



Holyoke Public Schools Mathematics Curriculum Map Grade 2

Measuring Length and Time

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Curriculum Maps

GOALS:

1. To ensure that students are exposed to a rigorous curriculum in every school and every grade.
2. To have consistent instruction and assessment district wide.
3. To prepare students for the MCAS test.
4. To explain what is expected to be covered in each CMP or Investigations Unit.

EXPECTATIONS:

The district's expectation is for students to successfully meet the Massachusetts Mathematics Standards. In order to help facilitate this, teachers are required to follow the curriculum maps. The successful implementation of these maps requires teachers to thoroughly read each lesson in the TE and work through the project and problems in the map and the text prior to planning their lessons. Work should be kept in the binder with the curriculum map. Working through the math is an essential part of lesson planning, as it helps the teacher to better understand the concept being taught and the students' possible misunderstandings.

FEEDBACK TO STUDENTS:

Feedback needs to happen daily in the classroom. There are many ways to give feedback. Conferencing, observations, questions asked during your opening, work time and closing are all forms of feedback.

MAP COMPONENTS:

1. GENERAL PROBING QUESTIONS
2. UNIT SPECIFIC PROBING QUESTIONS
3. GOALS OF UNIT, CONTENT STANDARDS, & PERFORMANCE STANDARDS
4. PROJECT- to be done at end of unit and kept in the portfolio.
 - o STUDENT MASTER – for project
5. INVESTIGATIONS:
 - o NOTEBOOK - includes: 3 Ring Binder, Bound Notebook, Portfolio
 - o ACCOUNTABLE TALK – using probing questions
5. ON-DEMAND ASSESSMENTS - to be done during teaching of unit.
 - o STUDENT MASTERS- for on-demand assessments.

Mathematics

Evidence of Learning Artifacts

Artifact	K - 1	2 - 5	6 - 8
<i>3 Ring Binder (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 (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>Portfolio³ (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

Measuring Length and Time Probing Questions for Accountable Talk

As students progress through this unit, they should be asked the following questions to assess their knowledge about problem situations that involve measuring length and time with standards and non-standard units.

What is length?

What is width?

How do you measure length longer than 12 inches? 24 inches?

Which measuring tool would you use to measure... why?

Which is more accurate to use, standard or non-standard units, and why?

How can you use a timeline to calculate the duration of an event?

How many minutes are in a quarter-hour?

How many minutes are in a half-hour?

Classroom Routines

Classroom Routines:

What Time Is It?: Sessions 1.3, 1.6, 2.3, 3.4, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7

Quick Images: Sessions: 1.1, 1.4, 2.1, 3.2, 3.5

Toady's Number: Sessions: 1.2, 1.5, 2.2, 3.3, 4.1

How Many Pockets: Sessions: 3.1

Classroom Routines occur at regular intervals, perhaps during morning meeting, or at another convenient time. These short activities, designed to take no longer than **10 minutes**, support and balance the in depth work of each curriculum unit. After their first introduction in a math session, **they are intended for use outside of math time**. Some teachers use them to bring the whole class together just before or after lunch or recess or at the beginning or end of the day.

Implementing Investigations in Grade 2: Please review page 25- 40 for Classroom Routines.

Additional Probing Questions for Accountable Talk

The teacher's role in probing for understanding is to ask questions that will:

- Clarify student understanding
- Get at the objective of the lesson
- Go deeper into the mathematics
- Uncover misconceptions and misunderstandings
- Compare and contrast

The students' role is to be an active participant by:

- Explaining their strategies
- Asking clarifying questions to teacher and other students
- Being active listeners
- Using the language of mathematics

When probing for understanding the teacher and students can use one or more of these suggested questions:

- Why are you using $< >$?
- What are the ways you could $< >$?
- What else do you know?
- How do you know that?
- Can you show that?
- What convention did you use here?
- What can you do if you do not know?
- What standard does this work apply to?
- Is this always true?
- How does this connect to other mathematics we have learned?
- What is the same and what are the differences between $< >$?
- Can you back that up?
- Where is the math in your sketch?
- What does the answer mean?
- Does the answer make sense?
- Could you have used another operation to solve this task?
- Can you give examples?
- Can you say it another way?
- What's the math?
- Tell me about the task in your own words?
- What are you trying to find?
- How did you make your estimate?
- Will your answer be an over-estimate or an under-estimate? Why?
- I noticed that you used $< \dots >$ to help you understand the task. Can you show us what you did and tell us how it helped you?
- Where do you see $< >$ in your $<$ model, diagram, number line, chart, etc. $>$?
- How can we see $< >$ in your $<$ model, diagram, number line, chart, etc. $>$?
- You have used a representation that is different from others that I've seen. Can you show us your $<$ model, diagram, number line, chart, etc. $>$, and tell us how it helped you?
- How did you decide to solve the task? Why did you choose that method?
- Did you try any method that didn't work?
 - Tell us what you tried.
 - Why didn't it work?
 - Would it ever work?

