Mathematics II, Semester B

Course Overview

Mathematics II extends students' geometric knowledge and introduces them to quadratic expressions, equations, and functions, exploring the relationships among these and their linear and exponential counterparts. Students learn through discovery and application, developing the skills they need to break down complex challenges and demonstrate their knowledge in new situations.

Course topics include extending the number system; quadratic functions and modeling; expressions and equations; applications of probability; similarity, right-triangle trigonometry, and proofs; and circles with and without coordinates.

This course supports all students as they develop computational fluency and deepen conceptual understanding. Students begin each lesson by discovering new concepts through guided instruction, and then confirm their understanding in an interactive, feedback-rich environment. Modeling activities equip students with tools for analyzing a variety of real-world scenarios and mathematical ideas. Journaling activities allow students to reason abstractly and quantitatively, construct arguments, critique reasoning, and communicate precisely. Performance tasks prepare students to synthesize their knowledge in novel, real-world scenarios and require that they make sense of multifaceted problems and persevere in solving them.

This course is built to state standards.

Course Components and Grading Rubric

The table gives a breakdown of the weight for each component in the course. Weight represents the percentage of the total score coming from each activity.

Course Components	Count	Weight
Pretest. *A pretest is an optional assessment, typically designed for credit recovery. If a student shows mastery of a lesson objective, the student may be automatically exempted from the upcoming activities associated with the mastered objective. Each passing pretest grade is entered into the gradebook.*	7	0%
Practice. *A practice activity provides instruction similar to that found in a study so that students can practice or review skills necessary to complete their assignment with mastery.*	7	10%
Journal. *A journal is a short reflective writing exercise that encourages students to connect historical events and ideas to their own lives and circumstances.*	7	5%
Project. *A project is a hands-on investigation that extends over several weeks.*	1	5%

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Course Components	Count	Weight
Mastery Test. *A mastery test is a computer-scored lesson-level summative assessment.*	54	40%
Posttest. *A posttest appears at the end of each unit.*	7	15%
End-of-Semester Test. *An end-of-semester test (EOS) appears at the end of each course.*	1	10%
Teacher-Graded Posttest. *A posttest that prompts students for written responses appears at the end of each unit.*	7	15%
Total	**91**	**100%**

**Teachers may manually adjust these weights if desired, per district grading requirements.*

UNIT 1: PREPARING FOR PROOFS

Lesson and Duration	Description
Pretest: Preparing for Proofs *40 minutes*	Complete the pretest (optional).
Preparing for Proofs: Unit Overview *1 minute*	Read the unit overview.
LESSON 1 **Induction: The Search for Rules and Patterns: Lesson Overview** *5 minutes*	Read the lesson objectives.
Induction: The Search for Rules and Patterns: Study *35 minutes*	Learn about looking for patterns, making conjectures, cross-referencing to history and science, real-world examples of inductive reasoning, building a triangle, and examples of symmetry.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Induction: The Search for Rules and Patterns: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.

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Lesson and Duration	Description
LESSON 2 **Deduction: Making a Case: Lesson Overview** *5 minutes*	Read the lesson objectives.
Deduction: Making a Case: Study *35 minutes*	Learn about the definition of deductive reasoning; postulates and conditional statements; and using deductive reasoning in proofs. Explore a real-world example of deducing that deals with the combination of a lock.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Deduction: Making a Case: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **The Look and Language of Logic: Lesson Overview** *5 minutes*	Read the lesson objectives.
The Look and Language of Logic: Study *35 minutes*	Explore examples of geometric reasoning. Learn about converses, inverses, and contrapositives of conditional statements.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
The Look and Language of Logic: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 4 **Introduction to Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Introduction to Proofs: Study *35 minutes*	Learn about postulates and axioms, givens, proof by contradiction (indirect proof), theorems and corollaries, and the axiomatic method.

