</i></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>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"> <li>○ How did you know that?</li> <li>○ How can you use ...?</li> <li>○ Can you show another way?</li> <li>○ What convention did you use?</li> </ul> <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: Exploring Linear Functions with Graphs & Tables

<p><b><u>Objectives</u></b> Investigations 2.1 – 2.4</p>	<p><b><u>Pacing:</u></b> 5 days</p>
<p style="text-align: center;"><b><i>Evidence of Learning Artifacts</i></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><u>Vocabulary</u><sup>2</sup>:</b> <a href="#">Appendix 2</a>, Investigation 2</p> <hr/> <p><b><u>Core Problems</u><sup>2</sup>:</b> Moving Straight Ahead , Investigation 2 ACE Problems: #1, 29 – 32, 2 – 5, 6,7,10, 16, 22- 28</p> <hr/> <p><b><u>Work Time</u><sup>1</sup>:</b> Moving Straight Ahead, Problems 2.1 – 2.4</p> <hr/> <p><b><u>Journal Entries</u><sup>1</sup>:</b> <a href="#">Appendix 3</a>, Inv 2.1 – 2.4</p> <hr/> <p><b><u>On Demand Tasks</u><sup>3</sup>:</b> <a href="#">Appendix 5</a>, Investigation 2</p> <hr/> <p><b><u>Mathematical Reflection</u><sup>3</sup></b> <a href="#">Appendix 4</a>, MMR2:</p>
<p style="text-align: center;"><b><i>Accountable Talk</i></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>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"> <li>○ How did you know that?</li> <li>○ How can you use ...?</li> <li>○ Can you show another way?</li> <li>○ What convention did you use?</li> </ul> <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: Solving Equations

<p><b><u>Objectives</u></b> Investigations 3.1 – 3.5</p>	<p><b><u>Pacing:</u></b> 7 days</p>
<p><b><i>Evidence of Learning Artifacts</i></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><u>Vocabulary</u><sup>2</sup>:</b> <a href="#">Appendix 2</a>, Investigation 3</p> <p><b><u>Core Problems</u><sup>2</sup>:</b> Moving Straight Ahead, Investigation 3 ACE Problems# 2-4, 28, 30, 5-8, 10, 12 –13, 39, 40, 43, 16 – 19, 21</p> <p><b><u>Work Time</u><sup>1</sup>:</b> Moving Straight Ahead, Problems 3.1 – 3.5</p> <p><b><u>Journal Entries</u><sup>1</sup>:</b> <a href="#">Appendix 3</a>, Inv 3.1 – 3.5</p> <p><b><u>On Demand Tasks</u><sup>3</sup>:</b> <a href="#">Appendix 5</a>, Investigation 3</p> <p><b><u>Mathematical Reflection</u><sup>3</sup></b> <a href="#">Appendix 4</a>, MMR3:</p>
<p><b><i>Accountable Talk</i></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>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"> <li>○ How did you know that?</li> <li>○ How can you use ...?</li> <li>○ Can you show another way?</li> <li>○ What convention did you use?</li> </ul> <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: Exploring Slope

<b>Objectives</b> Investigation 4.1 – 4.3	<b>Pacing:</b> 6 day
<p style="text-align: center;"><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>Vocabulary</b><sup>2</sup>: <a href="#">Appendix 2</a>, Investigation 4</p>
	<p><b>Core Problems</b><sup>2</sup>: Moving Straight Ahead, Investigation 4 ACE Problems: #1,2,15-17,3-5,6-14</p>
	<p><b>Work Time</b><sup>1</sup>: Moving Straight Ahead, Problem 4.1 – 4.3</p>
	<p><b>Journal Entries</b><sup>1</sup>: <a href="#">Appendix 3</a>, Inv 4.1 – 4.3</p>
	<p><b>On Demand Tasks</b><sup>3</sup>: <a href="#">Appendix 5</a>, Investigation 4</p>
	<p><b>Mathematical Reflection</b><sup>3</sup> <a href="#">Appendix 4</a>, MMR4:</p>
<p style="text-align: center;"><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>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"> <li>○ How did you know that?</li> <li>○ How can you use ...?</li> <li>○ Can you show another way?</li> <li>○ What convention did you use?</li> </ul> <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>

<sup>1</sup> .Marble Note Book

<sup>2,3</sup> Ring Binder

<sup>3</sup>. Portfolio

## Appendix 1 Unit Project

<p style="text-align: center;"><b><i>Project</i><sup>1</sup></b></p> <p>Student work should be placed in portfolio</p>	<p>The project is the culminating assessment, which will allow students to apply what they learned about linear relationships. It is written in MCAS form to give students the experience of answering an open-response question.</p> <p>The unit project is called ‘Danny’s New Bike’ and the student handout for the project can be found in <a href="#">Appendix 1</a></p>
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*1. portfolio*