Goals, Content Standards, & Performance Standards

Unit Goals:

- Identify sources of measurement error
- Recognize that the same count of different-sized units yields different lengths
- Recognize that, when measuring the same length, larger units yields smaller counts
- Measure object using inches and centimeters
- Use a ruler to measure lengths longer than one foot
- Solve problem involving the beginning time of an event, ending time of an event, and duration of the event; given two of these, find the third for event beginning and ending on the half-hour
- Use a timeline to record and determine duration to hour and half-hour

Math Content Standards:

- (2.M.1) Compare the length, weight, area, and volume of two or more objects by using direct comparison.
- (2.M.2) Measure and compare common objects using metric and English units of length Measuring Length and Time, e.g., centimeter, inch.
- (2.M.3) Select and correctly use the appropriate Measuring Length and Time tools, e.g., ruler, balance scale, thermometer. *
- (2.M.4) Make and use estimates of Measuring Length and Time, including time, volume, weight, and area.
- (2.M.5) Select and correctly use the appropriate measurement tools, e.g., ruler, balance scale, thermometer. :
- (2.M.6) Make and use estimates of measurement, including time, volume, weight, and area.

Performance Standards:

- M2g Uses basic ways of estimating and measuring the size of figures and objects in the real world including length, width, perimeter, and area.
- M2i Selects and uses units, both formal and informal as appropriate, for estimating and measuring quantities such as weight, length, area and volume.
- M2j Carries out simple unit conversions, such as between cm and m, and between hours and minutes.

UNIT: Measuring Length and Time

End-of-Unit Project

GRADE: 2

End-of-Unit Project (P)

Student work should be placed in portfolio (P).

The project is the culminating assessment which will allow students to apply what they learned in the unit. It is written in MCAS form to give students the experience of answering an open-response question.

End-of-Unit Assessment: Unit 9, M32, M33, M34, M35 from Resource Binder, “Resources Masters and Transparencies”

UNIT: MEASURING LENGTH AND TIME

Investigation 1 (1.1 – 1.6)

DAYS: 7

GRADE: 2

<p>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><i>Vocabulary</i> – length, width, measure, estimate, height, unit</p> <p><i>Work Time</i> – Student Sheets 1-18</p> <p><i>Journal Entries</i> – *Maximum 5 minutes</p> <p>Inv. 1.2 What strategy did you use to estimate the number of yellow and blue strips you needed to measure an object?</p> <p>Inv. 1.3 Name three tools you could use to measure an object or distance.</p> <p>Inv. 1.5 How did you find the difference between your longest and shortest jump?</p> <p><i>Reflection</i> – Name one non-standard unit of measurement that you have used in class. Name two classroom objects you could easily measure with it and two that you would not measure with it and why.</p>
<p>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><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</i></p> <p><i>What is length?</i> <i>What is width?</i> <i>How do you measure length longer than 12 inches? 24 inches?</i> <i>Which measuring tool would you use to measure... why?</i> <i>Which is more accurate to use, standard or non-standard units, and why?</i> <i>How can you use a timeline to calculate the duration of an event?</i> <i>How many minutes are in a quarter-hour?</i> <i>How many minutes are in a half-hour?</i></p> <p><i>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

UNIT: MEASURING LENGTH AND TIME

Investigation 2 (2.1 – 2.3)

DAYS: 4

GRADE: 2

<p>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><i>Vocabulary</i> – inch, measurement, accurately</p> <p><i>Work Time</i> – Student Sheets 19-30</p> <p><i>Journal Entries</i> – *Maximum 5 minutes</p> <p>Inv. 2.1 How did you use inch blocks to figure out how long Pim jumped?</p> <p>Inv. 2.3 Which tool would you use to measure objects longer than 24 inches? Why?</p> <p><i>Reflection</i> – Which tool would you use to measure objects longer than 24 inches? Why?</p>
<p>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><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question</i></p> <p><i>What is length?</i></p> <p><i>What is width?</i></p> <p><i>How do you measure length longer than 12 inches? 24 inches?</i></p> <p><i>Which measuring tool would you use to measure... why?</i></p> <p><i>Which is more accurate to use, standard or non-standard units, and why?</i></p> <p><i>How can you use a timeline to calculate the duration of an event?</i></p> <p><i>How many minutes are in a quarter-hour?</i></p> <p><i>How many minutes are in a half-hour?</i></p> <p><i>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

