



Holyoke Public Schools

Grade 6

Prime Time

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| CURRICULUM MAPS OUTLINE | |
| <u>Map Goals:</u> | |

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 |
|--|--|---|---|
| 3 Ring Binder (3R)* | <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> |
| Marble Notebook (MNB) | <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> |
| Portfolio³ (P) | <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.

- *Will breaking a number into factors help me solve the problem?*
- *What relationships are revealed by doing that?*
- *What do the factors and multiples of the numbers tell me about the situation?*
- *How can I find the factors of the numbers?*
- *How can I find the multiples?*
- *What common factors and common multiples do the numbers have?*

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:

- *Understand relationships among factors, multiples, divisors and products*
- *Recognize and use properties of prime and composite numbers, even and odd numbers, and square numbers*
- *Use rectangles to represent the factor pairs and numbers*
- *Develop strategies for finding factors and multiples, least common multiples, and greatest common factors*
- *Recognize and use the fact that every whole number can be written in exactly one way as a product of prime numbers*
- *Use factors and multiples to solve problems and to explain some numerical facts of everyday life*
- *Develop a variety of strategies for solving problems- building models, making lists and tables, drawing diagrams, and solving simpler problems*

Math Content Standards:

- *(6.N.1) Apply number theory concepts—including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2, 3, 4, 5, 6, 9, and 10—to the solution of problems.*
- *(6.N.8) Apply number theory concepts of common factor, common multiple, and divisibility rules for 2, 3, 5 and 10 to the solution of problems. Demonstrate an understanding of the concepts of prime and composite numbers.*
- *(6.N.11) Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, −, ×, ÷)*
- *(6.P.1) Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns*

Performance Standards:

- *M1a) Adds, subtracts, multiplies, and divides whole numbers, with and without calculators.*
- *(M1f) Describes and compares quantities by using whole numbers up to 10,000; that is:*
- *finds, identifies, and sorts numbers by their properties, e.g., odd, even, multiple, square.*

- *(M6a) Adds, subtracts, multiplies, and divides whole numbers correctly; that is:*
- *Knows single digit addition, subtraction, multiplication, and division facts;*
- *Multiplies and divides numbers with one or 2 digits.*
- *(M7a) Uses appropriate mathematical terms, vocabulary, and language, based on prior conceptual work.*
- *(M7b) Shows mathematical ideas in a variety of ways, including words, numbers, symbols, pictures, charts, graphs, tables, diagrams, and models.*
- *(M7c) Explains solutions to problems clearly and logically, and supports solutions with evidence, in both oral and written work.*

Investigation 1: Factors and Products

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|---|---|
| <p><u>Objectives</u> Investigations 1.1 – 1.3</p> | <p><u>Pacing:</u> 5 days</p> |
| <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> <hr/> <p><u>Core Problems</u>²: Prime Time , Investigation 1 ACE Problems: #1- 8, 10-13, 15 - 16, 19 - 21, 23-24, 27, 35-37</p> <hr/> <p><u>Work Time</u>¹: Prime Time , Problems 1.1 – 1.3</p> <hr/> <p><u>Journal Entries</u>¹: Appendix 3, Inv # 1.1,1.2,1.3</p> <hr/> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 1</p> <hr/> <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: Whole Number Patterns and Relationships

| | |
|---|--|
| <p><u>Objectives</u> Investigations 2.1 – 2.3</p> | <p><u>Pacing:</u> 4 days</p> |
| <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 2</p> <hr/> <p><u>Core Problems</u>²: Prime Time , Investigation 2 ACE Problems # 1-8, 10-17, 19, 21, 23, 27, 28</p> <hr/> <p><u>Work Time</u>¹: Prime Time , Problems #2.1 – 2.3</p> <hr/> <p><u>Journal Entries</u>¹: Appendix 3, Inv #2.1, 2.2, 2.3</p> <hr/> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 2</p> <hr/> <p><u>Mathematical Reflection</u>³ Appendix 4, MMR2:</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...? ○ How can you justify...? ○ Does your answer make sense? ○ Can you draw a diagram? <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: Common Multiples and Common Factors

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|---|--|
| <p><u>Objectives</u> Investigations 3.1 – 3.4</p> | <p><u>Pacing:</u> 6 days</p> |
| <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 3</p> <hr/> <p><u>Core Problems</u>²: Prime Time , Investigation 3 ACE Problems: :#1-3, 10 -11, 15-19, 24-26, 30</p> <hr/> <p><u>Work Time</u>¹: Prime Time , Problems 3.1 - 3.4</p> <hr/> <p><u>Journal Entries</u>¹: Appendix 3, Inv #3.1, 3.2, 3.3, 3.4</p> <hr/> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 3</p> <hr/> <p><u>Mathematical Reflection</u>³ Appendix 4, MMR3:</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"> ○ What is your strategy? ○ How could you check that ... is correct? ○ Could you begin with a different step? ○ Does make sense given the information in the problem? <p>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.</p> |