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Lesson and Duration	Description
Introduction to Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Basic Postulates in Geometry: Lesson Overview** *5 minutes*	Read the lesson objectives.
Basic Postulates in Geometry: Study *35 minutes*	Learn about the relationship of rays, lines, and angles to direction; the definition of a line; notation for rays and lines; building and defining an angle (including its vertex and sides); conventions for naming angles; and straight and zero angles.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Basic Postulates in Geometry: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 6 **Planes and the Space of Geometry: Lesson Overview** *5 minutes*	Read the lesson objectives.
Planes and the Space of Geometry: Study *35 minutes*	Learn about dimensionality, collinear points, two-dimensional objects, the geometric plane, the flat plane, postulate coplanar objects, and three-dimensional objects (solids).
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Planes and the Space of Geometry: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Practice: Modeling: Logo Design *30 minutes*	Use your knowledge of location, direction, and angles to model and solve a real-world problem.

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Lesson and Duration	Description
LESSON 7 **Intersecting Lines and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Intersecting Lines and Proofs: Study *35 minutes*	Learn about intersections that form vertical angles; the vertical angle theorem; perpendicular lines, rays, and segments; distance and length; and perpendicular bisectors.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Intersecting Lines and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 8 **Parallel Lines and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Parallel Lines and Proofs: Study *35 minutes*	Learn about skew lines, coplanar lines that do not intersect, parallel line notation, transversals and corresponding angles, alternate interior angles, consecutive interior angles, and parallel line theorems.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Parallel Lines and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: Consecutive Angle Theorem *30 minutes*	Use what you know about lines and angles to critique the reasoning of others and prove a theorem.
Solving the Mirror Problem: Study *35 minutes*	Learn about applying theorems from this unit to the problem of measuring light reflected off a mirror. Learn about the law of reflection.

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Lesson and Duration	Description
UNIT 1 WRAP-UP **Preparing for Proofs: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Preparing for Proofs *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Preparing for Proofs *30 minutes*	Take a teacher-scored test to check what you have learned in this unit.

UNIT 2: TRIANGLES

Lesson and Duration	Description
Pretest: Triangles *40 minutes*	Complete the pretest (optional).
Triangles: Unit Overview *1 minute*	Read the unit overview.
LESSON 1 **What Is a Triangle?: Lesson Overview** *5 minutes*	Read the lesson objectives.
What Is a Triangle?: Study *35 minutes*	Learn about the definition and parts of a triangle; opposite and included figures; naming and sorting triangles; equilateral, isosceles, and scalene triangles; and the triangle inequality theorem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
What Is a Triangle?: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 2 **The Angles of a Triangle: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
The Angles of a Triangle: Study *35 minutes*	Explore the angle sum theorem and third angle theorem for triangles. Investigate the relationship between a given triangle's vertex and its exterior and remote interior angles.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
The Angles of a Triangle: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **Congruence: Lesson Overview** *5 minutes*	Read the lesson objectives.
Congruence: Study *35 minutes*	Learn about congruence, transformations of triangles, corresponding triangles, notation for writing congruence statements, and the CPCTC triangle congruence theorem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Congruence: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 4 **Congruence Postulates: Lesson Overview** *5 minutes*	Read the lesson objectives.
Congruence Postulates: Study *35 minutes*	Learn about postulates including the SSS, SAS, ASA, and AAS theorems.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Congruence Postulates: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Proofs of Congruence: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
Proofs of Congruence: Study *35 minutes*	Learn about proving that parts of triangles are congruent by using Thales's method for measuring the distance from ship to shore.
Proofs of Congruence: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: Proofs of Congruence *30 minutes*	Use what you know about congruence of triangles to prove the Perpendicular Bisector Theorem.
LESSON 6 **Similar Triangles: Lesson Overview** *5 minutes*	Read the lesson objectives.
Similar Triangles: Study *35 minutes*	Learn about similarity versus congruence, testing for similarity among triangles, proportionality, the definition of similar triangles, and scale factor.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Similar Triangles: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 7 **Similarity Theorems and Proportional Reasoning: Lesson Overview** *5 minutes*	Read the lesson objectives.
Similarity Theorems and Proportional Reasoning: Study *35 minutes*	Learn about the ASA similarity postulate, the SSS similarity theorem, and the SAS similarity theorem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Similarity Theorems: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.

