Claim 1: Concepts and Procedures
Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Content Domain: **Statistics and Probability**

Target H [a]: Draw informal comparative inferences about two populations. (DOK Level 2)

Tasks for this target will require students to make informal inferences about two populations based on measures of center and variability.

Standards: 7.SP.B, 7.SP.B.3, 7.SP.B.4	**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 science book.*
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 6.SP.A, 6.SP.A.2, 6.SP.A.3, 6.SP.B, 6.SP.B.4, 6.SP.B.5 8.SP.A, 8.SP.A.1, 8.SP.A.2, 8.SP.A.3, 8.SP.A.4	**Related Grade 6 standards** **6.SP.A Develop understanding of statistical variability.** **6.SP.A.2** Understand that a set of data collected to answer a statistical question has a distribution, which can be described by its center, spread, and overall shape. **6.SP.A.3** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. **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. **Related Grade 8 Standards** **8.SP.A Investigate patterns of association in bivariate data.** **8.SP.A.1** Construct and interpret scatter plots for bivariate

	measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. **8.SP.A.2** Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. **8.SP.A.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.* **8.SP.A.4** Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*
DOK Level(s):	2
Achievement Level Descriptors:	
RANGE Achievement Level Descriptor (Range ALD) Target H: Draw informal comparative inferences about two populations.	**Level 1** Students should be able to use the mean to compare and draw inferences about two different populations.
	Level 2 Students should be able to use range to draw comparisons about two different populations. They should be able to informally compare the visual overlap of two numerical data distributions with similar variability in familiar contexts.
	Level 3 Students should be able to informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers in any context.
	Level 4 Students should be able to use measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
Evidence Required:	1. The student makes comparisons between two numerical data distributions. 2. [Retired Evidence Required statement]
Allowable Response Types:	Matching Tables, Equation/Numeric
Allowable Stimulus Materials:	lists, tables, dot plots, histograms, box plots, and other data displays
Construct-Relevant Vocabulary:	numerical data distribution, center, variability, random sample, comparative inference, mean, median, mean absolute deviation, range, interquartile range
Allowable Tools:	Calculator
Target-Specific Attributes:	
Non-Targeted	

Constructs:	
Accessibility Guidance:	Item writers should consider the following Language and Visual Element/Design guidelines[1] when developing items. Language Key Considerations: • Use simple, clear, and easy-to-understand language needed to assess the construct or aid in the understanding of the context • Avoid sentences with multiple clauses • Use vocabulary that is at or below grade level • Avoid ambiguous or obscure words, idioms, jargon, unusual names and references Visual Elements/Design Key Considerations: • Include visual elements only if the graphic is needed to assess the construct or it aids in the understanding of the context • Use the simplest graphic possible with the greatest degree of contrast, and include clear, concise labels where necessary • Avoid crowding of details and graphics Items are selected for a student's test according to the blueprint, which selects items based on Claims and targets, not task models. As such, careful consideration is given to making sure fully accessible items are available to cover the content of every Claim and target, even if some item formats are not fully accessible using current technology.[2]
Development Notes:	Much of the evidence for 7.SP.B will be assessed in Claim 4.

[1] For more information, refer to the General Accessibility Guidelines at: http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/05/TaskItemSpecifications/Guidelines/AccessibilityandAccommodations/GeneralAccessibilityGuidelines.pdf

[2] For more information about student accessibility resources and policies, refer to http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf

Task Model 1

Response Type: Matching Tables

DOK Level 2

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.*

Evidence Required: 1. The student makes comparisons between two numerical data distributions.

Tools: Calculator

Version 3 Update: Retired TM2

Prompt Features: The student is prompted to informally assess the degree of visual overlap of two numerical data distributions.

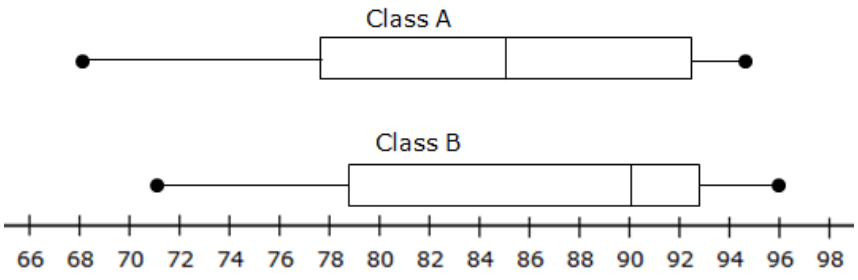
Stimulus Guidelines:

- Context must be familiar to students 12–14 years old.
- Visual displays should be dot plots, histograms, and box plots
- Item difficulty can be adjusted via these example methods:
  - Changing the measure of variability given
  - Items use whole numbers, decimals, or fractions

TM1

Stimulus: The student is presented with two numerical data distributions with similar variability.

Example Stem: The box plot shows a summary of test scores for Class A and Class B on the same exam. Both classes have the same number of students.



Determine whether each statement is true based on these box plots. Select True or False for each statement.

Statement	True	False
In each class, at least 25% of students scored below 80 on the test.		
The median test score of Class B is 5 points **less** than the median test score of Class A.		
In each class, more than 25% of students have test scores **greater** than 90.		

Rubric: (1 point) Student correctly identifies each statement as true or false (e.g., T, F, T). False statements could include incorrect interpretations of the measures of variability.

Response Type: Matching Tables