

Topics & Standards

Quarter 1

Mathematical Practices Handbook

- 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.

Unit 1: Ratio and Proportional Relationships

CH 1: "How can you show that two objects are proportional?"

Ratios and Proportions

- 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 ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½ / ¼ miles per hour, equivalently 2 miles per hour.)
- 7.RP.2 Recognize and represent proportional relationships between quantities.
 - a. 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.
 - b. Identify constant of proportionality(unit rate) in tables, graphs, equations, diagrams,& verbal descriptions of proportional relationships.
 - c. Represent proportional relationships by equations.
 - d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.
- 7.RP.3 Use proportional relationships to solve multi-step rational and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Number Systems

• 7.NS.3 Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

CH 2: "How can percent help you understand situations involving money?

Ratio and Proportions

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 - c. Represent proportional relationships by equations.
- 7.RP.3 Use proportional relationships to solve multi-step rational and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Expressions and Equations



- 7.EE.2 Use properties of operations to generate equivalent expressions.
- **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.

SPIRAL REVIEW

- Aleks Software:
 - O Tier 1 and 2 students should be accessing Aleks at least 2 hours or 10 topics per week. Tier 3 students should be accessing Aleks at least 3 hours or 15 topics per week. This allows students to spiral content throughout the year.

MAJOR SUPPORTING ADDITIONAL

Students should spend the majority of learning on the major work of the grade level; which should account for at least 65% of the academic year (Achieve the core, n.d.). Major content should be emphasized via a greater number of days of instruction, depth and mastery.

| Assessment | Resources | Key Concept tools & practices for |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Evidence) | (Curriculum & Textbook) | Differentiation |
| Formative & Summative Assessments 4-7 tasks that reach DOK 3-4 At least (1) GRASPS per quarter & Illuminate weekly | McGraw-Hill Glencoe, Course 2 Mathematical Practices (1 week) • 6th Grade Review: Long Division, Plotting points on a Coordinate plane | Meaning Making Resources Embedded within each Lesson: • Bell work/lesson openers/notebook add-ins • worked examples |
| MGraw-Hill Glencoe Assessment Resources (Formative, Pre/Post, and Summative): | CHAPTER 1: Ratio and Proportional Reasoning Lessons 1-9 (4 weeks) Inquiry labs and projects | pre-written student methods error analysis sorting activities/flash cards/unit rate Gizmos introduction Number sense (multiplication, division, fractional, part to whole) Discuss to Understand Think for Yourself Work with Your Partner |
| or 15 topics per week. | Inquiry labs and projects | OH.Math.7.RP.1(Gizmos) Beam to Moon (Ratios and Proportions) Household Energy Usage Road Trip (Problem Solving) Unit Conversions Direct and Inverse Variation Estimating Population Size |



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| | www.ww | nancial Literacy should be incorporated after CH 2 vw.NEA.org (Resources for teaching Financial Literacy) vw.practicalmoneyskills.com vw.aeseducation.com | Geometric Probability Part-to-part and Part-to-whole Ratios Percents and Proportions Proportions and Common Multipliers |
| T | Unit 2 The Number System | | |
| Topic & | Unit 2 The Number System CH 3: "What happens when you add, subtract, multiply, and divide integers?" | | |
| Standard | Number Systems | iditiply, and divide integers: | |
| Quarter 2 | subtraction on a horizontal or vertical number of the contexts. c. Understand subtraction of rations numbers on the number line is the d. Apply properties of operations as of the numbers of operations as of the number of operations as of the number line is the d. Apply properties of operations as of the number line is the d. Apply and extend previous unders are understand that multiplication is properties of operations, particular signed numbers. Interpret product is numbers. Interpret product is number. If p and q are incontexts. c. Apply properties of operations as of the contexts. c. Apply properties of operations as of the rules for manipulating fraction operations and the rules for manipulating fraction of the rules | posite quantities combine to make 0. located a distance $ q $ from p, in the positive or negative er and its opposite have a sum of 0 (are additive inversal numbers as adding the additive inverse, p-q = p + (-q). It is absolute value of their difference, and apply this principal strategies to add and subtract rational numbers. It is addings of operations with fractions to add, subtract, must extended from fractions to rational numbers by requilarly the distributive property, leading to products such exts of rational numbers by describing real-world contexts divided, provided that the divisor is not zero, and every quantegers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients as strategies to multiply and divide rational numbers. The problems involving the four operations with rational numbers to complex fractions. | direction depending on whether q is positive ses). Interpret sums of rational numbers by Show that the distance between two rational ple in real-world contexts. ultiply and divide rationalnumbers. iring that operations continue to satisfy the as (-1) (-1) = 1 and the rules for multiplying uotient of integers (with non-zero divisor) is a of rational numbers by describing real-world numbers. Computations with rational numbers tional numbers, |
| | fractions, and decimals), using tools strate | egically. Apply properties of operations to calculate with | numbers in any form; convert between forms |
| | as appropriate; and assess the reasonable | eness of answers using mental computation and estimation | on strategies. |

