Grade 6 Target J

Domain, Target, Standards, DOK, Vertical Alignments, Achievement Levels, Evidence Required, Vocabulary, Response Types, Materials, Attributes, Question Types, and Question Banks (Examples)

Content Domain: Statistics and Probability
Target J [s]: 6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.
Standards included in Target J: 6.SP.B Summarize and describe distributions.
Vertical Alignment
Achievement Level Descriptors
Evidence Required
Vocabulary
Response Types
Materials
Attributes
Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks
Claim 2 Problem Solving Question Banks
Claim 3 Communicating Reasoning Question Banks
Claim 4 Modeling and Data Analysis Question Banks

Content Domain: Statistics and Probability

Target J [s]: 6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.

Standards included in Target J: 6.SP.B Summarize and describe distributions.

6.SP.B Summarize and describe distributions.

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.B.5 Summarize numerical data sets in relation to their context, such as by:

a. Reporting the number of observations.
b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Vertical Alignment

Related Grade 5 standards

5.MD.B Represent and interpret data.

5.MD.B.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Related Grade 7 Standards

7.SP.B Draw informal comparative inferences about two populations.

7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade book.

Achievement Level Descriptors

Level 1 Students should be able to summarize or display numerical data on a number line, in dot plots, and in histograms; find the median of an odd number of data points; and find the mean when data points are nonnegative integers.

Level 2 Students should be able to calculate mean and median, understand that mean and median can be different or the same, and use the measure of center to summarize data with respect to the context.

Level 3 Students should be able to summarize or display data in box plots and find the interquartile range. They should be able to use the interquartile range along with the angle and measures of center to describe overall patterns in a data distribution, such as symmetry and clusters, and any striking deviations. They should also be able to examine a data set in context and explain the choice of the mean or median, as it relates to the data.

Level 4 Students should be able to relate choice of measures of center and variability to the shape of the data distribution in context of the data; find mean absolute deviation and identify outliers with reference to the context of the situation; and predict effects on the mean and

median, given a change in data points.

Evidence Required

1. The student displays numerical data on line plots, dot plots, histograms, and box plots.

2. The student summarizes numerical data sets by describing the nature of the attribute under investigation, including how it was measured, its units of measurement, and number of observations.

3. The student summarizes numerical data sets by determining quantitative measures of center (median and/or mean) and variability (interquartile range, range, and/or mean absolute deviation).

Vocabulary
variability, interquartile range, range, mean absolute deviation, outliers, center, spread, mean, median, shape (pertaining to statistics such as gap, cluster, peak, skew, bell curve, and uniform distribution)

Response Types
Multiple Choice, single correct response; Multiple Choice, multiple correct response; Equation/Numeric; Drag and Drop; Hot Spot; Matching Tables

Materials
number line diagrams, dot plots, histograms, box plots

Attributes
None

Claim 1: Concepts and Procedures (DOK 1, 2) Question Banks
Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Claim 1 6.SP.B.4 DOK Level 2

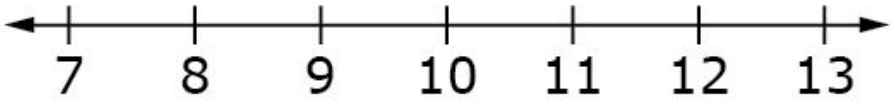
Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Evidence Required
The student displays numerical data on line plots, dot plots, histograms, and box plots.

Question Type 1: Students create a dot plot given a data set.

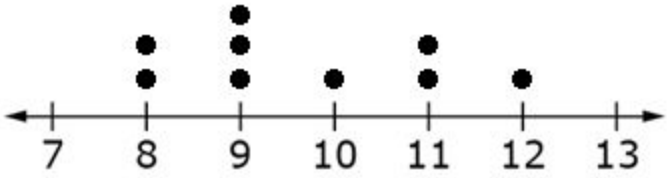
1. The ages of 9 students in a summer camp are shown.

10	11	12
9	8	9
11	9	8



Interaction: The student is given a labeled number line. Student uses the Hot Spot tool to click spaces above the number line to create a dot plot.

Rubric: (1 point) Student correctly creates a dot plot to represent the data (see below).



Response Type: Hot Spot

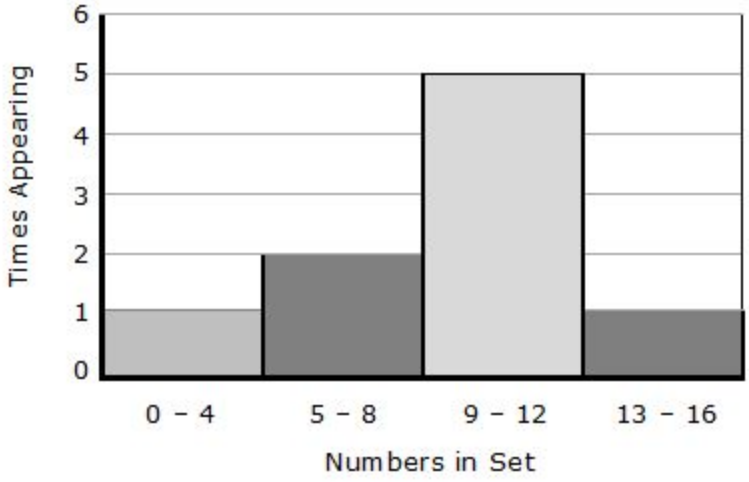
Question Type 2: The numbers of test questions answered correctly by 9 students are shown.

10	11	2
9	15	9
7	4	8

Click within the graph area to create a histogram for the data set.

