Introduction

The Math Test Specifications provide an overview of the structure and content of Ohio's State Test. This overview includes a description of the test design as well as information on the types of items that will appear on the test. Also included is a test blueprint, a document that identifies the range and distribution of points grouped into various reporting categories (e.g., Fractions, Ratios and Proportions, Functions, Probability). The specifications also provide specific guidelines for the development of all items used for Ohio's math tests.
This document is a resource not only for item writers and test designers, but also for Ohio educators and other stakeholders who are interested in a deeper understanding of the test.

Overview of Structure and Content

Ohio's Learning Standards

In 2017, Ohio adopted revisions to Ohio's Learning Standards for Mathematics which include standards for mathematical content and mathematical practice. Then, based on the 2017 Standards, Ohio adopted revisions to the Model Curriculum, a document that connects standards to instruction. The mathematics assessment items (test questions) align to the 2017 Standards.

Standards for Mathematical Practice

The Standards for Mathematical Practice (SMP) describe skills that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The design of each item on Ohio's state tests encourages students to use one or more Standards for Mathematical Practice. Below is a list of the mathematical practices.

Grade 7 Standards for Mathematical Practice
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Blueprint

Test blueprints serve as a guide for test construction and provide an outline of the content and skills to be measured on the test. They contain information about the number of points of opportunity students will encounter in each reporting category on the math test. The following test blueprint displays the distribution of the content standards and depth of knowledge across the entire test and categories for reporting test results for Grade 7.

Reporting Category	Standards				Approximate Portion of Test	
Ratios and Proportions	7.RP.1				22% – 31% 12 – 16 points	Modeling and Reasoning* (minimum 20%)
	7.RP.2					
	7.RP.3					
The Number System	7.NS.1	7.NS.3	7.EE.1	7.EE.3	28% – 37% 15 – 19 points	
	7.NS.2		7.EE.2	7.EE.4		
Geometry	7.G.1	7.G.3	7.G.5		20% – 25% 11 – 13 points	
	7.G.2	7.G.4	7.G.6			
Statistics and Probability	7.SP.1	7.SP.3	7.SP.5	7.SP.7	22% – 29% 12 – 15 points	
	7.SP.2		7.SP.6	7.SP.8		
				Total Test	52 – 54 points	

Depth of Knowledge (DOK) Level	Approximate Portion of Test
1	8 – 16 points
2	25 – 34 points
3	8 – 16 points

Modeling and Reasoning

Modeling and Reasoning are included in the eight Standards for Mathematical Practice within Ohio's Learning Standards. Each grade's blueprint identifies modeling and reasoning as an independent reporting category that will account for a minimum of 20 percent of the overall points on that grade's test.

Depth of Knowledge (DOK)

DOK refers to the complexity of thinking required to complete a task in a given item. Items with a DOK 1 designation focus on the recall of information, such as definitions and terms, and

simple procedures. Items with a DOK 2 designation require students to make decisions, solve routine problems, perform calculations, or recognize patterns. Items with a DOK 3 designation feature higher-order cognitive tasks. These DOK 3 tasks include but are not limited to: critiquing a statement and forming a conclusion; explaining, justifying, or proving a statement; or approaching abstract, complex, open-ended, and non-routine problems. Each grade's blueprint contains information about the number of points of opportunity students will encounter at each DOK level.

Test Design

The assessment is a two-part test, developed in a computer-based format and a paper-based format. Its purpose is to measure student progress and provide information to parents, teachers, and building, district and state administrators. The test will contain technology-enhanced items that require the student to enter a response into the computer interface. The test will be administered near the end of the academic school year or the end of a semester (for high school). The test can be administered in one or two sessions. After the student has completed both parts of the test, his or her scores will be combined to yield a comprehensive test score. Test results are reported back to schools by June 30th.

Performance Level Descriptors (PLDs)

At each grade level/course, PLDs are general statements describing what students should know or be able to do at each performance level.

After the Ohio State Mathematics test is scored, each student's performance level is identified based on the combined scores (Part 1 and Part 2). Districts and schools are sent item level reports and the performance level for each student along with the performance level descriptors. Teachers and math coaches can use this information for their instructional design.

Calculator

Calculators are **not** permitted for use on either the paper-based or computer-based mathematics test for grades 3-5. Grades 6 and 7 have a non-calculator part and a calculator part for both the paper-based and the computer-based mathematics test. The calculator designation for items in grades 6 and 7 is decided during development on an item-by-item basis. A calculator may be used on the entire grade 8 and high school End of Course (EOC) paper-based or computer-based mathematics tests. Note that calculator usage may differ for those students with an Individualized Education Plan (IEP) or 504 plan that specifies a calculator accommodation.