1. Marble Note Book
2.3 Ring Binder
3. Portfolio

Investigation 4: Factorizations: Searching For Factor Strings

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|---|--|
| <p><u>Objectives</u> Investigation 4.1 – 4.3</p> | <p><u>Pacing:</u> 5 days</p> |
| <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 4</p> <hr/> <p><u>Core Problems</u>²: Prime Time , Investigation 4 ACE Problems#1-7, 12,14,19-21, 25, 27-29, 32</p> <hr/> <p><u>Work Time</u>¹: Prime Time , Problem #4.1 – 4.3</p> <hr/> <p><u>Journal Entries</u>¹: Appendix 3, Inv #4.1, 4.2, 4.3</p> <hr/> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 4</p> <hr/> <p><u>Mathematical Reflection</u>³ Appendix 4, MMR4:</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 5: Putting It All Together

| | |
|---|--|
| <p><u>Objectives</u> Investigations (only 5.1).</p> | <p><u>Pacing:</u> 3 days</p> |
| <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 5</p> <hr/> <p><u>Core Problems</u>²: Prime Time , Investigation 5 ACE Problems: #1-3,5-6,11,13-15</p> <hr/> <p><u>Work Time</u>¹: Prime Time , Problem 5.1 only</p> <hr/> <p><u>Journal Entries</u>¹: Appendix 3, Inv 5.1</p> <hr/> <p><u>On Demand Tasks</u>³: Appendix 5, Investigation 5</p> <hr/> <p><u>Mathematical Reflection</u>³ Appendix 4, MMR5:</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 decide to.....? ○ How does this connect to other math we have learned? ○ 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*

Appendix 1 Unit Project

| | |
|--|--|
| <p style="text-align: center;"><i>Project</i>¹</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 the use of algebraic notation and reasoning. It is written in MCAS form to give students the experience of answering an open-response question.</p> <p>The unit project is called ‘Exercise Program’ and the student handout for the project can be found in Appendix 1</p> |
|--|--|

1. portfolio

Unit Project Scoring Guide

| Score | Description |
|-----------------|---|
| <u>4</u> | The student response demonstrates an exemplary understanding of the Number Sense and Operations concepts involved in the applications of number theory, including common factors, least common multiple, and divisibility rules, to the solution of problems. The student applies the concepts of factors, multiples, and least common multiple in a problem-solving situation. |
| <u>3</u> | The student response demonstrates a good understanding of the Number Sense and Operations concepts involved in the applications of number theory, including common factors, least common multiple, and divisibility rules, to the solution of problems. 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 Number Sense and Operations concepts involved in the applications of number theory, including common factors, least common multiple, and divisibility rules, to the solution of problems. 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 Number Sense and Operations concepts involved in the applications of number theory, including common factors, least common multiple, and divisibility rules, to the solution of problems. |
| <u>0</u> | The student response contains insufficient evidence of an understanding of the Number Sense and Operations concepts involved in the applications of number theory, including common factors, least common multiple, and divisibility rules, to the solution of problems to merit any points |

NAME: _____

DATE: _____

UNIT PROJECT: Bakery Celebration

- *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.*

A local bakery celebrated its one-year anniversary on Saturday. On that day, every fourth customer received a free cookie. Every 6th customer received a free muffin.

- a. Did the 30th customer receive a free cookie, a free muffin, both, or neither? Show and explain how you got your answer.
 - b. Casey was the first customer to receive a free cookie and a free muffin. What number customer was Casey? Show and explain how you got your answer.
 - c. Tom entered the bakery after Casey. He received a free cookie only. What number customer could Tom have been? Show and explain how you got your answer.
- On that day, the bakery gave away a total of 29 free cookies. What was the total of free muffins the bakery gave away on that day? Show and explain how you got your answer.

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Student Work: Question #10 - Score Point 4

- Ⓐ The 30th customer will receive a muffin. I know this because 30 can't be divided by 4 (so no cookie) however it can be divided by 6. The customer will receive 1 muffin.
- Ⓑ Casey must have been customer number 12. I know this is true because it is the first number that can be divided by both 6 and 4.
- Ⓒ Tom could have been customer 16. I know this because it's the first number after 12 that can be divided by only 4.
- Ⓓ There were 19 muffins given away. I found my answer by first doing 29×4 . I got 116. Then I did 116 divided by 6 because every 6th customer got a muffin. $116 \div 6 = 19.\bar{3}$. That's about 19. So 19 muffins were given away that day.

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Student Work: Question #10 - Score Point 3

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Student Work: Question #10 - Score Point 2

A) The 30th customer will receive a free muffin because if you multiply 6×5 you will get 30.

B) 12 customer because 12 is the lowest common multipul of 6 and 4.

