

Grade 6 Mathematics

Achievement Level Descriptors

Major Content

The student solves problems involving the Major Content for the course with connections to the Standards for Mathematical Practice.

| Major Content | | | | |
|---|--|--|--|--|
| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
| Multiply and Divide Fractions 6.NS.A.1 | Divides fractions with unlike denominators and solves word problems. | Divides fractions with unlike denominators and solves word problems with scaffolding. | Divides fractions with common denominators and solves word problems with scaffolding. | Divides fractions with common denominators. |
| Ratio and Rate 6.RP.A.1 6.RP.A.2 6.RP.A.3 | Uses ratio and rate reasoning to solve real-world and mathematical problems, including ratio, unit rate, percent, and unit conversion problems, using and connecting a variety of representations and strategies. | Uses ratio and rate reasoning to solve real-world and mathematical problems, including ratio, unit rate, percent, and unit conversion problems using a limited variety of representations and strategies. | Uses ratio and rate reasoning to solve mathematical problems, including ratio, unit rate, percent, and unit conversion problems using a limited variety of representations and strategies. | Solves problems including ratio, unit rate, percent, and unit conversion problems using a limited variety of representations and strategies. |
| | Finds missing values in tables and plots pairs of values on the coordinate plane. | Finds missing values in tables and locates and plots pairs of values on the coordinate plane. | Finds missing values in tables and locates pairs of values on the coordinate plane. | |

| Major Content | | | | |
|---|---|--|---|---|
| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
| Rational Numbers 6.NS.C.5 6.NS.C.6 6.NS.C.7 6.NS.C.8 | Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line and compared with or without the use of a number line. | Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line and compared with or without the use of a number line. | Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line. | Understands that positive and negative numbers describe mathematical or real-world quantities which have opposite values or directions and can be represented on a number line. |
| | Understands the concept of and interprets the absolute value of a rational number. | Understands the concept of absolute value of a rational number. | Determines the absolute value of a rational number. | Determines the absolute value of a rational number. |
| | Plots ordered pairs on a coordinate plane to solve real-world and mathematical problems. | Plots ordered pairs on a coordinate plane to solve real-world and mathematical problems. | Locates or plots ordered pairs on a coordinate plane to solve mathematical problems. | |
| | Recognizes the locations of points are related by reflections across one or both axes when two ordered pairs differ only by signs. | | | |
| | Distinguishes comparisons of absolute value from statements about order. | | | |
| Expressions, Inequalities, and Equations 6.EE.A.1 6.EE.A.2 | Writes, reads, and evaluates numerical and algebraic expressions, including those that contain whole number exponents. | Writes, reads, and evaluates numerical and algebraic expressions, including those that contain whole number exponents. | Reads numerical and algebraic expressions including those that contain whole number exponents. | |

| Major Content | | | | |
|--|---|---|--|--|
| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
| 6.EE.A.4 6.EE.B.5 6.EE.B.6 6.EE.B.7 6.EE.B.8 6.EE.C.9 | Identifies parts of algebraic and numerical expressions using mathematical terms and views one or more parts of an expression as a single entity. | Identifies parts of algebraic and numerical expressions using mathematical terms. | Identifies parts of algebraic and numerical expressions using mathematical terms. | Identifies parts of algebraic or numerical expressions using mathematical terms. |
| | Identifies equivalent expressions using properties of operations. | Identifies equivalent expressions using properties of operations. | | |
| | Uses variables to represent numbers and writes expressions and single-step equations to solve real-world and mathematical problems and understands their solutions. | Uses variables to represent numbers and writes expressions and single-step equations to solve real-world or mathematical problems. | Uses variables to represent numbers and writes expressions (without exponents) and single-step equations to solve mathematical problems. | Uses variables to represent numbers and writes expressions (without exponents) and single-step equations to solve mathematical problems. |
| | Expresses a relationship between dependent and independent variables and relates tables and graphs to equations. | Relates tables and graphs to equations. | Relates tables and graphs to equations. | |
| | Writes and graphs inequalities to represent a constraint or condition in a real-world or mathematical problem. | Writes and graphs inequalities to represent a constraint or condition in a real-world or mathematical problem. | Writes and graphs inequalities to represent a constraint or condition in a mathematical problem. | Writes and graphs inequalities to represent a constraint or condition in a mathematical problem. |
| | Understands that there are an infinite number of solutions for an inequality. | | | |

Additional & Supporting Content

The student solves problems involving the Additional & Supporting Content for the course with connections to the Standards for Mathematical Practice.