- Guidance on Desmos Calculator for Grades 3-8
- Grades 3-8 Handheld Calculator Guidance

- [Guidance on Desmos Calculator for High School](#)
- [High School Handheld Calculator Guidance](#)

Reference Sheets

A [reference sheet](#) may be used on the Ohio State Mathematics Tests by all students in grades four and above. For paper-based testers, the math reference sheets will be included within the student test booklet. For online testers, the math reference sheet is embedded within the testing platform.

Interaction Types

Ohio's State Tests are composed of several interaction types. Currently, there are ten interaction types that may appear on a math computer-based assessment:

- Equation Item(EQ)
- Gap Match Item (GM)
- Grid Item (GI)
- Hot Text Item (HT)
- Inline Choice Item (IC)
- Matching Item (MI)
- Multiple Choice Item (MC)
- Multi Select Item (MS)
- Simulation Item (Sim)
- Table Item (TI)

For paper-based assessments (including those for students with an IEP or 504 plan that specifies a paper-based accommodation), the items may be modified so that they can be scanned and scored electronically or hand-scored.

Interaction Type	Description
Equation Item (EQ)	The student is presented with a keypad that includes a variety of mathematical symbols that can be used to create a response. Responses may be in the form of a number, variable, expression, or equation, as appropriate to the test item. The student enters their response in the response box which may be on a line by itself, or embedded in a sentence or phrase. For paper-based assessments, this interaction type may be replaced with a modified version of the item that can be scanned and scored electronically or the student may be given an answer box to write their answer.

Interaction Type	Description
Gap Match Item (GM)	Given a set of options (e.g., numbers, words, phrases, or sentences) the student hovers over the options which then highlight, indicating that the option is selectable. The student can then click on the object, hold down the mouse button, and drag it to an answer area, indicated by a dotted box, in a graphic, table, or paragraph. For paper-based assessments, the options are associated with a letter, and students write a letter for their response in each response area.
Grid Item (GI)	The student may select numbers, words, phrases, or images to display their response. The student may also use the drag-and-drop feature to place objects into a response area. This interaction type may also require the student to use the point, line, or arrow tools to create a response on a graph or gridded area. For paper-based assessments, the student may be given the response space to draw their answer, or this interaction type may be replaced with another interaction type that assesses the same standard at the same level of difficulty and can be scanned and scored electronically.
Hot Text Item (HT)	**Selectable Hot Text -** Given a set of options (e.g., phrases, sentences, or numbers) the student hovers over the options which then highlight, indicating that the text is selectable ("hot"). The student can then click on an option to select it as their response. For paper-based assessments, a "selectable" hot text item is modified so that it can be scanned and scored electronically. The student fills in a circle to indicate the correct response.
	Drag-and-Drop Hot Text - Given a set of options (e.g., numbers, words, phrases, or sentences) the student hovers over the options which then highlight, indicating that the option is selectable ("hot"). The student can then click on the object, hold down the mouse button, and drag it to a graphic, table, or paragraph. For paper-based assessments, the options are associated with a letter, and students write a letter for their response in each response area.
Inline Choice Item (IC)	Given a sentence, paragraph, or table, the student clicks a blank box embedded within a sentence or table which reveals a drop-down menu containing options for completing a sentence or table. The student then selects an option from the drop-down menu to respond. For paper-based assessments, the interaction is modified so that it can be scanned and scored electronically. The student fills in a circle to indicate the correct response.
Matching Item (MI)	Given column and row headers in a table format, the student checks a box to indicate if information from a column header matches information from a row header. For paper-based assessments, the interaction is modified so that it can be scanned and scored electronically. The student fills in a circle to indicate the correct response.

Interaction Type	Description
Multiple Choice Item (MC)	The student selects one correct answer from four options. For paper-based assessments, the student fills in a circle to indicate the correct response.
Multi Select Item (MS)	The student is directed to either select an indicated number of correct answers or to select all of the correct answers. Students in grades 3-5 always select an indicated number of correct answers; students in grades 6-8 select an indicated number of correct answers on 50% of the items and select all on 50% of the items; and students taking high school end-of-course tests are always directed to select all correct answers. These items are different from multiple choice items, and require the student to select 2 or more correct answers. For paper-based assessments, the student fills in circles to indicate the correct responses.
Simulation Item (Sim)	Given a set of instructions, the student may interact with any of the following controls to generate data: radio buttons, drop-down menus, slide bars, or selecting a number by clicking arrows. Once the student has set the parameters, they click the start button to begin the simulation and generate a data set. Once the student has enough data, they may answer questions about the data using a different interaction type. For paper-based assessments, this interaction will be replaced with another interaction type that assesses the same standard at the same level of difficulty and can be scanned and scored electronically.
Table Item (TI)	The student types numeric values into a given table. The student may complete the entire table or portions of the table depending on what is being asked. For paper-based assessments, the student writes their responses in the blank boxes of the table.