C) 13

D) 30 muffins

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Student Work: Question #10 - Score Point 1

a.) Both, because thirty is divisible by six and four.

b.) 12, because twelve is divisible by six and four.

c.) Thirteen, because thirteen is a prime number.

d.) 29 free muffins, because it had to be equal.

Appendix 2 Vocabulary

Investigation 1:

- *whole number, factor, divisor, proper factors, prime number, composite number, multiple, square number, divisible by*

Investigation 2:

- *factor pair, dimensions, square numbers, even and odd numbers, Venn diagram, intersection, greatest common factor (GCF), least common multiple (LCM), conjecture*

Investigation 3:

- *common multiples, common factors, greatest common factor (GCF), least common multiple (LCM)*

Investigation 4:

- *factorization, exponent, multiplication symbols: Raised dot and parentheses*

Investigation 5:

- *(reinforce previous vocabulary)*

Appendix 3 Journal Entries

Investigation 1:

Investigation 1.1:

How do you know when you have found all of the factors of a number?

Investigation 1.2:

What is the best first move? Why?

Investigation 1.3:

Using the terms factor, divisor, multiple, product and divisible by, write as many statements as you can about the number sentence $4 \times 7 = 28$ (ACE #17)

Investigation 2:

Investigation 2.1

How far do you have to go in checking numbers to be sure you have found all the factors?

Investigation 2.2

How can you tell whether the sum of several numbers will be even or odd? How can you tell whether the product of several numbers will be even or odd?

Investigation 2.3

How are Venn diagrams useful for showing relationships among numbers?

Investigation 3

Investigation 3.1

Describe a strategy for finding common multiples.

Investigation 3.2

How can we tell when the least common multiple will be the product of the two (or more) numbers given, and when the least common multiple will be less than the product of the two or more numbers given?

Investigation 3.3

Describe how you can find common factors and the greatest common factors of 2 numbers

Investigation 3.4

What signals situations where finding common multiples or common factors can be useful

Investigation 4

Investigation 4.1

How do you know you have found the longest string?

Investigation 4.2

Describe your strategy for finding the prime factorization of a number

Investigation 4.3

If we find the product of two numbers, will the product be a common multiple of the factors?

Investigation 5

none

Appendix 4 Reflections

MMR1

Write something new that you have learned about your special number now that you have played the Factor Game and the Product Game.

Would your special number be a good first move in either game? Why or why not?

MMR2

Write about your special number

- What can you say about your number now?
- Is your number even?
- Is it odd?
- List the factor pairs for your number.

MMR3

Choose a second number to use with your special number. Find the LCM and GCF of these 2 numbers?

MMR4

Write the prime factorization of your number

MMR5

What new things can you say about your special number?

Appendix 5 On Demand Tasks

CMP2: Prime Time

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|---|--|
| <p><i>On-Demand Tasks</i></p> <p><u><i>Additional Practice & Skills</i></u></p> <p><u><i>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>After Inv. 1</u> Additional practice and Skills #1B,pg.1 ACE #17, pg. 15</p> <p><u>After Inv. 2</u> ACE #9, pg. 30</p> <p><u>After Inv. 3</u> ACE #27, pg.43</p> <p><u>After Inv. 4</u> ACE # 26.pg.57</p> <p><u>After Inv. 5</u> none</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.*

Use the clues to determine the secret number.

CLUE 1: The number is prime.

CLUE 2: The number is less than 19

CLUE 3: The sum of the digits of the number is greater than 7.

(ACE #17, pg. 15)

Using the terms factor, divisor, multiple, product and divisible by, write as many statements as you can about the number sentence $4 \times 7 = 28$

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.*

Luke has chosen a mystery number. His number is greater than 12 and less than 40, and has exactly three factors. What might his number be? Use the display of rectangles for the numbers 1 to 30 from Problem 2.1 to help you find Luke's number. You may also need to think about what the displays for the numbers 31 to 40 would look like.

NAME: _____

DATE: _____

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.*

Mr. Mendoza and his 23 students are planning to have hot dogs at their class picnic. Mr. Mendoza can buy hot dogs in packages of 12 and hot dog buns in packages of 8.

- a. Mr. Mendoza plans that everyone will get the same number of hot dogs and buns and there will be no leftovers. What are the least number of hot dog packages and the least number of bun packages Mr. Mendoza can buy? How many hot dogs and buns will each person get?

- b. Suppose that the class invites the principal, the secretary, the bus driver, and 3 parents to help supervise. How many packages of hot dogs and buns will Mr. Mendoza have to buy so that everyone will get the same number of hot dogs and buns with no leftovers? How many hot dogs and buns will each person get?

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.*

Mr. and Mrs. Fisk have 8 children. Each of those children has 8 children. How many grandchildren do Mr. and Mrs. Fisk have? If each grandchild has 8 children, how many great-grandchildren do Mr. and Mrs. Fisk have?

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NOTES