| Additional & Supporting Content | | | | |
|--|--|---|---|---|
| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
| Factors and Multiples 6.NS.B.4 | Determines greatest common factors and least common multiples. | Determines greatest common factors and least common multiples. | Identifies greatest common factors and least common multiples. | Identifies greatest common factors and least common multiples. |
| | Uses the distributive property to rewrite a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. | Uses the distributive property to rewrite a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. | | |
| Solve Area, Surface Area, and Volume Problems 6.G.A.1 6.G.A.2 6.G.A.3 6.G.A.4 | Solves real-world and mathematical problems involving area of polygons by composing into rectangles or decomposing into triangles and other shapes. | Solves real-world and mathematical problems involving area of polygons by either composing into rectangles or decomposing into triangles and other shapes. | Solves mathematical problems involving area of polygons by either composing into rectangles or decomposing into triangles and other shapes. | Solves mathematical problems involving area of polygons by composing into rectangles. |
| | Determines measurements of polygons in the coordinate plane. | Determines measurements of polygons in the coordinate plane. | Determines measurements of polygons in the coordinate plane. | |
| | Identifies and uses nets of three-dimensional figures to find surface area. | Identifies and uses nets of three-dimensional figures to find surface area. | Uses nets of three-dimensional figures to find surface area. | |
| | Determines volume of right rectangular prisms with fractional edge lengths by packing them with unit cubes and using formulas. | Determines volume of right rectangular prisms with fractional edge lengths by packing them with unit cubes and using formulas. | Determines volume of right rectangular prisms with fractional edge lengths by packing them with unit cubes. | |
| | Uses volume formulas to find unknown measurements. | Uses volume formulas to find unknown measurements. | | |
| | Applies concepts of area and volume to solve problems without scaffolding. | Applies concepts of area and volume to solve problems with scaffolding. | | |
| | | | | |

| Additional & Supporting Content | | | | |
|---|---|--|---|---|
| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
| Statistical Variability and Data Distributions 6.SP.A.1 6.SP.A.2 6.SP.A.3 6.SP.B.4 6.SP.B.5 | Recognizes a statistical question and understands a set of collected data has a distribution which can be described by its center, spread, and overall shape. | Recognizes a statistical question and understands a set of collected data has a distribution which can be described by its center, spread, and overall shape. | Recognizes a statistical question and understands a set of collected data has a distribution which can be described by its center, spread, and overall shape. | Understands a set of collected data has a distribution which can be described by its center, spread, and overall shape. |
| | Understands the purpose of center and variability and the center of a set of data can be summarized with a single number. | Understands the purpose of center and the center of a set of data can be summarized with a single number. | Understands the purpose of center and the center of a set of data can be summarized with a single number. | Understands the center of a set of data can be summarized with a single number. |
| | Displays numerical data in plots on a number line, including dot plots, histograms, and box plots. | Displays numerical data in plots on a number line, including dot plots, histograms, and box plots. | Displays numerical data on a number line including dot plots and histograms. | Displays numerical data on a number line including dot plots. |
| | Summarizes numerical data sets in relation to a context, such as reporting the number of observations, describing the nature of the attributes under investigation, and using measures of center and variability. | Summarizes numerical data sets in relation to a context, such as reporting the number of observations, describing the nature of the attributes under investigation, and using measures of center and variability. | Summarizes numerical data sets in relation to a context, such as reporting the number of observations, describing and using measures of center, and using the interquartile range as a measure of variability. | |
| | Determines which measures of center and variability are the most appropriate for a set of data. | | | |
| Operations with Multi-Digit Numbers 6.NS.B.2 6.NS.B.3 | Fluently divide multi-digit numbers using the standard algorithm. | Fluently divide multi-digit numbers using the standard algorithm. | Divide multi-digit numbers with limited accuracy. | Divide multi-digit numbers with limited accuracy. |
| | Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. | Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. | Add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation with limited accuracy. | Add and subtract multi-digit decimals with limited accuracy. |

Mathematical Reasoning & Modeling

In connection with course content, the student: expresses course-level appropriate mathematical reasoning by constructing viable arguments and critiquing the reasoning of others; attends to precision when making mathematical statements; solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses); engages in the modeling practice by using mathematics to solve problems arising in everyday scenarios; makes sense of problems and perseveres when solving them; uses appropriate tools strategically; and looks for and makes use of structure.

