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 G [s]: Use random sampling to draw inferences about a population. (DOK Levels 1, 2) Tasks for this target will ask students to evaluate statements about a sample relative to a population.	
Standards: 7.SP.A, 7.SP.A.1, 7.SP.A.2	**7.SP.A Use random sampling to draw inferences about a population.** **7.SP.A.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. **7.SP.A.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*
Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling: 6.SP.A, 6.SP.A.1, 6.SP.A.2, 6.SP.A.3 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.1** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.* **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. **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):	1, 2
Achievement Level Descriptors:	
RANGE Achievement Level Descriptor(Range ALD) Target G: Use random sampling to draw inferences about a population.	**Level 1** Students should be able to describe what a representative sample entails and identify biased and unbiased samples of a population.
	Level 2 Students should be able to determine whether or not a sample is random and understand that random samples of an appropriate population are representative samples that support valid results. They should be able to use data from a random sample to draw obvious inferences about a population presented in a familiar context.
	Level 3 Students should be able to use data from a random sample to draw inferences about a population with an unknown characteristic of interest presented in an unfamiliar context.
	Level 4 Students should be able to generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
Evidence Required:	1. The student determines whether a sample is representative of a population. 2. The student draws inferences about a population using data from a random sample.
Allowable Response Types:	Multiple Choice, single correct response; Multiple Choice, multiple correct response
Allowable Stimulus Materials:	tables, lists, dot plots, histograms
Construct-Relevant Vocabulary:	random sample, representative sample, inference, validity, variation, data sets, prediction
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:	Other tasks will require students to explain variability in estimates or predictions using data from multiple samples of the same size in Claims 2-4.

[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: Multiple Choice, single correct response** **DOK Level 1** **7.SP.A.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. **Evidence Required:** 1. The student determines whether a sample is representative of a population. **Tools:** Calculator	**Prompt Features:** The student is prompted to identify whether a method to collect a sample is more likely to produce a representative sample. **Stimulus Guidelines:** • Context should be familiar to students 12–14 years old. • Descriptions should include sufficient information about sampling methodology to determine the validity of the sample. **TM1** **Stimulus:** The student is presented with a context where a sample is taken from a population. **Example Stem:** David wants to estimate the number of students from his seventh grade class whose favorite subject is math. He plans to ask 20 students and wants the best chance that it will be representative of his seventh grade class. From which of the following populations should he randomly select his sample? A. Students in a math class. B. Students on a school bus. C. Students in a seventh grade assembly. D. Students in the cafeteria. **Answer Choices:** Answer choices should be statements relating to samples that represent the population. Distractors should include statements where the sample does not represent the population such as biased samples, or samples that are too general. **Rubric:** (1 point) Student selects the correct answer choice (e.g., C). **Response Type:** Multiple Choice, single correct response

Task Model 2

Response Type: Multiple Choice, single correct response

DOK Level 2

7.SP.A.2
Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

Evidence Required: 2. The student draws inferences about a population using data from a random sample.

Tools: Calculator

Version 3 Update: Changed the response type from Multiple Choice, multiple correct to single correct response.

Prompt Features: The student is prompted to identify correct statements about a population based on a random sample.

Stimulus Guidelines:

- Context should be familiar to students 12–14 years old.
- Item difficulty can be adjusted via these example methods:
  - Number of categories in sample data
  - Calculations required in answer choices
  - Range of numbers

TM2a
Stimulus: The student is presented with data from a random sample of a population.

Example Stem: A random sample of 50 students from a high school with 1000 students is surveyed. Each student is asked what science class he or she is taking and all students at the school take science. The table shows the responses.

Science Class	Number of Students
Physics	6
Chemistry	10
Biology	18
Earth Science	4
Health Science	12

Based on the survey results, which statement about all of the students at the high school is most appropriate to make?

A. Twice as many students at the high school are taking Biology than are taking Chemistry.
B. About 10% of students at the high school are taking Chemistry.
C. In a group of 25 students at the high school, it is expected that 4 of the students are taking Earth Science.
D. It is estimated that about 120 of the students at the high school are taking Physics.

Answer Choices: Each answer choice is a sentence describing the data. Distractors should include misinterpretations of the data such as assuming that the data includes the entire population or not understanding that a random sample can be representative of the population.

Rubric: (1 point) Student selects the correct statement (e.g., D).

Response Type: Multiple Choice, single correct response

Task Model 2

Response Type: Multiple Choice, single correct response

DOK Level 2

7.SP.A.2
Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

Evidence Required:
2. The student draws inferences about a population using data from a random sample.

Tools: Calculator

Version 3 Update: Changed the response type from Multiple Choice, multiple correct to single correct response.

Prompt Features: The student is prompted to identify inferences about a population that correspond to a set of sample data.

Stimulus Guidelines:

- Context should be familiar to students 12–14 years old.
- Data sets can be presented as a:
  - table
  - list
  - dot plot
  - histogram
- Item difficulty can be adjusted via these example methods:
  - Presentation of data
  - Ease of multiplying numbers
  - Ratio in data

TM2b
Stimulus: The student is presented with a statement about a population.

Example Stem: A sandwich shop manager wants to estimate how many of each type of sandwich will be purchased in a month. The manager keeps track of all of the orders for one week. The table shows the results.

Type of Sandwich	Number Ordered
Roast Beef	152
Tuna	114
Turkey	209

Based on the data, which estimate best represents the number of times each type of sandwich is likely to be ordered in a month?

A. 850 roast beef, 460 tuna, 620 turkey
B. 650 roast beef, 490 tuna, 900 turkey
C. 480 roast beef, 880 tuna, 640 turkey
D. 1300 roast beef, 1000 tuna, 1800 turkey

Answer Choices: Each answer choice is an estimate. Distractors should include switching numbers and categories.

Rubric: (1 point) Student selects the correct estimate (e.g., B).

Response Type: Multiple Choice, single correct response