



Holyoke Public Schools  
Mathematics Curriculum Map  
Grade 4

Describing the Shape of the Data

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

# Mathematics

## Evidence of Learning Artifacts

<b>Artifact</b>	<b>K - 1</b>	<b>2 - 5</b>	<b>6 - 8</b>
<b><i>3 Ring Binder (3R)*</i></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><i>Marble Notebook (MNB)</i></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><i>Portfolio<sup>3</sup> (P)</i></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

## **Describing the Shape of the Data** **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 data.

- Which representation is best for analyzing the distribution of the data?
- How would you organize data to best represent a pattern?
- How would you decide what data to collect to represent a question?
- Compare the two sets, what do you notice?
- Is this typical for the data?
- What does the data tell you?

### ***Ten Minute Math***

Today's Number: Session 1.1

Quick Survey: Session 1.4

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 no longer than 10 minutes, support and balance the in-depth work of each curriculum unit.

Implementing Investigations in Grade 4: Please review pages 31 – 34 for 2 Ten Minute Math activities in this unit.

## 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:

- Design an effective survey question to compare two groups.
- Organize and represent data about two groups in order to compare the groups.
- Describe the shape of the data from a numerical data set, including where the data are concentrated and the highest, lowest, and median values.
- Use data to compare two groups.
- Use evidence from a set of data to support an argument.
- Describe the likelihood of an event in terms of a scale from impossible (probability of 0) to certain (probability of 1)

## Math Content Standards:

- (4.M.1) Demonstrate an understanding of such attributes as length, area, weight, and volume, and select the appropriate type of unit for measuring each attribute.
- (4.M.5) Identify and use appropriate metric and English units and tools (e.g. ruler, angle ruler, graduated cylinder, thermometer) to estimate, measure, and solve problems involving length, area, volume, weight, time, angle size, and temperature)
- (4.D.1) Collect and organize data using observations, measurements, surveys, or experiments and identify appropriate ways to display the data.
- (4.D.2) Match a representation of data with the actual set of data
- (4.D.3) Construct, draw conclusions, and make predictions from various representations of data sets including tables, bar graphs, pictographs, line graphs, line plots, and tallies.
- (4.D.4) Represent the probable outcomes for a simple probability situation e.g., the probability of drawing a red marble from a bag containing three red marbles and four green marbles.
- (4.D.5) List and count the number of possible combinations of objects from three sets, e.g., how many different outfits can one make from a set of three shirts, a set of 2 skirts, and a set of 2 hats?
- (4.D.6) Classify outcomes as certain, likely, unlikely, or impossible by designing and conducting experiments using concrete objects such as counters, number cubes, spinners, and coins.

## Performance Standards:

- (M4a) Collects and organizes data to answer a question or test a hypothesis by comparing sets of data
- (M4b) Displays data in a line plots, graphs, tables, and charts
- (M4c) Makes statements and draws simple conclusions based on data
- (M4d) Gather data about an entire group to understand the concept
- (M4e) Predicts results, analyzes data and finds out why some results are more likely, less likely, or equally likely.

# UNIT: DESCRIBING THE SHAPE OF THE DATA

## End-of-Unit Project

GRADE: 4

### 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 about data and reasoning. It is written in MCAS form to give students the experience of answering an open-response question.

#### Open Response Question 13



Look at the three graphs below. They show information about a class of fourth graders. The titles and labels are missing.

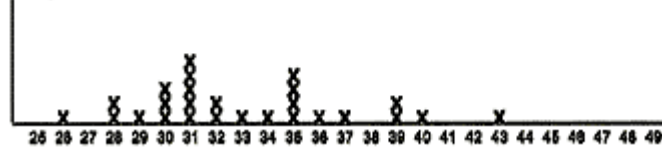
Graph 1



Graph 2



Graph 3



- Which graph would most likely be titled NUMBER OF BROTHERS AND SISTERS? Explain why you chose that graph.
- Which graph would most likely be titled AGES OF PARENTS OR GUARDIANS? Explain why you chose that graph.
- Choose a graph. Write a title for the graph. Explain how your title fits the information in the graph. You may NOT use the titles from parts a and b.