UNIT: MEASURING LENGTH AND TIME

Investigation 3 (3.1 – 3.5)

DAYS: 6

GRADE: 2

<p>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>Vocabulary – unit, footlength, ruler, tape measure, yardstick, inch, foot, benchmark, metric system, centimeter, meter</p> <p>Work Time – Student Sheets 31-48</p> <p>Journal Entries – *Maximum 5 minutes</p> <p>Inv. 3.2 Why did you use a tape measure, not a ruler to measure your height?</p> <p>Inv. 3.3 How did you keep track of how many units you measured?</p> <p>Inv. 3.5 If a yellow pencil measure 7 inches and a blue pencil measures 7 cm, which pencil is longer? Why?</p> <p>Reflection – What are similarities and differences about the two sides of the ruler?</p>
<p>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><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</i></p> <p><i>What is length?</i> <i>What is width?</i> <i>How do you measure length longer than 12 inches? 24 inches?</i> <i>Which measuring tool would you use to measure... why?</i> <i>Which is more accurate to use, standard or non-standard units, and why?</i> <i>How can you use a timeline to calculate the duration of an event?</i> <i>How many minutes are in a quarter-hour?</i> <i>How many minutes are in a half-hour?</i></p> <p><i>These are some recommended questions that you might use. Others can be found be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

UNIT: MEASURING LENGTH AND TIME

Investigation 4 (4.1 – 4.7)

DAYS: 8

GRADE: 2

<p>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><i>Vocabulary</i> – timeline, half-hour, a.m., p.m., quarter-hour, midnight, noon, interval, duration</p> <p><i>Work Time</i> – Student Sheets 49-70</p> <p><i>Journal Entries</i> – *Maximum 5 minutes</p> <p>Inv. 4.2 How would you use a timeline to figure out how many hours are in a school day?</p> <p>Inv. 4.4 How are a timeline and an analog clock similar? How are they different?</p> <p><i>Reflection</i> – How many half-hours there are in the school day, if the school day starts at 9 a.m. and ends at 3 p.m. Which tool would you use and why?</p>
<p>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><i>As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:</i></p> <p><i>What is length?</i></p> <p><i>What is width?</i></p> <p><i>How do you measure length longer than 12 inches? 24 inches?</i></p> <p><i>Which measuring tool would you use to measure... why?</i></p> <p><i>Which is more accurate to use, standard or non-standard units, and why?</i></p> <p><i>How can you use a timeline to calculate the duration of an event?</i></p> <p><i>How many minutes are in a quarter-hour?</i></p> <p><i>How many minutes are in a half-hour?</i></p> <p><i>These are some recommended questions that you might use. Others can be found at the beginning of the map and on the probing question sheet in the district mathematics guide.</i></p>

End-of-Unit Project

Student work should be placed in **portfolio (P)**.

The project is the culminating assessment which will allow students to apply what they learned about problem situations that involve measuring length and time with standards and non-standard units. It is written in MCAS form to give students the experience of answering an open-response question.

NAME: _____

DATE: _____

End-of-Unit Project

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all work (diagrams, tables, and computations) on your answer sheet.**
- **If you do the work in your head, explain in writing how you did the work.**

Inches and Centimeters

1. Use a ruler to measure this line twice. First measure in inches, and then in centimeters.



The line measures _____ inches.

The line measures _____ centimeters.

Which unit gives you a greater number? _____

Explain why you think that is.

2. Use your ruler to measure the adding machine tape in **inches**.

The adding machine tape is _____ inches long.

Explain how you figured out the length of the tape.

Chris's Story: Timeline Problems

On Saturday, Chris got up at 9:00 A.M. It was raining. He ate breakfast and read a book for a while. An hour and a half after he got up, it stopped raining.

- 1.** What time did it stop raining? _____

At 11:30 A.M., he played with his baby sister, Serena, for a half hour.

- 2.** When did Chris stop playing with Serena?

In the afternoon, he went to the movies with his friends. The movie was an hour and a half long. It ended at 2:00 P.M.

