

## Unit 1: Rational Numbers & Exponents

### Equivalent forms: fractions, decimals, and percents

This topic reviews the three forms of rational numbers that are used most frequently in situations: fractions, decimals, and percents. Students use these rational numbers in real-world settings and explore order-from least to greatest or vice versa. Students practice converting from one form of rational number to another through multiple representations.

### Using ratios

This topic explores and applies proportional reasoning through multiple representations. Students interactively use ratios and proportional reasoning to enlarge and reduce images. They also apply ratios and proportional reasoning in a variety of contexts. Real-world applications engage students to explore and make reasonable conjectures while testing their predictions.

### Ratios and rates

In this topic, students will apply their understanding of ratios and proportional reasoning to working with rates and unit rates in a variety of contexts such as speed, mileage, and unit pricing, including situations involving ratios of fractions. Students will also find and apply a constant proportionality to solve problems involving indirect measurement of distant objects.

### Patterns in Proportional Relationships

Students will build on their understanding of proportional relationships, rates, and unit rates in additional algebraic contexts and represent those relationships in multiple ways. Students will interpret the meaning of specific points on the graph of a proportional relationship in terms of the scenario represented. Students will write and solve simple equations to ask and answer questions involving proportional relationships.

### Applications of percents

This topic investigates the various uses of percent in solving real-world problems. Applications include gratuities, commissions, fees, percent error, discount, markup, increases and decreases in value, and simple interest.

## Unit 2: Proportionality and Linear Relationships

### Adding and subtracting integers

This topic focuses on the models that represent integers. Students build on their understanding of integers (including opposites and absolute value) and their relation to rational numbers, including their position on the number line. They investigate integers in multiple contexts. They learn to add and subtract integers using a variety of models, including number line and tiles.

### Multiplying and Dividing Integers

In this topic, students experience real-world applications as the context for investigating multiplying and dividing integers. Patterns, profits and losses, ocean depth, and exponential notation are tools used to explore different products and quotients.

### Rational numbers

This topic builds on students' prior work with applying properties of operations to solve problems with positive fractions and decimals, and with integers. Students will solve real-world and mathematical problems involving the four operations with positive and negative rational numbers including negative fractions and decimals

### **Equations and inequalities**

In this topic, students will build on their understanding of proportional relationships to including other linear relationships and linear inequalities. Students will also broaden their understanding of algebraic expressions by applying properties of operations to solve problems with linear equations and inequalities. Throughout this topic, students will interpret their symbolic representations in relation to the contexts they are investigating.

## **Unit 3: Introduction to Sampling and Inference**

### **Probability**

In this topic, students investigate simple and compound events using proportional reasoning through several different models. Games of a probabilistic nature are developed as tools to test conjectures and the idea of fairness. Vocabulary and appropriate terminology are emphasized throughout the topic.

### **Representing and interpreting data**

This topic explores visual representations of data, including stem-and-leaf plots, box-and-whisker plots, histograms, bar graphs, and line plots. Students understand a variety of sampling methods and the benefits of each. Students learn that representations can be used to organize data, to compare data sets, and to express an opinion and imply conclusions. Students use data and representations of data to investigate measures of center and variability. They see that representations can be manipulated and learn to carefully analyze the information contained in a graph.

### **Designing Experiments**

This topic explores the use of simulation techniques in probabilistic settings. Students generate results by conducting simulations using coins, spinners, playing cards, number cubes, and other related tools. Solving problems involving real-world situations, students evaluate the reasonableness of their results.

## **Unit 4: Creating, Comparing, and Analyzing Geometric Figures**

### **Angles and Triangles**

In this topic, students will engage in hands-on investigation of the properties of triangles. Students will also explore numerous angle relationships and use those angle relationships to ask and answer questions in a variety of contexts.

### **Solving problems with 2-D shapes**

In this topic students will expand their understanding of measurement with two-dimensional shapes as they investigate the relationships among circumference, area, radius and diameter in circles. They will also develop the formulas for circumference and area of circles, and areas of special quadrilaterals. They will apply formulas to solve problems in a variety of contexts involving circles and polygons.

### **Effects of change**

In this topic, students explore the effects of proportional change on perimeters and areas of two-dimensional figures and on surface areas and volumes of three-dimensional figures. Students also use estimation to solve problems involving volume and surface area.