

Richmond Public Schools

Curriculum Framework

7th Grade Math

Strand: Probability and Statistics

- 7.9** The student, given data in a practical situation, will
- a) represent data in a histogram;
 - b) make observations and inferences about data represented in a histogram; and
 - c) compare histograms with the same data represented in stem-and-leaf plots, line plots, and circle graphs.

Suggested Pacing

Third Nine Weeks – 8 days

Spiraling Standards

Spiraling Down:

- 6.10** The student, given a practical situation, will
- a) represent data in a circle graph;
 - b) make observations and inferences about data represented in a circle graph; and
 - c) compare circle graphs with the same data represented in bar graphs, pictographs, and line plots.
- 5.16** The student, given a practical problem, will
- a) represent data in line plots and stem-and-leaf plots;
 - b) interpret data represented in line plots and stem-and-leaf plots; and
 - c) compare data represented in a line plot with the same data represented in a stem-and-leaf plot.

Spiraling Up:

- 8.12** The student will
- a) represent numerical data in boxplots;
 - b) make observations and inferences about data represented in boxplots; and
 - c) compare and analyze two data sets using boxplots.
- 8.13** The student will
- a) represent data in scatterplots;
 - b) make observations about data represented in scatterplots; and
 - c) use a drawing to estimate the line of best fit for data represented in a scatterplot.

Richmond Public Schools
Curriculum Framework
7th Grade Math

Essential Questions	Common Misconceptions
<p>What types of data are most appropriate to display in a histogram? <i>Numerical data that can be characterized using consecutive intervals are best displayed in a histogram.</i></p> <p>What must all graphs include? <i>A title and labels that describe the data.</i></p> <p>Why do we analyze data? <i>Comparisons, predictions and inferences are made by examining characteristics of a data set displayed in a variety of graphical representations to draw conclusions. Data analysis helps describe data, recognize patterns or trends, and make predictions.</i></p>	<ul style="list-style-type: none"> ● Students often have a hard time identifying the difference between a bar graph and a histogram. ● The interval widths of the histograms are proportional and dependent upon the data set.
Understanding the Standard	Essential Knowledge and Skills
<ul style="list-style-type: none"> ● A histogram is a graph that provides a visual interpretation of numerical data by indicating the number of data points that lie 	<p>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</p>

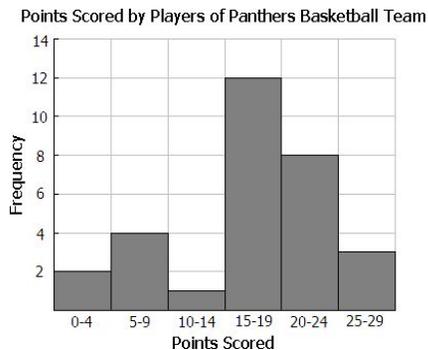
Richmond Public Schools

Curriculum Framework

7th Grade Math

within a range of values, called a class or a bin. The frequency of the data that falls in each class or bin is depicted by the use of a bar. Every element of the data set is not preserved when representing data in a histogram.

- All graphs must include a title and labels that describe the data.
- Numerical data that can be characterized using consecutive intervals are best displayed in a histogram.
- Teachers should be reasonable about the selection of data values. Students should have experiences constructing histograms, but a focus should be placed on the analysis of histograms.
- A histogram is a form of bar graph in which the categories are consecutive and equal intervals. The length or height of each bar is determined by the number of data elements (frequency) falling into a particular interval.



- A frequency distribution shows how often an item, a number, or range of numbers occurs. It can be used to construct a histogram.

- Collect, organize, and represent data in a histogram. (a)
- Make observations and inferences about data represented in a histogram. (b)
- Compare data represented in histograms with the same data represented in line plots, circle graphs, and stem-and-leaf plots. (c)

Richmond Public Schools

Curriculum Framework

7th Grade Math

**Number of Cappuccinos Made
per Hour at the Cafe**

Number of Cups of Coffee	Tally	Frequency
0 - 3		2
4 - 7		3
8 - 11	 	8
12 - 15		3
16 - 19		2

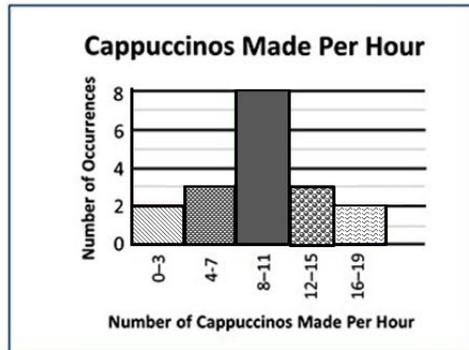
To construct a histogram:

- Organize collected data into a table. Create one column for data range categories (bins), divided into equal intervals that will include all of your data (for example, 0-10, 11-20, 21-30), and another column for frequency.
 - Bins should be all the same size.
 - Bins should include all of the data.
 - Boundaries for bins should reflect the data values being represented.
 - Determine the number of bins based upon the data.
 - If possible, the number of bins created should be a factor the number of data values (e.g., a histogram representing 20 data values might have 4 or 5 bins).
- Create a graph. Mark the data range intervals on the x -axis (horizontal axis) with no space between the categories. Mark frequency on the y -axis (vertical axis), also in equal intervals.
- Plot the data. For each data range category (bin), draw a horizontal line at the appropriate frequency or marker. Then, create a vertical bar for that category reaching up to the marked frequency. Do this for each data range category (bin).

Richmond Public Schools

Curriculum Framework

7th Grade Math



- Note: histograms may be drawn so that the bars are horizontal. To do this, interchange the x - and y -axis. Mark the data range intervals (bins) on the y -axis and the frequency on the x -axis. Draw the bars horizontally.
- Comparisons, predictions and inferences are made by examining characteristics of a data set displayed in a variety of graphical representations to draw conclusions. Data analysis helps describe data, recognize patterns or trends, and make predictions.
- There are two types of data: categorical and numerical. Categorical data can be sorted into groups or categories while numerical data are values or observations that can be measured. For example, types of fish caught would be categorical data while weights of fish caught would be numerical data. While students need to be aware of the differences, they do not have to know the terms for each type of data.

Richmond Public Schools

Curriculum Framework

7th Grade Math

- Different types of graphs can be used to display categorical data. The way data is displayed is often dependent on what someone is trying to communicate.
- A line plot provides an ordered display of all values in a data set and shows the frequency of data on a number line. Line plots are used to show the spread of the data, to include clusters (groups of data points) and gaps (large spaces between data points), and quickly identify the range, mode, and any extreme data values.
- A circle graph is used for categorical and discrete numerical data. Circle graphs are used to show a relationship of the parts to a whole. Every element of the data set is not preserved when representing data in a circle graph.
- A stem and leaf plot is used for discrete numerical data and is used to show frequency of data distribution. A stem and leaf plot displays the entire data set and provides a picture of the distribution of data.
- Different situations or contexts warrant different types of graphs, and it helps to have a good knowledge of what graphs are available. Students can determine which graph makes the most sense to use based on the type of data provided and which graph can help them answer questions most easily.
- Comparing different types of representations (charts and graphs) provide students an opportunity to learn how different graphs can show different things about the same data. Following construction of graphs, students benefit from discussions around what information each graph provides.
- The information displayed in different graphs may be examined to determine how data are or are not related, differences between

Richmond Public Schools

Curriculum Framework

7th Grade Math

<p>characteristics (comparisons), trends that suggest what new data might be like (predictions), and/or “what could happen if” (inference).</p>	
Vocabulary	Instructional Activities Organized by Learning Objective
<p>Graph Interval Frequency Tables Chart Data</p>	<p>Virginia Department of Education <u>Numbers In A Name</u></p> <p>Textbook Virginia Math Connects, Course 2, ©2012, Price, et al, McGraw-Hill School Education Group 1, pgs 520-525, 541(in part)</p>
Assessment	<p>Notes <u>Math Is Fun- Histograms</u></p> <p>Resources</p> <ul style="list-style-type: none"> ● Print <ul style="list-style-type: none"> ○ Virginia Coach, New SOL Edition, Mathematics, Grade 7, @2018, Triumph Learning pg(s) 130 - 141 ● Technology-based <ul style="list-style-type: none"> ○ Khan Academy <ul style="list-style-type: none"> ▪ <u>Creating Histograms</u> <p>Station Activities <u>Census.gov - Using The Census and Histograms Activity</u>(in part) <u>Using Post-Its To Create Histograms</u>(idea only)</p>

Richmond Public Schools

Curriculum Framework

7th Grade Math

Cross-Curricular Connections	Tiered Differentiations
<u>Scholastic: Using Scientific Flood Data and Histograms</u>	(Tier One) Students can describe how the histogram would change if the intervals were changed for a constructed histogram. (Tier Two) Students are to explain how they used histograms to interpret data. (Tier Three) Students are given division chart and post its to create intervals for created histograms.