Specific Guidelines for Item Development

Standards are presented according to reporting categories as shown on grade level or course blueprints.

Reporting Category	**RATIOS AND PROPORTIONS**
Content Standard	***7.RP RATIOS AND PORPORTIONAL RELATIONSHIPS*** **Analyze proportional relationships and use them to solve real-world and mathematical problems.** ***7.RP.1*** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. *For example, if a person walks $^1/_2$ mile in each $^1/_4$ hour, compute the unit rate as the complex fraction $^{(1/2)}/_{(1/4)}$ miles per hour, equivalently 2 miles per hour.*
Content Limits	- Items may use all types of rational numbers. - At least one number in the ratio must be expressed as a fraction or a decimal. - Ratios can be expressed as a fraction (1/5), with a colon (1:5), or with words, e.g., *per, to, each, for each*, *for every*.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	**RATIOS AND PROPORTIONS**
Content Standard	***7.RP RATIOS AND PORPORTIONAL RELATIONSHIPS*** **Analyze proportional relationships and use them to solve real-world and mathematical problems.** ***7.RP.2*** Recognize and represent proportional relationships between quantities. ***<u>7.RP.2a</u>*** Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. ***<u>7.RP.2b</u>*** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. ***<u>7.RP.2c</u>*** Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* ***<u>7.RP.2d</u>*** Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where *r* is the unit rate.
Content Limits	- Items may use all types of rational numbers. - Ratios can be expressed as a fraction ($\frac{1}{5}$), with a colon (1:5), or with words, *e.g., per, to, each, for each, for every.*
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**RATIOS AND PROPORTIONS**
Content Standard	***7.RP RATIOS AND PORPORTIONAL RELATIONSHIPS*** **Analyze proportional relationships and use them to solve real-world and mathematical problems.** ***7.RP.3*** Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
Content Limits	• Items may use all types of rational numbers. • Ratios can be expressed as a fraction ($\frac{1}{5}$), with a colon (1:5), or with words, *e.g., per, to, each, for each, for every.* • Items will require at least two steps. • Percentages used can be greater than 100% or less than 1%.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	THE NUMBER SYSTEM
Content Standard	**7.NS THE NUMBER SYSTEM** *(italic)* **Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.** **7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. **7.NS.1a** Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* **7.NS.1b** Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. **7.NS.1c** Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. **7.NS.1d** Apply properties of operations as strategies to add and subtract rational numbers.
Content Limits	• Items may use all types of rational numbers. • Items must include at least 1 negative number. • Students need to be able to recognize the formal names of properties.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	THE NUMBER SYSTEM
Content Standard	**_7.NS THE NUMBER SYSTEM_** **Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.** **_7.NS.2_** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. **_7.NS.2a_** Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (−1)(−1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. **_7.NS.2b_** Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = {(-p)}/{q} = {p}/{(-q)}$. Interpret quotients of rational numbers by describing real-world contexts. **_7.NS.2c_** Apply properties of operations as strategies to multiply and divide rational numbers. **_7.NS.2d_** Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
Content Limits	• Items may use all types of rational numbers. • For 2a, 2b, and 2c, items must include a negative number. • Students need to be able to recognize the formal names of properties.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	THE NUMBER SYSTEM
Content Standard	**_7.NS THE NUMBER SYSTEM_** **Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.** **_7.NS.3_** Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.
Content Limits	• Items may use all types of rational numbers.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	THE NUMBER SYSTEM
Content Standard	**7.EE EXPRESSIONS AND EQUATIONS** **Use properties of operations to generate equivalent expressions.** **7.EE.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
Content Limits	• Items may use all types of rational numbers. • Items use only linear expressions. • Negative numbers and multiple operations may be used. • Students need to be able to recognize the formal names of properties.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**THE NUMBER SYSTEM**
Content Standard	***7.EE EXPRESSIONS AND EQUATIONS*** **Use properties of operations to generate equivalent expressions.** ***7.EE.2*** In a problem context, understand that rewriting an expression in an equivalent form can reveal and explain properties of the quantities represented by the expression and can reveal how those quantities are related. *For example, a discount of 15% (represented by p – 0.15p) is equivalent to (1 – 0.15)p, which is equivalent to 0.85p or finding 85% of the original price.*
Content Limits	• Items may use all types of rational numbers. • Exponents of a variable are limited to 1. • Students need to be able to recognize the formal names of properties.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	**THE NUMBER SYSTEM**
Content Standard	***7.EE EXPRESSIONS AND EQUATIONS*** **Solve real-life and mathematical problems using numerical and algebraic expressions and equations.** ***7.EE.3*** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example, if a woman making $25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 $\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*