# UNIT: DESCRIBING THE SHAPE OF THE DATA

Investigation 1 (1.1 – 1.5)

DAYS: 5

GRADE: 4

<p><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>(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio</b></p> <p><i>Vocabulary</i> – data, bar graph, line plot, outlier, range, representation, median mode (3R)</p> <p><i>Work Time</i> – Student Activity Sheets pgs. 1 - 9 (3R)</p> <p><i>Journal Entries</i> – (MNB)</p> <p><b>Inv. 1.1</b> What is a fairly typical number or raisins in a box, according to our data? Explain how you know.</p> <p><b>Inv. 1.2</b> What would you expect if you measured the heights of more classes of fourth graders? Explain your answer.</p> <p><b>Inv. 1.3</b> Write at least two statements about what you notice about the data comparing first and fourth graders.</p> <p><b>Inv. 1.4</b> Based on the data we have collected what would you predict the height of a third grader to be? Explain your answer.</p> <p><b>Inv. 1.5</b> None due to assessment</p> <p><i>Reflection</i> – What does typical mean when analyzing data? (P)</p>
<p><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><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>How did you know that? How can you use ...? Can you show another way? What convention did you use?</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: DESCRIBING THE SHAPE OF THE DATA

Investigation 2 (2.1 – 2.7)

DAYS: 7

GRADE: 4

<p><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>(3R) – 3 ring binder; (MNB) –marble notebook; (P) – portfolio</b></p> <p><i>Vocabulary</i> –survey, numerical data, line plot, bar graph, conclusion, value (3R)</p> <p><i>Work Time</i> – Student Activity Book 10 – 38 (3R)</p> <p><i>Journal Entries</i> – (MNB)</p> <p><b>Inv. 2.1</b> What makes a good survey question?</p> <p><b>Inv. 2.2</b> Explain your system for organizing, collecting, and recording your responses.</p> <p><b>Inv. 2.3</b> Why did you choose to represent your data as you did? Explain your answer.</p> <p><b>Inv. 2.4</b> What did you learn from your classmates comments about your representation?</p> <p><b>Inv. 2.5</b> What strategies did you use to determine the identity of the mystery data?</p> <p><b>Inv. 2.6</b> If you went to a game in which Mabika was playing, how many points might you expect her to make? Why?</p> <p><b>Inv. 2.7</b> About how many points does Mabika score in a typical game? Explain your thinking.</p> <p><i>Reflection</i> – What are the important things to consider when constructing a representation of data for an audience? (P)</p>
<p><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><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>How did you know...?</p> <p>How can you justify...?</p> <p>Does your answer make sense?</p> <p>Can you draw me a diagram?</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: DESCRIBING THE SHAPE OF THE DATA

Investigation: 3.1 – 3.5      DAYS: 5

GRADE: 4

<p><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>(3R) – 3 ring binder; (MNB) – marble notebook; (P) – portfolio</b></p> <p><b>Vocabulary</b> – probability, certain, impossible, likely, unlikely, maybe (equally likely), chance, definite, outcome (3R)</p> <p><b>Work Time</b> – Student Activity Sheets #39 – 52 (3R)</p> <p><b>Journal Entries</b> – (MNB)</p> <p><b>Inv. 3.1</b> How would you describe the difference between an event in the maybe category and an event in the unlikely category?</p> <p><b>Inv. 3.2</b> How can you decide where to place an event on the likelihood line?</p> <p><b>Inv. 3.3</b> If a coin was tossed 10 times, what would you expect the outcomes to be and why?</p> <p><b>Inv. 3.4</b> How do the data from the 3 different experiments compare? How do the results compare with your predictions?</p> <p><b>Inv. 3.5</b> None due to assessment</p> <p><b>Reflection</b> – Choose one of the experiments in the Investigations and describe the shape of the data set using the terms; median, mode, range, and outlier.</p>
<p><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><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>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> <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>

# 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 and reasoning. It is written in MCAS form to give students the experience of answering an open-response question.