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Lesson and Duration	Description
Practice: Modeling: Similarity Theorems *30 minutes*	Use your knowledge of similarity to model and solve a real-world problem.
LESSON 8 **Triangle Theorems: Lesson Overview** *5 minutes*	Read the lesson objectives.
Triangle Theorems: Study *35 minutes*	Learn and prove the isosceles triangle theorem and its converse. Investigate two corollaries involving angle measures for equilateral triangles. Explore theorems for scalene triangles. Apply what you have learned to solve Thales's problem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Triangle Theorems: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 9 **Medians and Altitudes: Lesson Overview** *5 minutes*	Read the lesson objectives.
Medians and Altitudes: Study *35 minutes*	Identify and explore medians and altitudes. Discover their relationship to centroids, orthocenters, incenters, and circumcenters.
Medians and Altitudes: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 10 **Bisectors and Midsegments: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
Bisectors and Midsegments: Study *35 minutes*	Identify and explore angle bisectors, perpendicular bisectors, and midpoint bisectors, and lines parallel to one side of a triangle to discover their relationships to circumcenters, incenters, and side lengths.
Bisectors and Midsegments: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
UNIT 2 WRAP-UP **Triangles: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Triangles *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Triangles *30 minutes*	Take a teacher-scored test to check what you have learned in this unit.

UNIT 3: RIGHT TRIANGLES AND TRIGONOMETRY

Lesson and Duration	Description
Pretest: Right Triangles and Trigonometry *40 minutes*	Complete the pretest (optional).
Right Triangles and Trigonometry: Unit Overview *1 minute*	Read the unit overview.
LESSON 1 **The Pythagorean Theorem: Lesson Overview** *5 minutes*	Read the lesson objectives.
The Pythagorean Theorem: Study *35 minutes*	Learn how the Pythagorean theorem applies only to right triangles and discover one proof of it. Learn about the converse of the Pythagorean theorem, Pythagorean triples, and applying the theorem to the problem of fitting a baseball bat into a rectangular trunk.

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Lesson and Duration	Description
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
The Pythagorean Theorem: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: Proving the Pythagorean Theorem *30 minutes*	Use what you know about congruence of triangles to prove the Pythagorean Theorem.
LESSON 2 **Congruent Right Triangles: Lesson Overview** *5 minutes*	Read the lesson objectives.
Congruent Right Triangles: Study *35 minutes*	Learn about the HL, LL, HA, LA, and perpendicular bisector theorems. Learn about the angle bisector theorem and its converse.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Congruent Right Triangles: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **Similar Right Triangles: Lesson Overview** *5 minutes*	Read the lesson objectives.
Similar Right Triangles: Study *35 minutes*	Explore the properties of similar right triangles. Prove that if an altitude is drawn from the right-angle vertex of a right triangle to its hypotenuse, then three similar triangles are formed. Calculate the missing sides of similar right triangles by using proportions and apply concepts learned to a miniature-golf problem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.

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Lesson and Duration	Description
Similar Right Triangles: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 4 **Special Right Triangles: Lesson Overview** *5 minutes*	Read the lesson objectives.
Special Right Triangles: Study *35 minutes*	Explore 45-45-90 and 30-60-90 triangles as special cases of right triangles and learn how to apply the ratios of their side lengths.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Special Right Triangles: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Trigonometric Ratios: Lesson Overview** *5 minutes*	Read the lesson objectives.
Trigonometric Ratios: Study *35 minutes*	Learn the definitions of *sine*, *cosine*, and *tangent*. Memorize the shortcut "soh-cah-toa" as a way to relate these ratios. Explore the use of trigonometric ratios in the solution of a real-world problem involving the construction of a cable car.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Trigonometric Ratios: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Practice: Modeling: Leaning Towers *30 minutes*	Use your knowledge of right triangles, trigonometric ratios, and the Pythagorean Theorem to model and solve a real-world problem.