Content Limits	• Items may use all types of rational numbers. • Items involving estimation to assess reasonableness will not require the student to find the exact answer. • Students need to be able to recognize the formal names of properties. • Variables may need to be defined using appropriate units.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**THE NUMBER SYSTEM**
Content Standard	***7.EE EXPRESSIONS AND EQUATIONS*** **Solve real-life and mathematical problems using numerical and algebraic expressions and equations.** ***7.EE.4*** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. **_7.EE.4a_** Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* **_7.EE.4b_** Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example, as a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*
Content Limits	• Items may use all types of rational numbers. • For 4a, equations must be of the form $px + q = r$ or $p(x + q) = r$, where p, q, and r are specific rational numbers. • For 4b, inequalities must be of the form $px + q > r$, $px + q \geq r$, $px + q < r$ or $px + q \leq r$, where p, q, and r are specific rational numbers. • Items may require graphing a solution to an inequality on a number line.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**GEOMETRY**
Content Standard	***7.G GEOMETRY*** **Draw, construct, and describe geometrical figures and describe the relationships between them.** ***7.G.1*** Solve problems involving similar figures with right triangles, other triangles, and special quadrilaterals. ***7.G.1a*** Compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale. ***7.G.1b*** Represent proportional relationships within and between similar figures.
Content Limits	• Figures are limited to triangles and special quadrilaterals. • Scale factors can be any positive rational number not equal to 1.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**GEOMETRY**
Content Standard	**_7.G GEOMETRY_** **Draw, construct, and describe geometrical figures and describe the relationships between them.** **_7.G.2_** Draw (freehand, with ruler and protractor, and with technology) geometric figures with given conditions. **_7.G.2a_** Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. **_7.G.2b_** Focus on constructing quadrilaterals with given conditions noticing types and properties of resulting quadrilaterals and whether it is possible to construct different quadrilaterals using the same conditions.
Content Limits	• Figures are limited to triangles and quadrilaterals. • Items to this standard will focus on Van Hiele Level 1 (Analysis) with some aspects of Van Hiele Level 2 (Informal Deduction/Abstraction). • Items will not require knowledge of the hierarchy of quadrilaterals (e.g., all squares are rhombuses but not all rhombuses are squares).
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**GEOMETRY**
Content Standard	***7.G GEOMETRY*** **Draw, construct, and describe geometrical figures and describe the relationships between them.** ***7.G.3*** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
Content Limits	• Prisms and pyramids can have bases up to six sides. • All slices will be parallel or perpendicular to the base of the figure.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**GEOMETRY**
Content Standard	***7.G GEOMETRY*** **Solve real-life and mathematical problems involving angle measure, circles, area, surface area, and volume.** ***7.G.4*** Work with circles. <u>***7.G.4a***</u> Explore and understand the relationships among the circumference, diameter, area, and radius of a circle. <u>***7.G.4b***</u> Know and use the formulas for the area and circumference of a circle and use them to solve real-world and mathematical problems.
Content Limits	• Only whole circles and semi-circles will be used. • Items may ask for exact answers in terms of π. • Scoring will allow for using 3.14, using the π-button on a calculator, or $\frac{22}{7}$ for the value of π.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**GEOMETRY**
Content Standard	***7.G GEOMETRY*** **Solve real-life and mathematical problems involving angle measure, circles, area, surface area, and volume.** ***7.G.5*** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
Content Limits	• Items may use all types of rational numbers. • Angles must be measured in degrees. • Items may require the student to refer to two angles as "equal in measure". • Items will not require students to understand congruency of two figures.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**GEOMETRY**
Content Standard	***7.G GEOMETRY*** **Solve real-life and mathematical problems involving angle measure, circles, area, surface area, and volume.** ***7.G.6*** Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Content Limits	• Items may use all types of rational numbers. • Two-dimensional shapes are limited to polygons. • Three-dimensional shapes are limited to right prisms and pyramids. • Prisms and pyramids can have bases up to six sides. • Items will not require the student to find the volume of a pyramid.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**STATISTICS AND PROBABILITY**
Content Standard	***7.SP STATISTICS AND PROBABILITY*** **Use sampling to draw conclusions about a population.** ***7.SP.1*** Understand that statistics can be used to gain information about a population by examining a sample of the population. ***7.SP.1a*** Differentiate between a sample and a population. ***7.SP.1b*** Understand that conclusions and generalizations about a population are valid only if the sample is representative of that population. Develop an informal understanding of bias.
Content Limits	• Items may use all types of rational numbers. • In 1b, the focus will be on making sure that samples are representative of the population. Students will not be required to understand the difference between a non-randomized and a randomized sample. • Items will focus on Level A of the GAISE model.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	**STATISTICS AND PROBABILITY**