# End-of-Unit Project

## Describing the Shape of the Data

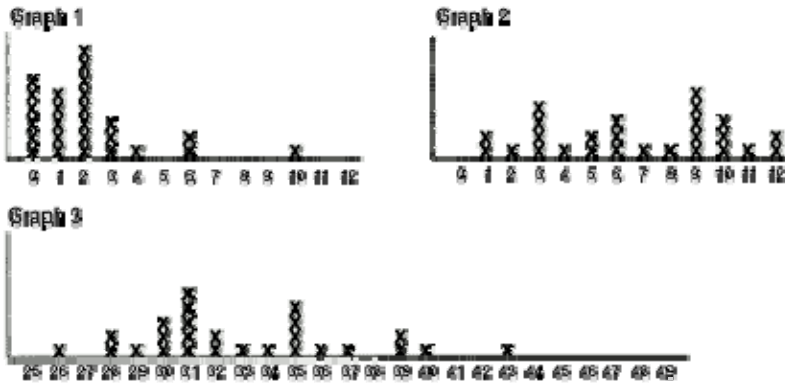
### Grade 4

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

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

- **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.**

Look at the three graphs below. They show information about a class of fourth graders. The titles and labels are missing.



a. Which graph would most likely be titled NUMBER OF BROTHERS AND SISTERS? Explain why you chose that graph.

b. Which graph would most likely be titled AGES OF PARENTS OR GUARDIANS? Explain why you chose that graph.

c. Choose a graph. Write a title for the graph. Explain how your title fits the information in the graph. You may NOT use the titles from parts a and b.

## Scoring Guide

Score	Description
4	The response shows a thorough understanding of data concepts by accurately identifying graphs for data sets and clearly and effectively communicating reasoning.
3	The response shows a general understanding of data concepts by identifying graphs for data sets and adequately communicating reasoning.
2	The response shows a basic understanding of data concepts by identifying some graphs for data sets and/or providing limited explanations of reasoning.
1	The response shows a minimal understanding of data concepts.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measure.
Blank	No response.

2001 MCAS Sample Student Work:

Grade 4 Mathematics

Question 13; Score Point 4

(A) I chose graph 1 because in graph 2, I do not think anybody has 42 brothers and sisters and in graph 3 it is not really a possibility that people have 12 brothers and sisters. So I chose graph 1 because it is a possibility that you have 10 brothers and sisters.

(B) I chose graph 3. I chose graph 3 because it is the only graph that a person could be old enough to have kids and the other graphs are not old enough.

(C) "It seems" I chose graph 2. I chose it because there ~~is~~ are good numbers. What I mean by numbers is people probably have one to 12 pets. So that's what I mean. Those were the numbers on graph 2.

## 2001 MCAS Sample Student Work:

### Grade 4 Mathematics

#### Question 11: Score Point 3

- (A) I chose graph 1 because most people don't have 12 buttons on shirts.
- (B) I chose 3 because most questions are not 1 to 13.
- (C) I chose the with number of pants for graph 2 because most people have pants.

Massachusetts Comprehensive Assessment System

2001 MCAS Sample Student Work:

Grade 4 Mathematics

Question 13; Score Point 2

- A. most likely graph A would be labeled  
Number of Brothers and Sisters.
- B. most likely graph C would be titled  
ages of Parents or Guardians,
- C. I choose graph A and the title for it  
is number of Pets because alot of people  
have 0, 1, or 2 pets.

