Holyoke Public Schools
Mathematics Curriculum Map
Grade 5

How Long Can You Stand On One Foot?

Table of Contents

Curriculum Maps

GOALS:

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

EXPECTATIONS:

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

FEEDBACK TO STUDENTS:

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

MAP COMPONENTS:

1. GENERAL PROBING QUESTIONS
2. UNIT SPECIFIC PROBING QUESTIONS
3. GOALS OF UNIT, CONTENT STANDARDS, & PERFORMANCE STANDARDS
4. PROJECT- to be done at end of unit and kept in the portfolio.
    - STUDENT MASTER – for project
5. INVESTIGATIONS:
    - NOTEBOOK - includes: Folder, Bound Notebook, Portfolio
    - ACCOUNTABLE TALK – using probing questions

5. ON-DEMAND ASSESSMENTS - to be done during teaching of unit.
    - STUDENT MASTERS- for on-demand assessments.

Mathematics
Evidence of Learning Artifacts

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

[*] *Folders may be used in place of binders for these grade levels*
[1] *Send home at the end of each unit*
[2] *Use grade level math journals*
[3] *All documents should be kept for the entire year*

How Long Can You Stand On One Foot?
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 data.

- *What is the best way to describe the data?*
- *What are you comparing?*
- *How will you effectively record and keep track of your data?*
- *When analyzing the data, when will you use the mode, median, and mean?*
- *How will you decide what data to collect to represent a question?*
- *How does the probability relate to what actually happened?*

Ten Minute Math

Continue from previous units:

Estimation and Number Sense
Quick Survey

Ten Minute Math activities offer practice and review of key concepts at each grade level. After their initial introduction, these short activities, designed to take place outside of math class (no longer than 10 minutes), support and balance the in-depth work of each curriculum unit.

Implementing Investigations in Grade 5: Please review pages 24 -26, 35 -36 for 2 Ten Minute Math activities in this unit.

Computer

Logo Paths

Additional Probing Questions for Accountable Talk

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

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

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

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

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

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

Goals, Content Standards, & Performance Standards

Benchmarks:

- Describe major features of a set of data represented in a line plot or a bar graph, and quantify the description by using the median or fractional parts of the data.
- Draw conclusions about how two groups compare based on summarizing the data for each group.
- Design and carry out experiments in order to compare two groups.
- Use a decimal, fraction, or percent to describe and compare the theoretical probabilities of events with a certain number of equally likely outcomes.

Math Content Standards:

5.P.6 Interpret graphs that represent the relationship between two variables in everyday situations.

5.D.1 Given a set of data, find the median, mean, mode, maximum, minimum, and range, and apply to solutions of problems.

5.D.2 Construct and interpret line plots, line graphs, and bar graphs. Interpret and label circle graphs.

5.D.3 Predict the probability of outcomes of simple experiments (e.g., tossing a coin, rolling a number cube) and test the predictions.

Performance Standards:

(M4 a) Collects data, organizes data, displays data with tables, charts and graphs that are appropriate.
(M4 b) Analyzes data with respect to characteristics to frequency and distribution, including mode and range.
(M4 c) Analyzes appropriately central tendencies of data by considering mean and median.
(M4 d) Makes conclusions and recommendations based on data analysis.
(M4 e) Critiques the conclusions and recommendations of others' statistics.
(M4 f) Considers the effects of missing or incorrect information.
(M4 g) Formulates hypotheses to answer a question and uses data to test hypotheses.

UNIT: How Long Can You Stand On One Foot?
End-of-Unit Project
GRADE: 5

End-of-Unit Project (P) Student work should be placed in **portfolio (P)**. The project is the culminating assessment which will allow students to apply what they learned in the unit. It is the end-of-unit assessment.	Resource Binder M 35 - 38

UNIT: HOW LONG CAN YOU STAND ON ONE FOOT?
Investigation 1 (1.1 – 1.4) DAYS: 5

GRADE: 5

Evidence of Learning Artifacts Journal and Reflection questions should be posted and referred to at the beginning of the appropriate *Investigation*. Journal and Reflection entries need to be done in class as part of the closure and assessment.	**(F) – Folder; (MNB) – marble notebook; (P) – portfolio** ***Vocabulary*** – data, experiment, line plot, range, median, spread of the data, typical, outlier, numerical data (F) ***Student sheets to be used as class work, homework, and/or review to support learning as appropriate.*** ***Journal Entries*** – (MNB) *Maximum 5 minutes #1 What is your strategy for finding the median in a set of data? ***Reflection*** – Student Activity Sheet 12 (P)
Accountable Talk To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.	*As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:* How did you know that? How can you use …? Can you show another way? What convention did you use? *These are some recommended questions that you might use. Others can be found be found at the beginning of the map and on the probing question sheet in the district mathematics guide.*

UNIT: HOW LONG CAN YOU STAND ON ONE FOOT?
Investigation 2 (2.1 – 2.6) DAYS: 6
GRADE: 5