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Lesson and Duration	Description
LESSON 6 **Trigonometric Ratios and the Unit Circle: Lesson Overview** *5 minutes*	Read the lesson objectives.
Trigonometric Ratios and the Unit Circle: Study *35 minutes*	Learn the six trigonometric ratios and how the unit circle defines them.
Pythagorean Theorem: Study *35 minutes*	Review the Pythagorean theorem.
Practice Problems: Checkup *25 minutes*	Complete a set of practice problems on trigonometric functions and the unit circle.
Trigonometric Ratios and the Unit Circle: Mastery Test *20 minutes*	Take a quiz to assess your understanding of the material.
UNIT 3 WRAP-UP **Right Triangles and Trigonometry: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Right Triangles and Trigonometry *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Right Triangles and Trigonometry *30 minutes*	Take a teacher-scored test to assess what you have learned in this unit.

UNIT 4: QUADRILATERALS AND OTHER POLYGONS

Lesson and Duration	Description
Pretest: Quadrilaterals and Other Polygons *40 minutes*	Complete the pretest (optional).
Quadrilaterals and Other Polygons: Unit Overview *1 minute*	Read the unit overview.

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Lesson and Duration	Description
LESSON 1 **Angle Sums of a Polygon and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Angle Sums of a Polygon and Proofs: Study *35 minutes*	Learn about the diagonal of a polygon, the formula for the sum of the measures of a polygon's interior angles and exterior angles, and a theorem for the sum of their measures.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Angle Sums of a Polygon and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 2 **Parallelograms and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Parallelograms and Proofs: Study *35 minutes*	Learn about the definition of a parallelogram, properties and theorems of parallelograms, consecutive angle pairs, and diagonals.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Parallelograms and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **Tests for Parallelograms: Lesson Overview** *5 minutes*	Read the lesson objectives.
Tests for Parallelograms: Study *35 minutes*	Explore parallelogram theorems involving opposite side lengths, opposite and consecutive angle measures, and bisecting diagonals. Then work through a sample proof.

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Lesson and Duration	Description
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Tests for Parallelograms: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Practice: Modeling: Finding Parallelograms *30 minutes*	Use your knowledge of quadrilaterals to model and solve a real-world problem.
LESSON 4 **Rectangles: Lesson Overview** *5 minutes*	Read the lesson objectives.
Rectangles: Study *35 minutes*	Learn about the definition of a rectangle, congruent diagonal theorems, and right angle theorems. Explore a sample problem about using the congruent diagonal theorem to prove that a window is rectangular.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Rectangles: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Rhombi and Squares: Lesson Overview** *5 minutes*	Read the lesson objectives.
Rhombi and Squares: Study *35 minutes*	Identify the properties and definitions of a rhombus and a square. Prove that the diagonals of a rhombus are perpendicular. Investigate how diagonals of a rhombus bisect opposite vertices. Apply the properties of rhombi and squares to find missing side lengths, diagonal lengths, and angle measures.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.

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Lesson and Duration	Description
Rhombi and Squares: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 6 **Trapezoids: Lesson Overview** *5 minutes*	Read the lesson objectives.
Trapezoids: Study *35 minutes*	Learn the definition of a trapezoid and identify its parts. Explore how base angles and diagonals of an isosceles trapezoid are congruent. Investigate the medians of a trapezoid. Apply the properties of trapezoids and isosceles trapezoids to find missing side lengths and median lengths.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Trapezoids: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: The Stone Arch *30 minutes*	Use what you know about triangles and parallelograms to solve a real-world problem.
UNIT 4 WRAP-UP **Quadrilaterals and Other Polygons: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Quadrilaterals and Other Polygons *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Quadrilaterals and Other Polygons *30 minutes*	Take a teacher-scored test to check what you have learned in this unit.