### Unit Project Scoring Guide

Score	Description
<u><b>4</b></u>	The student response demonstrates an exemplary understanding of the Patterns, Relations, and Algebra concepts involved in creating expressions and relating them to tabular and graphical representations. The student uses the table to interpret the pattern and show the relationship in a graph. Then the student uses the table or graph to create an expression for the linear relationship.
<u><b>3</b></u>	The student response demonstrates a good understanding of the Patterns, Relations, and Algebra concepts involved in creating expressions and relating them to tabular and graphical representations. 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><b>2</b></u>	The student response demonstrates a fair understanding of the Patterns, Relations, and Algebra concepts involved in creating expressions and relating them to tabular and graphical representations. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
<u><b>1</b></u>	The student response demonstrates a minimal understanding of the Patterns, Relations, and Algebra concepts involved in creating expressions and relating them to tabular and graphical representations.
<u><b>0</b></u>	The student response contains insufficient evidence of an understanding of the Patterns, Relations, and Algebra concepts involved in creating expressions and relating them to tabular and graphical representations to merit any points.

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

## UNIT PROJECT; Danny's New Bike

- *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.*

### Project

Danny saved money to buy a bike that cost a total of \$150. He saved the same amount of money each week until he had enough money to pay for the bike. The table below shows how much money Danny still needed at the end of each of the first five weeks of saving.

**Money Still Needed for Bike  
at End of Week**

Week Number	Money Needed
1	\$135
2	\$120
3	\$105
4	\$ 90
5	\$ 75

- How much money did Danny save each week? Show or explain how you got your answer.
- On the grid in your Student Answer Booklet, graph the data from the table. Be sure to title your graph and label the axes.
- How much money did Danny still need to save after he had saved for 7 weeks? Show or explain how you got your answer.
- Write an equation that could be used to find  $a$ , the amount of money Danny still needed to save after he saved for  $w$  weeks.

# 2006 MCAS Grade 7 Mathematics

## Student Work: Question #39 - Score Point 4

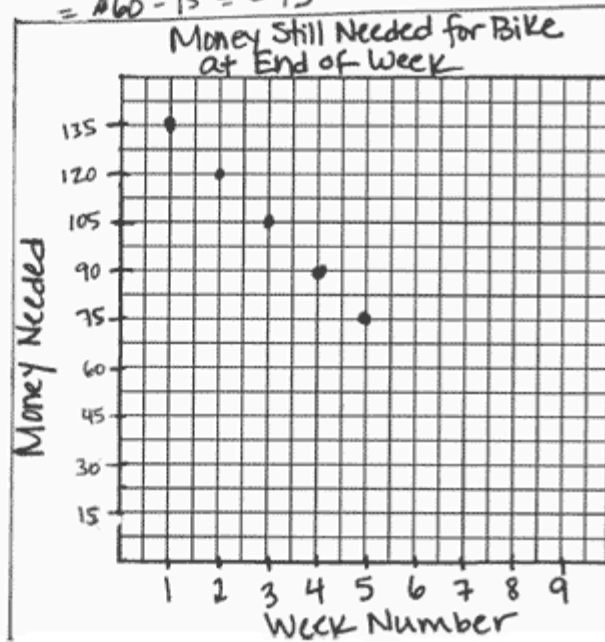
$20 = \$15$  } Danny saved 15 dollars each  
 $5 = \$15$  } week

grid below

needed after 5 weeks = \$75  
" " 6 " = \$75 - 15 = \$60  
" " 7 " = \$60 - 15 = \$45