Evidence of Learning Artifacts Journal and Reflection questions should be posted and referred to at the beginning of the appropriate *Investigation*. Journal and Reflection entries need to be done in class as part of the closure and assessment.	**(F) – Folder; (MNB) –marble notebook; (P) – portfolio** ***Vocabulary*** – multiple trials, plot, scale, axis, graph, measures of center (F) ***Student sheets to be used as class work, homework, and/or review to support learning as appropriate.*** ***Journal Entries*** – (MNB) *Maximum 5 minutes #1 When comparing two sets of data, describe which type of graph would best represent your experiment? ***Reflection*** – Student Activity Sheet p. 28 & 29 (P)
Accountable Talk To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.	*As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:* How did you know…? Can you solve the problem in a different way? Does your answer make sense? What was your strategy? *These are some recommended questions that you might use. Others can be found be found at the beginning of the map and on the probing question sheet in the district mathematics guide.*

UNIT: HOW LONG CAN YOU STAND ON ONE FOOT?
Investigation 3 (3.1 – 3.5) DAYS: 6
GRADE: 5

Evidence of Learning Artifacts Journal and Reflection questions should be posted and referred to at the beginning of the appropriate *Investigation*. Journal and Reflection entries need to be done in class as part of the closure and assessment.	**(F) – Folder; (MNB) –marble notebook; (P) – portfolio** ***Vocabulary*** – probability, fair, (F) ***Student sheets to be used as class work, homework, and/or review to support learning as appropriate.*** ***Journal Entry*** – (MNB) *Maximum 5 minutes **#1** When you look at the spins from the whole class, do you get different information than you got from just your own 50 spins? Explain. ***Reflection*** – Student Activity pp. 47 & 48 (P)
Accountable Talk To promote learning, explore solutions, and justify reasoning, conversations between students and students or students and teacher must be accountable – accountable to the learning community, to the mathematics discipline, and to rigorous thinking.	*As a result of this Investigation, students should be able to talk and manipulate the vocabulary of the Investigation in response to this type of question:* How did you know…? Can you solve the problem in a different way? Does your answer make sense? What was your strategy? *These are some recommended questions that you might use. Others can be found be found at the beginning of the map and on the probing question sheet in the district mathematics guide.*

End-of-Unit Project

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

The project is the culminating assessment which will allow students to apply what they learned about data.

Resource Binder M 35 – 38*

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

On-Demand Assessments

(To be filed in portfolio)

How Long Can You Stand On One Foot?
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: HOW LONG CAN YOU STAND ON ONE FOOT?

On-Demand Assessments

GRADE: 5

On-Demand Assessments (P) How Long Can You Stand On One Foot? 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:*** None ***Inv. 2:*** Resource Binder: Session 2.2, M22* assessment checklist M23-M24** ***Inv. 3:*** Attached MCAS format question

NAME: _____ **DATE:** _____

On-demand 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.**

2006, Mathematics - Grade 5
Question 10: Open-Response
Reporting Category: Data Analysis, Statistics, and Probability
Standard(s): 5.D.2

The table below shows a city's average temperature by month for the first six months of one year.

Average Temperature by Month

Month	Average Temperature (in Degrees Fahrenheit)
January	13°
February	20°
March	31°
April	46°
May	59°
June	68°

a. What is the range of the data for these six months? Show or explain how you got your answer.
b. On the grid in your Student Answer Booklet, make a bar graph to show the data in the table. Be sure to title your graph, label each axis, and use an appropriate scale.

Scoring Guide and Sample Student Work

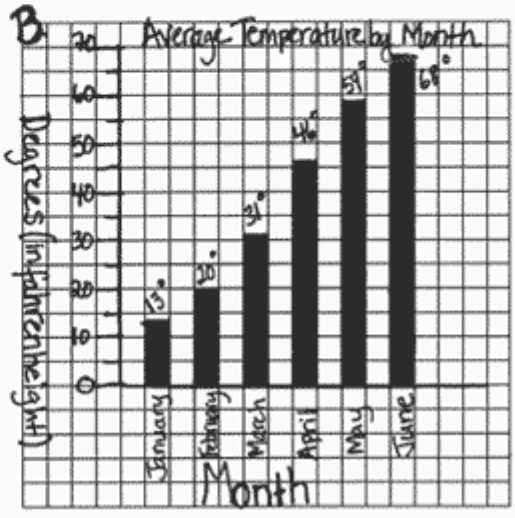
Select a score point in the table below to view the sample student response

Score	Description
4	The student response demonstrates an exemplary understanding of the Data Analysis, Statistics, and Probability concepts involved in finding the range of a data set and constructing a bar graph to represent the data.
3	The student response demonstrates a good understanding of the Data Analysis, Statistics, and Probability concepts involved in finding the range of a data set and constructing a bar graph to represent the data. 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.
2	The student response demonstrates a fair understanding of the Data Analysis, Statistics, and Probability concepts involved in finding the range of a data set and constructing a bar graph to represent the data. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Data Analysis, Statistics, and Probability concepts involved in finding the range of a data set and constructing a bar graph to represent the data.
0	The student response contains insufficient evidence of an understanding of the Data Analysis, Statistics, and Probability concepts involved in finding the range of a data set and constructing a bar graph to represent the data to merit any points.