CH 4: "What happens when you add, divide, multiply, and subtract fractions?"



Number Systems

- 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.
 - a. 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.
 - b. 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.
 - c. Apply properties of operations as strategies to add and subtract rational numbers.
- 7.NS.2 Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.
 - a. 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.
 - b. 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.
 - c. Apply properties of operations as strategies to multiply and divide rational numbers.
 - d. 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.
- 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.

Ratio and Proportions

• 7.RP.3 Use proportional relationships to solve multistep ratio and percent problems.

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.

Unit 3 Expressions and Equations

CH 5: "How can you use numbers and symbols to represent mathematical ideas?"

Expressions and Equations

- 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- **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.

Number System



• **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.

SPIRAL REVIEW

- Aleks Software:
 - O Tier 1 and 2 students should be accessing Aleks at least 2 hours or 10 topics per week. Tier 3 students should be accessing Aleks at least 3 hours or 15 topics per week. This allows students to spiral content throughout the year.

Topic & Standard

MAJOR SUPPORTING ADDITIONAL

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Concept Tools & Practices for Resources Assessment (Curriculum /Textbook) **Differentiation** (Evidence) **Formative & Summative Assessments** McGraw-Hill Glencoe. Course 2 OH.Math.7.NS.1a: • 4-7 tasks that reach DOK 3-4 *CH 2 may continue into Qtr. 2 Adding and Subtracting Integers Quarter 2 Integers, Opposites, and Absolute Values At least (1) GRASPS per quarter Rational Numbers, Opposites, and Absolute Illuminate weekly **CHAPTER 3 Integers - Lessons 1-5 (3 weeks) Values Inquiry labs and projects** McGraw-Hill Glencoe Assessment Integers: Add, Subtract, Multiply, Division Adding on the Number Line Resources (Formative, Pre/Post, and Absolute Value Improper Fractions and Mixed Numbers Summative): P.S.I: Look for a Pattern Simplifying Algebraic Expressions I Quick Checks **Properties** Sums and Differences with Decimals **Spiral Reviews** 21st Century: Astronomy OH.Math.7.NS.2c: Chapter Quizzes and Tests & Mid-**Dividing Fractions CHAPTER 4 Rational Numbers - Lessons 1-8** chapter Review **Dividing Mixed Numbers** (2-3 weeks) - 6th grade review **Multiplying Fractions** Aleks Software- *Tier 1 and 2 students Inquiry labs and projects **Multiplying Mixed Numbers** • Rational numbers on a number line should be accessing Aleks at least 2 hours Multiplying with Decimals or 10 topics per week. Tier 3 students Add/Subtract on a number line Percent's, Fractions, and Decimals should be accessing Aleks at least 3 hours • P.S.I: Draw a Diagram OH.Math.7.NS.3: or 15 topics per week. 21st Century: Fashion Adding Fractions (Fraction Tiles) Unit: Ocean Depths Adding and Subtracting Integers Adding on the Number Line CHAPTER 5 Expressions - Lessons 1-8 (3 weeks) **Dividing Fractions** Inquiry labs and projects **Dividing Mixed Numbers** Sequences



| • | Properties including Distributive | Estimating Population Size |
|---|------------------------------------|---------------------------------------------|
| • | Factor Linear Expressions | Estimating Sums and Differences |
| • | P.S.I: Make a table | Fractions Greater than One (Fraction Tiles) |
| • | 21st Century: Animal Conservations | Improper Fractions and Mixed Numbers |
| | | Multiplying Fractions |