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UNIT 5: CIRCLES WITHOUT COORDINATES

Lesson and Duration	Description
Pretest: Circles Without Coordinates *40 minutes*	Complete the pretest (optional).
Circles Without Coordinates: Unit Overview *1 minute*	Read the unit overview.
LESSON 1 **What Is a Circle?: Lesson Overview** *5 minutes*	Read the lesson objectives.
What Is a Circle?: Study *35 minutes*	Learn about the definition of a circle and about its center, radius, and circumference.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
What Is a Circle?: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 2 **Chords: Lesson Overview** *5 minutes*	Read the lesson objectives.
Chords: Study *35 minutes*	Investigate the properties and definitions of chords and diameters. Discover that two chords are congruent if they are the same distance from the center of the circle. Prove that the radius bisects a chord if it is perpendicular to the chord.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Chords: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **Arcs: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
Arcs: Study *35 minutes*	Learn the definitions of arc, endpoint, central angle, and intercept. Learn about minor and major arcs and semicircles, arc notation, the measure of minor and major arcs, and the arc congruence and congruent chord theorems.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Arcs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 4 **Chord and Arc Relationships: Lesson Overview** *5 minutes*	Read the lesson objectives.
Chord and Arc Relationships: Study *35 minutes*	Learn the definitions of arc, endpoint, central angle, and intercept. Learn about minor and major arcs and semicircles, arc notation, the measure of minor and major arcs, and the arc congruence and congruent chord theorems.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Chord and Arc Relationships: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Circles, Angles, and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Circles, Angles, and Proofs: Study *35 minutes*	Learn the definition of an inscribed angle. Experiment with inscribed angles and their intercepted arcs. Discover and prove that an inscribed angle is half the measure of its intercepted arc. Discover and prove the intersecting chord theorem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.

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Lesson and Duration	Description
Circles, Angles, and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 6 **Secants, Tangents, and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Secants, Tangents, and Proofs: Study *35 minutes*	Learn about the definition of secant and about secant-secant angle, its theorem, and proving the theorem. Learn about tangent line, point of tangency and tangent segments, tangents perpendicular to a circle's radius, a tangent-tangent angle and its theorem, and a tangent-chord angle and its theorem. Explore a sample proof.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Secants, Tangents, and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 7 **Circumference and Arc Length: Lesson Overview** *5 minutes*	Read the lesson objectives.
Circumference and Arc Length: Study *35 minutes*	Learn about the irrational number pi and the formula for finding the circumference of a circle. Apply circumference to a real-world problem about how to build a bridge that's tall enough for boats to travel beneath it. Learn about the degree measure of an arc and arc length. Derive the formula for arc length.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Circumference and Arc Length: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.

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Lesson and Duration	Description
LESSON 8 **Area and Sectors: Lesson Overview** *5 minutes*	Read the lesson objectives.
Area and Sectors: Study *35 minutes*	Learn about the formula for the area of a circle. Explore a case study comparing the cost per square inch of small and large pizzas. Learn about sectors and the area of a sector.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Area and Sectors: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Practice: Modeling: Stained Glass Window *30 minutes*	Use what you know about finding the area of circles and sectors to model and solve a real-world problem.
LESSON 9 **Circles and Triangles: Lesson Overview** *5 minutes*	Read the lesson objectives.
Circles and Triangles: Study *35 minutes*	Learn about inscribed objects; circumscribed objects; and the definitions of incenter and circumcenter.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Circles and Triangles: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: Similar Circles *30 minutes*	A peer uses dilation to prove that two circles are similar. Now you prove it using inscribed triangles.
LESSON 10 **Circles and Polygons: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
Circles and Polygons: Study *35 minutes*	Learn about the theorems of a quadrilateral inscribed in a circle and of a parallelogram inscribed in a circle.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Circles and Polygons: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
UNIT 5 WRAP-UP **Circles Without Coordinates: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Circles Without Coordinates *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Circles Without Coordinates *30 minutes*	Take a teacher-scored test to check what you have learned in this unit.