## 2001 MCAS Sample Student Work:

Grade 4 Mathematics

Question 13; Score Point 1

- (A) 2 because they are a lot the same
- (B) 2 because parents are not 0 to 12.
- (C) The cups because it has a number days

# On-Demand Assessments

(To be filed in portfolio)

## Describing the Shape of the Data *Investigations*

In class individualized On-Demand Assessments 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: DESCRIBING THE SHAPE OF THE DATA

## On-Demand Assessments

GRADE: 4

### On-Demand Assessments (P)

Describing the Shape of the Data  
*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 1.5, M7 & M8\*

**Inv. 2:** None

**Inv. 3:** Resource Binder, Session 3.5, M18 – 21\*

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

Name \_\_\_\_\_

Date \_\_\_\_\_



**Describing the Shape of the Data**

# Assessment: Comparing Numbers of Cavities

(page 1 of 2)

**1a.** Make a line plot of the data about the number of cavities students have using the cavity data that your teacher distributes.

**1b.** What do these data tell you about the number of cavities students in your class have?

Consider the highest and lowest number of cavities and the outliers. Consider also where the data are concentrated and what you think is typical.

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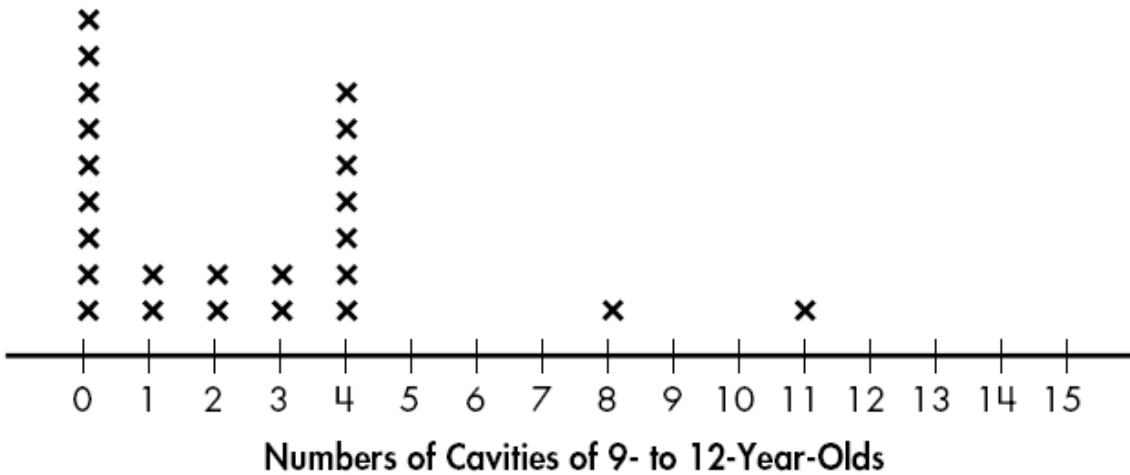
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# Assessment: Comparing Numbers of Cavities (page 2 of 2)

2. Below is data from a dentist in Massachusetts. He counted the number of cavities students in a group of 9- to 12-year-olds who visited his office have.



How does the number of cavities students in this group have compare with the number of cavities students in our class have?

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Name \_\_\_\_\_

Date \_\_\_\_\_






**Describing the Shape of the Data**

# End-of-Unit Assessment (page 1 of 4)

## Problem 1

### Likelihood Events

Use these Events to answer Questions A, B, and C on the next page.

<b>Event A:</b> The chance of rolling a number cube with the numbers 1, 2, 3, 4, 5, and 6 on it and getting a 4, 5, or 6.	
<b>Event B:</b> The chance of pulling a white marble out of this jar without looking:	
<b>Event C:</b> The chance of spinning an even number on this spinner:	
<b>Event D:</b> The chance of pulling a white marble out of this jar without looking:	
<b>Event E:</b> The chance of rolling a number cube like the one in Event A and getting a 10.	