needs \$45 after

-15w



# 2006 MCAS Grade 7 Mathematics

## Student Work: Question #39 - Score Point 3

A. 
$$\begin{array}{r} \$150 \\ -135 \\ \hline \$15 \end{array}$$

$$\begin{array}{r} 135 \\ -15 \\ \hline 120 \end{array}$$

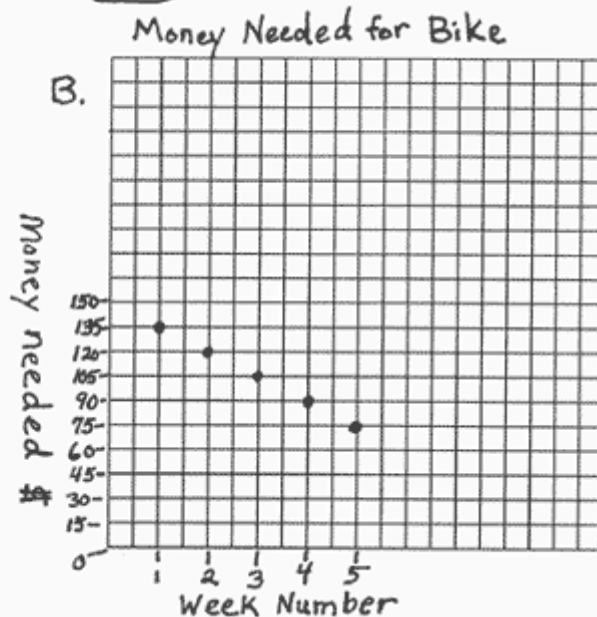
$$\begin{array}{r} 120 \\ -15 \\ \hline 105 \end{array}$$

$$\begin{array}{r} 105 \\ -15 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 90 \\ -15 \\ \hline 75 \end{array}$$

C. \$45 If the pattern of him saving \$15 a week keeps up he should need \$30 or \$15 for 2 weeks less than week five. So  $\begin{array}{r} 75 \\ -30 \\ \hline \$45 \end{array}$

D.  $a = w15$



# 2006 MCAS Grade 7 Mathematics

## Student Work: Question #39 - Score Point 2

a. Dany needs to save \$15 every week.

work.

$$\begin{array}{r} \$135 \\ -120 \\ \hline \$15 \end{array} \quad \begin{array}{r} \$120 \\ -105 \\ \hline \$15 \end{array} \quad \begin{array}{r} \$105 \\ -90 \\ \hline \$15 \end{array} \quad \begin{array}{r} \$90 \\ -75 \\ \hline \$15 \end{array}$$

c. Dany still needed to save \$45.

work.

$$\begin{array}{r} \$75 \\ -15 \\ \hline \$60 \end{array} \quad \begin{array}{r} 60 \\ -15 \\ \hline \$45 \end{array}$$

D.  $\frac{a}{w} = M$

$a = \$45 = M + \$15$

$w = 7$

B. Money still needed for bike at end of week

Week Number	Money Needed
1	\$135
2	\$120
3	\$105
4	\$90
5	\$75

## 2006 MCAS Grade 7 Mathematics

### Student Work: Question #39 - Score Point 1

A Danny saved \$15 on week one, on week two \$30, on week three \$45, on week four \$60, and on week five \$75. So he saved \$15 each week.

C.

## Appendix 2 Vocabulary

### **Investigation 1:**

- *linear relationships, linear functions*

### **Investigation 2:**

- *y-intercept, coefficient*

### **Investigation 3:**

- *properties of equality, point of intersection, solutions, solving the equation*

### **Investigation 4:**

- *slope, rise and run*

# Appendix 3 Journal Entries

## **Investigation 1:**

### ***Investigation 1.1:***

How is the walking rate represented in the graphs?

### ***Investigation 1.2:***

What effect does a walking rate have on the relationship between time and distance?

### ***Investigation 1.3:***

What are the coordinates of the point where each graph intercepts the y axis? What information does this point represent?

### ***Investigation 1.4:***

Compare the rates of change in this Problem with other rates that we have studied so far in this unit

## **Investigation 2:**

### ***Investigation 2.1***

How did your group interpret the problem? What strategy did you use?

### ***Investigation 2.2***

How does the pair of values, (10, 55) from the table show up on the graph and how is it related to the equation?

### ***Investigation 2.3***

In a linear situation describe how you can find a value of a variable if the value of the corresponding variable is known?

### ***Investigation 2.4***

How can you tell from the rate if the y values are increasing, decreasing or staying the same as the x values increase?

## **Investigation 3**

### ***Investigation 3.1***

How can you use a graph to solve  $20 = 5 + 0.5d$ , and what would the answer mean?

### ***Investigation 3.2***

What are some common strategies that we can use to maintain equality?

### ***Investigation 3.3***

Describe the general method for solving equations

### ***Investigation 3.4***

How can you get rid of or “undo” the operation, but still maintain equality?

## **Investigation 4**

### ***Investigation 4.1***

Apply what you have learned to a ladder. How can you use this info to help make sense of steepness? What would make a ladder feel steep? What would make the ladder feel less steep

### ***Investigation 4.2***

As  $x$  increases one unit, how does  $y$  increase? How is this change represented on the table? On the graph?

### ***Investigation 4.3***

Are the lines  $y = 5x + 2$  and  $y = -0.2x$  perpendicular? Why?