UNIT 6: CONIC SECTIONS

Lesson and Duration	Description
Pretest: Conic Sections *40 minutes*	Complete the pretest (optional).
Conic Sections: Unit Overview *1 minute*	Read the unit overview.
LESSON 1 **From Lines to Conic Sections: Lesson Overview** *5 minutes*	Read the lesson objectives.
From Lines to Conic Sections: Study *35 minutes*	Learn about four kinds of conic sections, as well as the definitions of right circular cone, nappe, vertex, conic section, and cross section.

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Lesson and Duration	Description
Practice Problems: Checkup *25 minutes*	Complete a set of practice problems to check your understanding of the lesson.
From Lines to Conic Sections: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 2 **Geometry of Conic Sections: Lesson Overview** *5 minutes*	Read the lesson objectives.
Geometry of Conic Sections: Study *35 minutes*	Learn about parts and geometric properties of circles, ellipses, hyperbolas, and parabolas.
Practice Problems: Checkup *25 minutes*	Complete a set of practice problems to check your understanding of the lesson.
Geometry of Conic Sections: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **Midpoint Formula: Lesson Overview** *5 minutes*	Read the lesson objectives.
Midpoint Formula: Study *35 minutes*	Learn about the midpoints of horizontal, vertical, and diagonal line segments and about the midpoint formula. Complete a sample problem.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Midpoint Formula: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 4 **The Distance Formula: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
The Distance Formula: Study *35 minutes*	Derive the distance formula from the Pythagorean theorem. Use this formula to calculate the distance between any two points. Apply the distance formula in a real-world problem that involves locating the shortest route on a nautical map.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
The Distance Formula: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Circles with Coordinates and Proofs: Lesson Overview** *5 minutes*	Read the lesson objectives.
Circles with Coordinates and Proofs: Study *35 minutes*	Use algebra to find an equation whose solution set is a circle. Learn about the standard equation for circles that are not centered at the origin.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Circles with Coordinates and Proofs: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: Point on a Circle *30 minutes*	Use what you know about equations of circles to prove whether or not a point is on a circle.
LESSON 6 **Parabolas: Lesson Overview** *5 minutes*	Read the lesson objectives.
Parabolas: Study *35 minutes*	Learn about finding a parabola's equation from its graph; the effect of the squared variable's coefficient on the parabola's orientation and shape; equations of parabolas with vertices at points other than the origin; vertex form and standard form of an equation for a parabola; and converting between vertex form and standard form.

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Lesson and Duration	Description
Practice Problems: Checkup *25 minutes*	Complete a set of practice problems to check your understanding of the lesson.
Parabolas: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 7 **Locus of Points: Lesson Overview** *5 minutes*	Read the lesson objectives.
Locus of Points: Study *35 minutes*	Learn about defining objects in terms of points and given distances. Explore examples of a parabola and bisecting angles.
Locus of Points: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Practice: Modeling: Wildlife Sanctuary *30 minutes*	Use what you know about locus of points to solve a real world problem.
UNIT 6 WRAP-UP **Conic Sections: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Conic Sections *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Conic Sections *30 minutes*	Take a teacher-scored test to check what you have learned in this unit.

UNIT 7: THREE-DIMENSIONAL SOLIDS

Lesson and Duration	Description
Pretest: Three-Dimensional Solids *40 minutes*	Complete the pretest (optional).
Three-Dimensional Solids: Unit Overview *1 minute*	Read the unit overview.