Content Standard	***7.SP STATISTICS AND PROBABILITY***
	
	Broaden understanding of statistical problem solving.
	
	7.SP.2 Broaden statistical reasoning by using the GAISE model:
	   a. Formulate Questions: Recognize and formulate a statistical question as one that anticipates variability and can be answered with quantitative data. *For example, "How do the heights of seventh graders compare to the heights of eighth graders?"* (GAISE Model, step 1)
	   b. Collect Data: Design and use a plan to collect appropriate data to answer a statistical question. (GAISE Model, step 2)
	   c. Analyze Data: Select appropriate graphical methods and numerical measures to analyze data by displaying variability within a group, comparing individual to individual, and comparing individual to group. (GAISE Model, step 3)
	   d. Interpret Results: Draw logical conclusions and make generalizations from the data based on the original question. (GAISE Model, step 4)

Content Limits	• Items may use all types of rational numbers. • Items can be aligned to one step of the GAISE model or to multiple steps. • Items will focus on progressing from Level A to Level B of the GAISE model. • Items may require knowledge of mean and median as measures of center. • Items may require knowledge of range, interquartile range, and mean absolute deviation (MAD) as measures of variation. • Items can test knowing the order of the four steps of the model.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	**STATISTICS AND PROBABILITY**
Content Standard	***7.SP STATISTICS AND PROBABILITY*** **Summarize and describe distributions representing one population and draw informal comparisons between two populations.** ***7.SP.3*** Describe and analyze distributions. ***7.SP.3a*** Summarize quantitative data sets in relation to their context by using mean absolute deviation (MAD), interpreting mean as a balance point. ***7.SP.3b*** Informally assess the degree of visual overlap of two numerical data distributions with roughly equal 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 (line plot), the separation between the two distributions of heights is noticeable.*
Content Limits	- Items may use all types of rational numbers. - Visual data displays are limited to dot plots (line plots), histograms, and box plots. - Items will focus on progressing from Level A to Level B of the GAISE model. - Items may require knowledge of mean and median as measures of center. - Items may require knowledge of range, interquartile range, and mean absolute deviation (MAD) as measures of variation.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	**STATISTICS AND PROBABILITY**
Content Standard	***7.SP STATISTICS AND PROBABILITY*** **Investigate chance processes and develop, use, and evaluate probability models.** ***7.SP.5*** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event; a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely; and a probability near 1 indicates a likely event.
Content Limits	• Items may use all types of rational numbers.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Optional

Reporting Category	STATISTICS AND PROBABILITY
Content Standard	**7.SP STATISTICS AND PROBABILITY** **Investigate chance processes and develop, use, and evaluate probability models.** **7.SP.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*
Content Limits	• Items may use all types of rational numbers.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	**STATISTICS AND PROBABILITY**
Content Standard	***7.SP STATISTICS AND PROBABILITY*** **Investigate chance processes and develop, use, and evaluate probability models.** ***7.SP.7*** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. ***7.SP.7a*** Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* ***7.SP.7b*** Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*
Content Limits	• Items may use all types of rational numbers.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required

Reporting Category	**STATISTICS AND PROBABILITY**
Content Standard	***7.SP STATISTICS AND PROBABILITY*** **Investigate chance processes and develop, use, and evaluate probability models.** ***7.SP.8*** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. ***7.SP.8a*** Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. ***7.SP.8b*** Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language, e.g., "rolling double sixes," identify the outcomes in the sample space which compose the event. ***7.SP.8c*** Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*
Content Limits	• Items may use all types of rational numbers.
DOK	1, 2, and/or 3 are eligible. DOK levels are designated on an item-by-item basis.
Context	Context Required