### ***Investigation 4.4***

How many points are on the line formed in Problem 4.4? Could you name them all? Explain

# Appendix 4 Reflections

## MMR1

How does the pattern of change for a linear relationship show up in a table, graph, and an equation of the relationship?

## MMR2

Summarize what you know about a linear represented by an equation In the form  $y = mx + b$ .

## MMR3

Compare the symbolic method for solving linear equations to the methods of using a table or graph.

## MMR4

For parts (a) and (b), explain how you can write an equation of a line from the information.

Use examples to illustrate your thinking.

- (a) the slope and the y-intercept of the line
- (b) two points on the line

## MMR5

~~Insert mathematical reflection 5 entry~~

# Appendix 5 On Demand Tasks

## CMP2: Moving Straight Ahead

<p><b><i>On-Demand Tasks</i></b></p> <p><b><i><u>Additional Practice &amp; Skills</u></i></b></p> <p><b><i><u>Workbook</u></i></b></p> <p><b><i><u>Assessment Resources</u></i></b></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><a href="#"><u>After Inv. 1</u></a> ACE #7 pg 14</p> <p><a href="#"><u>After Inv. 2</u></a> ACE #22-28 pg 39</p> <p><a href="#"><u>After Inv. 3</u></a> ACE #14-16 pg 59</p> <p><a href="#"><u>After Inv. 4</u></a> ACE #24-26 pg 82</p>
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## HPS Mathematics Scoring Rubric

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

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.*

The students in Ms. Chang's class decide to order water bottles that advertise the walkathon. Maliik obtains two different quotes for the costs of the bottles.

**Fill It Up** charges \$4 per bottle.

**Bottles by Bob** charges \$25 plus \$3 per bottle.

- For each company, write an equation Maliik could use to calculate the cost for any number of bottles.
- On the same set of axes, graph both equations from part (a). Which variable is the independent variable? Which is the dependent variable?
- Which company do you think the class should buy water bottles from? What factors influenced your decision?
- For what number of water bottles is the cost the same for both companies?

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

## Investigation 2

- *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.*

For Exercises 22 – 28, consider the following equations:

i.  $y = 2x$

ii.  $y = -5x$

iii.  $y = 2x - 6$

iv.  $y = -2x + 1$

v.  $Y = 7$

22. Which equation has a graph you can trace to find the value of  $x$  that makes  $8 = 2x - 6$  a true statement?
23. How does finding a solution to  $8 = 2x - 6$  help you find the coordinates of a point on the line of the equation  $y = 2x - 6$ ?
24. Which equation has a graph that contains the point  $(7, -35)$ ?
25. The following two points lie on the graph that contains the point  $(7, -35)$ . Find the missing coordinate for each point.  
 $(-1.2, \underline{\quad})$       $(\underline{\quad}, -15)$
26. Which equations have a positive rate of change?
27. Which equations have a negative rate of change?
28. Which equations have a rate of change equal to zero?

NAME: \_\_\_\_\_

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### Investigation 3

- 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.

14. Use properties of equality and numbers to solve each equation for  $x$ . Check your answers.

a.  $3x + 5 = 20$

b.  $3x - 5 = 20$

c.  $3x + 5 = -20$

d.  $-3x + 5 = 20$

e.  $-3x - 5 = -20$

15. Solve each equation. Check your answers.

a.  $3(x + 2) = 12$

b.  $3(x + 2) = x - 18$

c.  $3(x + 2) = 2x$

d.  $3(x + 2) = -15$

16. Two students' solutions to the equation  $6(x + 4) = 3x - 2$  are shown. **Both students made an error.** Find the errors and give a correct solution.

#### Student 1

$$6(x + 4) = 3x - 2$$

$$\text{---}X + 4 = 3x - 2 - 6$$

$$\text{---}X + 4 = 3x - 8$$

$$X + 4 + 8 = 3x - 8 + 8$$

$$\text{---}X + 12 = 3x$$

$$\text{---}12 = 2x$$

$$\text{---}X = 6$$

#### Student 2

$$6(x + 4) = 3x - 2$$

$$\text{---}6x + 4 = 3x - 2$$

$$\text{---}3x + 4 = -2$$

$$3x + 4 - 4 = -2 -$$

$$3x = -6$$

$$\text{---}x = -2$$

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

### **Investigation 4**

- *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.*

For each equation in Exercises 24 – 26, do parts (a)-(d).

24.  $y = x$

25.  $y = 2x - 2$

26.  $y = -0.5x + 2$

- a. Make a table of x and y values for the equation.
- b. Sketch a graph of the equation.
- c. Find the slope of the line.
- d. Make up a problem that can be represented by each equation.

# NOTES