Additional 6th grade review:

Constant, Coefficients, Like Terms, Factors

Multiplying Mixed Numbers
Multiplying with Decimals

Topic & Standard

CH 6: "What does it mean to say two quantities are equal?" 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 computations and estimation strategies.
- **7.EE.4** Use variables to represent quantities in a real-world or mathematical problems, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
 - a. Solve word problems leading to equations in 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.
 - b. 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.

Unit 4 Geometry

CH 7: "How does Geometry help us describe real-world objects?" Geometry

- **7.G.1** Solve problems involving similar figures with right triangles, other triangles, and special quadrilaterals.
 - a. Compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale.
 - b. Represent proportional relationships within and between similar figures.
- 7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric figures with given conditions.
 - a. 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.

Quarter 3



- b. 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.
- 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.
- 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.

CH 8: "How do measurements help you describe real-world objects?" Geometry

- 7.G.4 Work with circles
 - a. Explore and understand the relationships among the circumference, diameter, area, and radius of a circle.
 - b. Know and use the formulas for the area and circumference of a circle and use them to solve real-world and mathematical problems.
- 7.G.6 Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Unit 5 Statistics and Probability

CH 9: "How can you predict the outcome of future events?" Statistics and Probability

- 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 ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- 7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that products it and observing its long-run relative frequency, and predict the approximate relative frequency give the probability.
- **7.SP.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if agreement is not good, explain possible sources of the discrepancy.
 - a. Develop a uniform probability model and use it to find probabilities of events. Compare probabilities form a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
 - b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
- 7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
 - a. 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.
 - b. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event describes in everyday language (e.g., rolling double sizes), identify the outcomes in the sample space which compose the event.
 - c. Design and use a simulation to generate frequencies for the compound events.

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| (Evidence) | (Curriculum /Textbook) | Differentiation |
| Formative & Summative | CHAPTER 6 Equations and Inequalities - Lessons 1-8 | Modeling One-Step Equations |
| Assessments | (4 weeks) | Modeling and Solving Two-Step Equations |
| 4-7 tasks that reach DOK 3-4 | Inquiry lab and projects | Solving Algebraic Equations II |
| At least (1) GRASPS per quarter | One-step equations (Addition/Subtraction) | Solving Equations on the Number Line |
| Illuminate weekly | Solve equations w/ Bar diagram and rational | |
| | coefficient | Solving Two-Step Equations. |
| McGraw-Hill Glencoe Assessment | Two-step equations | Absolute Value Equations and Inequalities |
| Resources (Formative, Pre/Post, and | Inequalities | Rational Numbers, Opposites, and Absolute |
| Summative): | P.S.I: Work backwards | <u>Values</u> |
| Quick Checks | 21st Century: Veterinary Medicine | Solving Linear Inequalities in One Variable |
| Spiral Reviews | Unit: Stand Up and Be Counted | OH.Math.7.G.2: Draw (freehand, with ruler and |
| Chapter Quizzes and Tests & | | protractor, and with technology) geometric |
| Mid-chapter Review | CHAPTER 7 Geometric Figures- Lessons 1-6 (2 weeks) | figures with given conditions. |
| Aleks Software- *Tier 1 and 2 | Inquiry lab and projects | |
| students should be accessing | Create and Draw Triangles | Concurrent Lines, Medians, and Altitudes |
| Aleks at least 2 hours or 10 | Investigate online maps and scale drawings | <u>Triangle Inequalities</u> |
| topics per week. Tier 3 students | P.S.I: Make a Model | OH.Math.7.G.2b: |
| should be accessing Aleks at | 21st Century: Design Engineering | |
| | | |



