

Major Work of Grade 7

The purpose of this document is to provide a brief overview of the most essential content in the grade level along with a progression of how the content was addressed in the prior grade level and will prepare students for content in the future grade level. This is not a comprehensive list of content in the grade level as defined in the Utah Core Standards, but rather highlights the major work of the grade level.

Major Work of Grade Band: Grades 6 - 8

- Apply and use operations with rational numbers
- Understand ratio concepts and apply proportional reasoning
- Simplify expressions and solve equations
- Represent and analyze relationships

Vertical Alignment of Major Work

Major Work: Operations with Rational Numbers

Prior grades: Students have performed all four operations with non-negative rational numbers (6.NS.1-3), including dividing fractions by fractions in grade 6. Students are introduced to integers in grade 6 via number line models, absolute value, and opposite signs/value/ direction (6.NS.5-7).

Grade 7: Apply and extend understanding of **operations with rational numbers:** Apply previous understanding of operations with rational numbers (7.NS.1-3) to include integers and negative rational numbers. (Operations with all other rational numbers are being practiced in grade 7, with integers being new at this point in the 7th grade).

Future grades: In grade 8, students will use their understanding of rational numbers (including identifying and converting to different forms) to develop their understanding of irrational numbers (8.NS.1-3). In Secondary Math II, students will expand the number system to include complex numbers (SII.N.CN.1,2,7,8,9).

Major Work: Proportional Reasoning

Prior grades: Students create equivalent fractions (4.NF; 5.NF). In grade 6, students are introduced to ratio and rate reasoning (6.RP.1-3), understand the concept of unit rate (6.RP.2), and use multiple representations to solve ratio/rate problems (tables of equivalent ratios, equations, and plot values on a coordinate plane) (6.RP.3).

Grade 7: Understand and apply **proportional reasoning:** Compute unit rates (7.RP.1), recognize and represent proportional relationships between quantities using multiple representations (7.RP.2), use proportional relationships to solve multi-step and percent problems (7.RP.3), and solve problems using scale drawings of geometric figures (7.G.1).

Future grades: Students extend their understanding of proportional relationships and connect proportionality to linear equations (recognizing slope as a proportional relationship between quantities (8.EE.5) and that non-proportional linear functions have a vertical shift of b units (8.EE.5-6; 8th grade function standards). Proportional relationships are the foundation for developing an understanding of

rates of change (all functions in high school) and the connection between proportional relationships and a function who grows at a rate proportionate to the amount present.

Major Work: Simplify Expressions and Solve Equations

Prior grades: Students solve for unknown values starting in the early grades (K.OA.4; 1.OA.1; 2.OA1; etc). Students then use variables to solve simple equations and inequalities in grade 6. *For example:* $x+q < r$ (6.EE.5-8).

Grade 7: Simplify expressions and solve equations: Apply properties of operations to factor, expand (7.EE.1) and convert between forms of an expression (7.EE.2). Assess reasonableness of solutions (7.EE.3). Use variables to represent quantities to construct and solve real-world equations and inequalities. *For example:* $px+q < r$. (7.EE.4).

Future grades: Students analyze and solve linear equations, inequalities(8.EE.7), and systems of linear equations (8.EE.8,). Understand the relationship between linear equations in one variable vs linear functions with two variables (8.EE.7-8, 8th grade function standards). Students continue their progress in solving equations/inequalities and justifying solutions (High School algebra standards).

Major Work: Represent and Analyze Relationships

Prior grades: Students solve simple problems using numerical and algebraic expressions (6.EE.5-9), plot relationships on a coordinate plane (6.NS.8; 6.EE.9), and develop an understanding of statistical variability (6.SP.1-3).

Grade 7: Represent and analyze relationships: Solve problems using numerical and algebraic equations (7.EE.3; 7.EE4), draw inferences about two populations (7.SP.2-4), and investigate probability models (7.SP.5-8).

Future grades: Students represent two variable relationships, compare quantities, and analyze relationships throughout their mathematics career. Paying attention to how quantities interact and how two quantities compare is ongoing throughout all strands in the standards in grade 8 and throughout high school.