2006 MCAS
Grade 5 Mathematics
Question 10 - Score Point 4

A. The range of the data is 55°F. The range is the difference between the minimum and the maximum, so I did 68-13=55. That's how I got my answer of 55°F.

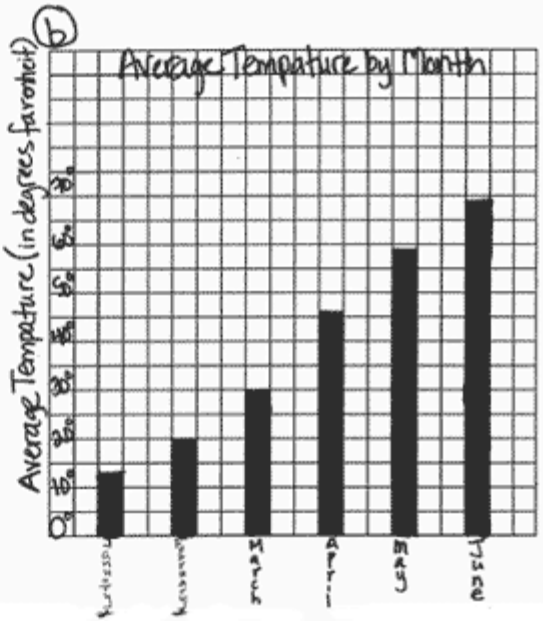
B



2006 MCAS
Grade 5 Mathematics
Question 10 - Score Point 3

(a) range = 81° I added the lowest and the highest tempature (13° + 68° = 81°), that's how I got 81° as an answer.

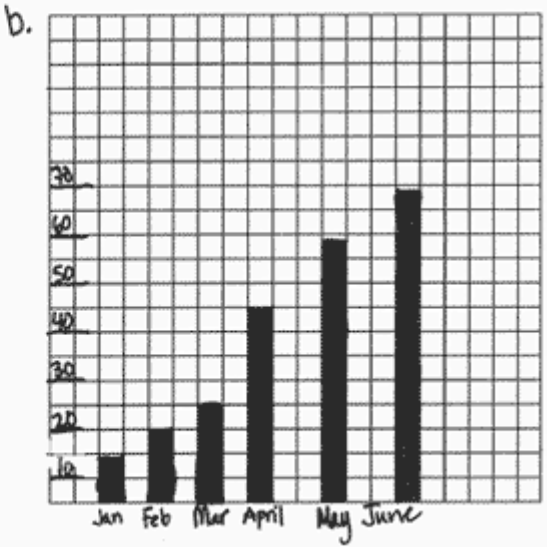
(b)



2006 MCAS
Grade 5 Mathematics
Question 10 - Score Point 2

a. 55

b.



2006 MCAS
Grade 5 Mathematics
Question 10 - Score Point 1

The range of those six months is 55°.

A) $\begin{array}{r} 68^\circ \\ -\ 13^\circ \\ \hline 55^\circ \end{array}$

Holyoke Public Schools
2007 - 2008
Mathematics
Scoring Rubric

Score point 4:
The response shows a ***comprehensive*** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has ***completed the task(s) correctly***, using mathematically sound procedures. It contains ***clear, complete explanations*** and/or ***adequate work required***.

Score point 3:
The response shows a ***general*** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It indicates that the student has ***completed the task(s)***, using mathematically sound procedures. It contains ***complete explanations*** and/or ***adequate work required***.

Score point 2:
The response shows a ***basic*** understanding of the mathematical concept(s) and/or procedures embodied in the task(s). It addresses ***most aspects of the task(s)***, using mathematically sound procedures. It may contain a correct solution but provides ***incomplete procedures, reasoning and/or explanations***. It may reflect ***some misunderstandings*** of the underlying mathematical concepts and/or procedures.

Score point 1:
The response shows a ***minimal*** understanding of the mathematical concepts and/or procedures embodied in the task(s). It addresses ***some elements of the task(s) correctly*** but reaches an ***inadequate solution and/or provides reasoning that is faulty or incomplete***. It exhibits ***multiple flaws related to a misunderstanding of important aspects*** of the task(s), ***misuse*** of mathematical procedures, or faulty mathematical reasoning. It reflects a ***lack of essential understanding*** of the underlying mathematical concepts. It may contain a correct numerical answer but the ***required work is not provided***.

Score point 0:
The response is ***completely incorrect, irrelevant, or incoherent***, or contains a correct response arrived at using an ***obviously incorrect procedure***.

NOTES