- 3.** When did the movie start? _____

He played outside from 4:00 P.M. to 6:30 P.M.
Then He went inside for dinner.

- 4.** How long did Chris play outside? _____

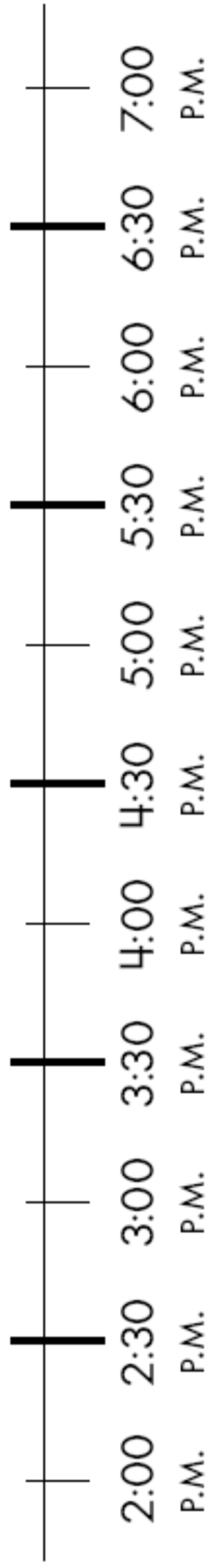
Chris's Story: Timeline Problems (*continued*)

5. Explain how you figured out how long Chris played outside.

On the timeline show:

1. When it rained
2. When Chris played with his sister, Serena
3. When Chris was at the movies
4. When Chris played outside

Chris's Story: Timeline



On-Demand Assessments

(To be filed in portfolio)

Measuring Length and Time Investigations

In class individualized On-Demand tasks assess knowledge of mathematical facts, operations, concepts, and skills, and their efficient application to problem solving. The results of these different forms of assessment provide rich profiles of students' achievements in mathematics and serve as the basis for identifying curricula and instructional approaches to best develop their talents.

UNIT: MEASURING LENGTH AND TIME

On-Demand Assessments

GRADE: 2

On-Demand Assessments (P)

Measuring Length and Time Investigations

In class individualized On-Demand tasks assess knowledge of mathematical facts, operations, concepts, and skills, and their efficient application to problem solving. The results of these different forms of assessment provide rich profiles of students' achievements in mathematics and serve as the basis for identifying curricula and instructional approaches to best develop their talents.

Inv. 1: Resource Binder: Session 1.6, M6 **

Inv. 2: (no On-Demand)

Inv. 3: Resource Binder: Session 3.1, M13**

Inv. 4: (no On-Demand)

*Assessment Checklists should be kept with tracking sheets

***Please refer to the section in the Teacher's Unit Guide entitled, "Professional Development" for examples of student work for each assessment.**

Name _____

Date _____



Measuring Length and Time

Assessment: A Measurement Disagreement

Sally and Jake both measured the teacher's desk in their classroom. Sally said that it was 8 units, and Jake said that it was 15 units.

Why did these two children get different counts when they measured the same desk? Name 3 possible reasons.

1. _____

2. _____

3. _____

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Holyoke Public Schools

Mathematics Scoring Rubric

Score point 4:

The response shows a **comprehensive** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has **completed the task(s) correctly**, using mathematically sound procedures. It contains **clear, complete explanations** and/or **adequate work required**.

Score point 3:

The response shows a **general** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has **completed the task(s)**, using mathematically sound procedures. It contains **complete explanations** and/or **adequate work required**.

Score point 2:

The response shows a **basic** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It addresses **most aspects of the task(s)**, using mathematically sound procedures. It may contain a correct solution but provides **incomplete procedures, reasoning and/or explanations**. It may reflect **some misunderstandings** of the underlying mathematical concepts and/or procedures.

Score point 1:

The response shows a **minimal** understanding of the mathematical concepts and/or procedures embodied in the task(s). It addresses **some elements of the task(s) correctly** but reaches an **inadequate solution and/or provides reasoning that is faulty or incomplete**. It exhibits **multiple flaws related to a misunderstanding of important aspects** of the task(s), **misuse** of mathematical procedures, or faulty mathematical reasoning. It reflects a **lack of essential understanding** of the underlying mathematical concepts. It may contain a correct numerical answer but the **required work is not provided**.

Score point 0:

The response is **completely incorrect, irrelevant, or incoherent**, or contains a correct response arrived at using an **obviously incorrect procedure**.

NOTES