| Type II | | | | |
|-------------|---|--|---|---|
| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
| | In connection with the content knowledge and skills described in Major Content, the student clearly constructs and communicates a complete | | In connection with the content knowledge and skills described in Major Content, the student constructs and communicates a | |
| LEAP.II.6.1 | written response based on properties of operations; and the relationships between addition and subtraction and between multiplication and division | | | |
| LEAP.II.6.2 | response based on concrete referents provided in the prompt or constructed by the student such as: diagrams that are connected to a written (symbolic) method, number line diagrams, or coordinate plane diagrams | | | |
| LEAP.II.6.3 | response to a given equation, multi-step problem, proposition or conjecture | | | |
| LEAP.II.6.4 | Responses may include: | | | |
| LEAP.II.6.5 | a logical approach based on a conjecture and/or stated assumptions | a logical approach based on a conjecture and/or stated assumptions | a logical approach based on a conjecture and/or stated assumptions | a faulty approach based on a conjecture and/or stated assumptions |
| LEAP.II.6.6 | a logical and complete progression of steps | a logical and complete progression of steps | a logical , but incomplete, progression of steps | an incomplete or illogical progression of steps |
| LEAP.II.6.7 | precise calculation | precise calculation | minor calculation errors | major calculation errors |
| LEAP.II.6.8 | fluent use of grade-level vocabulary, symbols, and labels | fluent use of grade-level vocabulary, symbols, and labels | limited use of grade-level vocabulary, symbols, and labels | limited use of grade-level vocabulary, symbols, and labels |
| LEAP.II.6.9 | complete justification of a conclusion | complete justification of a conclusion | partial justification of a conclusion | partial justification of a conclusion |
| | generalization of an argument or conclusion | | | |

Type II

| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
|---------|--|--|--|----------------------------|
| | evaluating, interpreting and critiquing the validity and efficiency of responses, reasoning, approaches, and conclusions, using mathematical connections and providing counter-examples where applicable | evaluating, interpreting, and critiquing the validity of responses, reasoning, approaches, and conclusions | evaluating the validity of approaches and conclusions | |
| | identifying and describing errors in solutions and presenting correct solutions | identifying and describing errors in solutions and presenting correct solutions | identifying and describing errors in solutions | |
| | distinguishing correct and flawed reasoning and correcting flawed reasoning | identifying and describing flaws in reasoning and presenting correct reasoning | | |

Type III

| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
|--|---|---|--|---|
| | In connection with the content knowledge, skills, and abilities described in Major Content, the student devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: | | | |
| LEAP.III.6.1 LEAP.III.6.2 LEAP.III.6.3 | using stated assumptions and making assumptions and approximations to simplify a real-world situation | using stated assumptions or making assumptions and approximations to simplify a real-world situation | using stated assumptions and approximations to simplify a real-world situation | using stated assumptions and approximations to simplify a real-world situation |
| | analyzing and/or creating limitations, relationships, and interpreting goals within a model | creating limitations and goals within a model | | |
| | analyzing, justifying and defending models which lead to a conclusion | using models which lead to a conclusion | | |
| | mapping relationships between quantities by selecting appropriate tools to create models | mapping relationships between quantities by selecting appropriate tools to create models | illustrating relationships between quantities by using provided tools to create models | identifying quantities by using provided tools to create models |
| | analyzing relationships mathematically between quantities to draw conclusions | analyzing relationships mathematically between quantities to draw conclusions | analyzing relationships mathematically between quantities to draw conclusions | analyzing relationships mathematically to draw conclusions |
| | applying proportional reasoning | applying proportional reasoning | applying proportional reasoning | applying proportional reasoning |
| | writing/using equations to describe how one quantity of interest depends on another | writing/using equations to describe how one quantity of interest depends on another | writing /using equations to describe how one quantity of interest depends on another | using equations to describe how one quantity of interest depends on another |
| | using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity | using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity | using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity | using unreasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity |

Type III

| Content | Level 5: Advanced | Level 4: Mastery | Level 3: Basic | Level 2: Approaching Basic |
|----------------|---|--|--|--|
| | In connection with the content knowledge, skills, and abilities described in Major Content, the student devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: | | | |
| | interpreting mathematical results in an applied context | interpreting mathematical results in an applied context | interpreting mathematical results in a simplified context | |
| | determining whether results make sense | determining whether results make sense | determining whether results make sense | |
| | improving a model if it has not served its purpose | improving a model if it has not served its purpose | altering a model if it has not served its purpose | |
| | writing a complete, clear, and correct algebraic expression or equation to describe a situation | writing a complete, clear, and correct algebraic expression or equation to describe a situation | writing an incomplete algebraic expression or equation to describe a situation | writing an incomplete algebraic expression or equation to describe a situation |