| least 3 hours or 15 topics per | CHAPTER 8 Measure Figures - Lessons 18 (2 weeks) | Classifying Quadrilaterals |
|--------------------------------|------------------------------------------------------------------|---------------------------------------------------|
| week. | Inquiry lab and projects | Special Parallelograms |
| | Circumference | OH.Math.7.G.B: |
| | Area of Circles | OH.Math.7.G.4: Work with circles. |
| | P.S.I: Solve simpler problems Values of Diverside | OH.Math.7.G.4a&b: |
| | Volume of PyramidsNets of 3-D objects | <u>Circumference and Area of Circles</u> |
| | Surface Area and Volume | OH.Math.7.G.5: |
| | Composite Figures | Investigating Angle Theorems |
| | 21st Century: Landscape Architecture | Triangle Angle Sum |
| | Unit: Turn Over New Leaf | OH.Math.7.G.6: |
| | CHAPTER 9 Probability - Lessons 1-7 (2 weeks) | Area of Parallelograms |
| | Inquiry lab and projects | Area of Triangles |
| | Relative Frequency | Chocomatic (Multiplication, Arrays, and Area) |
| | Fair/Unfair games | Fido's Flower Bed (Perimeter and Area) |
| | Simulate Compound Events | Perimeter and Area of Rectangles |
| | P.S.I: Act it Out | Prisms and Cylinders |
| | Independent/Dependent Events 31st Contumy Medicine | Pyramids and Cones |
| | 21st Century: Medicine | Surface and Lateral Areas of Prisms and Cylinders |
| | *CH 9 may be continued into Qtr. 4 | Theoretical and Experimental Probability |
| | | OH.Math.7.SP.7b: |
| | | Spin the Big Wheel! (Probability) |
| | | Theoretical and Experimental Probability |
| | | OH.Math.7.SP.8a: |
| | | Independent and Dependent Events |
| | | Theoretical and Experimental Probability |
| | | Permutations and Combinations |
| | | OH.Math.7.SP.8c: |
| | | Independent and Dependent Events |
| | | Populations and Samples |
| | | |
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Topic & Standard

CH 10 "How do you know which type of graph to do when displaying data? Statistics and Probability

- 7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population.
 - a. Differentiate between a sample and a population.
 - b. 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
- 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 7th 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. (Gaise Model, step 4)
- 7.SP.3 Describe and analyze distributions.
 - a. Summarize quantitative data sets in relation to their context by using mean absolute deviation(MAD), interpreting mean as a balance point.
 - b. 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
- 7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. (deleted standard)

Gaise Model:

- Step 1: Formulate the Question
 - o Students should pose their own statistical question of interest (Level C).
 - o Students are starting to form questions that allow for generalizations of a population (Level B-C).
- Step 2: Collect Data
 - o Students should begin to use random selection or random assignment (Level B).
- Step 3: Analyze Data
 - o Students measure variability within a single group using MAD, IQR, and/or standard deviation (Level A).
 - o Students compare measures of center and spread between groups using displays and values (Level B).
 - o Students describe potential sources of error (Level B).
 - Students understand and use particular properties of distributions as tools of analysis moving toward using global characteristics of distributions (Level B-C).
- Step 4: Interpret Results

Quarter 4



- O Students acknowledge that looking beyond the data is feasible by interpreting differences in shape, center, & spread (Level B).
- Students determine if a sample is representative of a population and start to move towards generalization (Level B-C).
- o Students note the difference between two groups with different conditions (Level B).

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| 2013 2020 | |
|----------------------------------|--|
| Real-Time Histogram | |
| OH.Math.7.SP.2d | |
| Box-and-Whisker Plots | |
| OH.Math.7.SP.C: | |
| OH.Math.7.SP.3: | |
| OH.Math.7.SP.3b: | |
| Box-and-Whisker Plots | |
| Describing Data Using Statistics | |
| Mean, Median, and Mode | |