Interaction: The student is given a graph with both axes labeled. Hot Spot tool is used to click unit squares on the graph to shade in and create a histogram.

Rubric: (1 point) Student correctly creates a histogram to represent the data (see below).



Response Type: Hot Spot

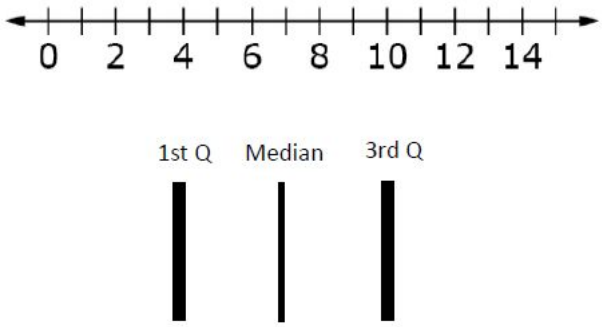
Question Type 3: The numbers of test questions answered correctly by 9 students are shown.

10	11	12
9	15	9
7	4	8

The vertical line segments represent the 1st quartile (1st Q), median, and the 3rd quartile (3rd Q) of the data set.

Drag each line segment to the correct location on the number line.

These pages were adapted from open source documents available on the Smarter Balanced Website: http://www.smarterbalanced.org/assessments/development/ August 2016



Interaction: The student is given a number line and a palette at the bottom of the screen. The palette contains three images of line segments labeled “1st Q,” “Median,” and “3rd Q.” Students use the drag-and-drop tool to place the line segments in the appropriate place on the number line. Snap-to feature should be used at each tick mark on the number line.

Rubric: (1 point) Student places the three line segments in the correct locations on the number line.

Response Type: Drag and Drop

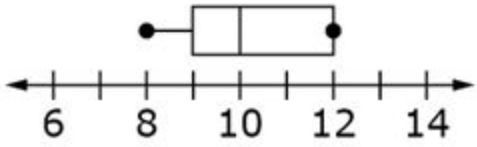
Question Type 2: Students identify the box plot that represents a given data set.

1. The ages of 9 students in a summer camp are shown in this frequency table.

Age	Frequency
8	2
9	3
10	1
11	2
12	1

Which box plot correctly displays the data shown in the table?

A.



B.

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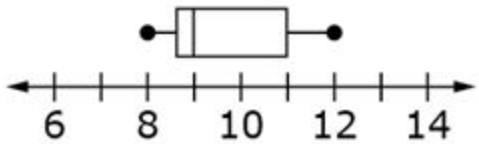
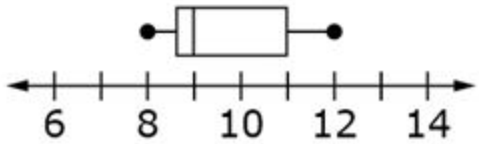
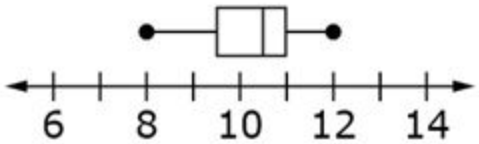


C.



D.



Answer Choices: Answer choices will be box plots. Distractors will include incorrectly calculating the median, upper and lower quartile, and/or misrepresenting the data on a box plot.

Rubric: (1 point) The student selects the correct box plot (e.g., B).

Response Type: Multiple Choice, single correct response

Claim 1 6.SP.B.5a, 6.SP.B.5b DOK Level 2

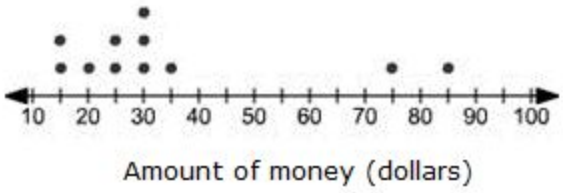
Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

Evidence Required

The student summarizes numerical data sets by describing the nature of the attribute under investigation including how it was measured, its units of measurement, and number of observations.

Question Type 1: The student is presented with a set of numerical data.

1. Ted surveyed his neighbors to see how much money they spent on gasoline each week. The results are in the dot plot shown.



Enter the total number of people Ted surveyed.

Rubric: (1 point) Student enters correct value (e.g., 11).

Response Type: Equation/Numeric

Claim 1 6.SP.B.5c DOK Level 2

Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Evidence Required
The student summarizes numerical data sets by determining quantitative measures of center (median and/or mean) and variability (interquartile range, range, and/or mean absolute deviation).

Question Type 1: The student is presented with a set of numerical data.

1. Sophia surveyed her friends to see how many minutes they studied for their math test last evening. The results are in this list. 10, 15, 20, 15, 35, 25, 20, 30, 25

Enter the mean of the data.

Rubric: (1 point) Student gives the correct mean of the data. Students' answers should be within an acceptable range (e.g., 21.6– 22).

Response Type: Equation/Numeric

2. Avery surveyed her friends to see how many minutes they studied for their math test last evening. The results are shown in the frequency table.

Minutes	Frequency
10	||
15	|||
20	||
25	||
30	||
35	|

Enter the median of the data.

Rubric: (1 point) Student gives the correct median of the data (e.g., 20).

Response Type: Equation/Numeric

Question Type 1: The student is presented with a set of numerical data.

1. Avery surveyed her friends to see how many minutes they studied for their math test last evening. The results are shown in the frequency table.

Minutes	Frequency
10	|
15	||
20	||
25	||
30	||
35	|

Enter the interquartile range of the data set.

Rubric: (1 point) Student enters the correct interquartile range of the data (e.g., 15).

Response Type: Equation/Numeric