© Pearson Education 4

Name \_\_\_\_\_

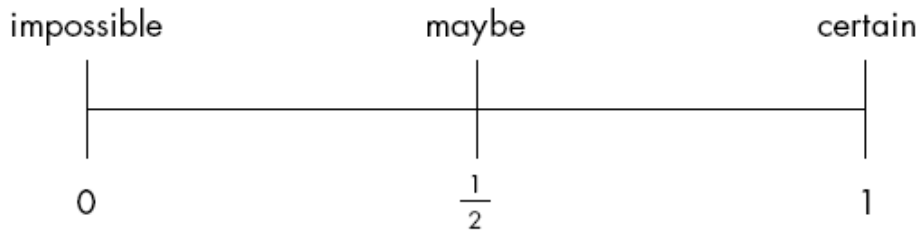
Date \_\_\_\_\_



**Describing the Shape of the Data**

# End-of-Unit Assessment (page 2 of 4)

**A.** Place the Events A through E on the Likelihood Line. Use letters to show where you think the event should go.



**B.** Where on the Likelihood Line did you place Event A?

\_\_\_\_\_

Why did you place Event A at this location on the likelihood line?

\_\_\_\_\_  
\_\_\_\_\_

**C.** Where did you place Event C?

\_\_\_\_\_

Why did you place Event C at this location on the likelihood line?

\_\_\_\_\_  
\_\_\_\_\_

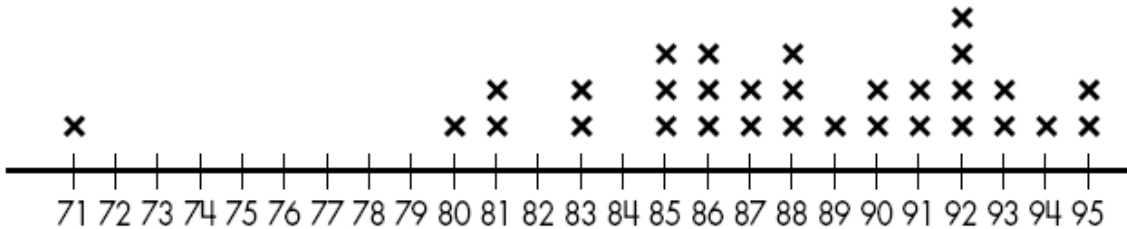


# End-of-Unit Assessment (page 3 of 4)

## Problem 2

### Was It Hotter in Philadelphia or Boston?

Samantha is thinking about moving to either Philadelphia or Boston. She wants to know what the average temperature is in each city because she does not like really hot weather. Here is a line plot of the recorded high temperatures for every day of July, 2003, in Philadelphia. The temperatures are in degrees Fahrenheit.



Recorded high temperatures in degrees Fahrenheit for each day in July, 2003

- A.** Describe to Samantha the temperature in Philadelphia in July, 2003, based on the data in this line plot. Consider where the data are concentrated, what the highest and lowest temperatures are, and what the outliers and the median are as you write your comparison. Write at least three statements about the temperature in Philadelphia in July, 2003.

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Name \_\_\_\_\_

Date \_\_\_\_\_



**Describing the Shape of the Data**

# End-of-Unit Assessment (page 4 of 4)

Here are the recorded high temperatures for every day of July, 2003, in Boston. The temperatures are in degrees Fahrenheit:

83	80	81	89	93	93	81	91	81	72
66	85	85	78	82	81	76	84	84	85
82	82	86	88	89	84	77	82	73	

- B.** Make a line plot of the temperatures in Boston in July, 2003, on a separate piece of paper.
  
- C.** What can you tell Samantha about how the temperature in Boston in July compared with the temperature in Philadelphia? Write at least three statements that compare the temperatures in the two cities in July. Consider where the data are concentrated, what the highest and lowest temperatures are, any outliers, and what the medians are as you write your comparison.

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- D.** According to these data, would you tell Samantha that July, 2003, was a hotter month in Boston or in Philadelphia? Use the data to support your answer.

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# 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