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Lesson and Duration	Description
LESSON 1 **What Is a Polyhedron?: Lesson Overview** *5 minutes*	Read the lesson objectives.
What Is a Polyhedron?: Study *35 minutes*	Learn about the definition and elements of a polyhedron, prisms and their components, triangular and rectangular prisms, cubes, and regular and irregular pyramids.
What Is a Polyhedron?: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 2 **Cylinders and Cones: Lesson Overview** *5 minutes*	Read the lesson objectives.
Cylinders and Cones: Study *35 minutes*	Learn about the definition, components, and properties of a cylinder; the definition and components of a cone; and the similarities between cones and pyramids.
Cylinders and Cones: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 3 **Platonic Solids: Lesson Overview** *5 minutes*	Read the lesson objectives.
Platonic Solids: Study *35 minutes*	Learn about polygonal numbers, regularity of Platonic solids, and building your own Platonic solids.
Platonic Solids: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Practice: Modeling: Solids *30 minutes*	Practice with a real-world solid modeling application.
LESSON 4 **Surface Area: Lesson Overview** *5 minutes*	Read the lesson objectives.

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Lesson and Duration	Description
Surface Area: Study *35 minutes*	Learn about perimeter and surface area; base and lateral area; slant height versus altitude; and the formulas for surface area of a right prism, an oblique prism, a regular pyramid, an oblique cylinder, a right cone, and an oblique cone. Explore sample problems dealing with these subjects.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Surface Area: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 5 **Volume: Lesson Overview** *5 minutes*	Read the lesson objectives.
Volume: Study *35 minutes*	Learn about area and volume, the formulas for volume of a cube and a rectangular prism, and Bonaventura Francesco Cavalieri's principle. Learn about the formulas for volume of a cylinder, a pyramid, and a cone; explore sample problems dealing with these formulas. Learn about cross-sectional area.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Volume: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
Journal: Volume *30 minutes*	Think about and discuss how changing one dimension of a given shape changes its volume and surface area.
LESSON 6 **Spheres: Lesson Overview** *5 minutes*	Read the lesson objectives.
Spheres: Study *35 minutes*	Learn about the definition of a sphere; the formulas for surface area and volume of a sphere; comparing the surface area and volume of a sphere, cube, cylinder, and cone; and using Cavalieri's principle to derive the formula for volume of a sphere.

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Lesson and Duration	Description
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Spheres: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 7 **Similar Solids: Lesson Overview** *5 minutes*	Read the lesson objectives.
Similar Solids: Study *35 minutes*	Learn about similar prisms, pyramids, cylinders, cones, and spheres; the constant ratio between corresponding parts of similar solids; and the ratio of volumes of similar solids.
Practice Problems: Checkup *25 minutes*	Check your understanding of the lesson.
Similar Solids: Mastery Test *20 minutes*	Take a quiz to check your understanding of what you have learned.
LESSON 8 **Performance Task: Lesson Overview** *5 minutes*	Read the lesson objectives.
Geodesic Domes: Study *35 minutes*	Use your knowledge of three-dimensional solids to solve a geodesic dome problem.
Project: Performance Task: The Subway Stop *2 hours*	Use what you know about three-dimensional solids to solve a real-world problem.
UNIT 7 WRAP-UP **Three-Dimensional Solids: Review** *25 minutes*	Check your understanding of the topics in this unit.
Posttest: Three-Dimensional Solids *40 minutes*	Take a computer-scored test to check what you have learned in this unit.
Teacher-Graded Posttest: Three-Dimensional Solids *30 minutes*	Take a teacher-scored test to check what you have learned in this unit.

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SEMESTER WRAP-UP

Lesson and Duration	Description
Semester Review: Review *20 minutes*	Prepare for the final exam by reviewing key concepts and skills.
End-of-Semester Test: Semester Exam *50 minutes*	Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in this semester.

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