Math 8 Unit 3: Geometry & Measurement

Content Area: **Math**
Course(s): **CP Algebra 1, Accelerated Algebra I, CP Geometry, Accelerated Algebra I, Acc. Geometry**
Time Period: **Marking Period 2**
Length: **9 weeks**
Status: **Published**

Course Pacing Guide

This pacing guide should include the vision and mission of the course. It will be the same for all units in your course.

The simpler, the better. Pacing guide flaws come when they are too constricting, so big ideas is best (Cobb, McClain, de Silva Lamberg, & Dean, 2003; Wiggins, Wiggins, & McTighe, 2005)

Unit	MP/Trimester	Weeks
Integers, Equations, and Inequalities	1	8
Rational Numbers and Proportions	1/2	5
Geometry and Measurement	2/3	9
Transformations	3	4
Functions	3/4	7
Data Analysis and Probability	4	4

Unit Overview

Geometry and Measurement: This unit allows students to evaluate and simplify expressions using radicals. Students are introduced to the Pythagorean Theorem, and how to find missing sides of right triangles. Students will master classifying numbers based on the real number system, as well as the Distance and Midpoint Formula. Students will expand on their knowledge of surface area and volume of 3-D figures, also finding the surface area and volume of pyramids and cones.

Enduring Understandings

For two numbers x and y, x2 = y, then x is a square root of y.

Every positive number y has two square roots, one positive and one negative.

A perfect square has integer square roots.

The Pythagorean Theorem states that the sum of the squares of the lengths of the legs of a right triangle is equal to the square of the hypotenuse of the triangle.

You can approximate a square root by finding the two perfect squares the number is between

When solving a radical equation, you must undo an exponent of 2 by taking the square root.

The hypotenuse is the longest side of a right triangle, and across from the right angle.

All real numbers can be classified as rational or irrational

All rational numbers can be represented by a ratio of two integers, an irrational number cannot.

The distance formula for the distance d between two points (x1, y1) and (x2, y2) is d = (x2 - x1)2 + (y2 - y1)2.

The midpoint M of a segment is the point whose x- and y-coordinates are the averages of the x and y coordinates, respectively, of the endpoints of the segment.

Surface area of a 3D object is the sum of the area of all the faces of the object

The volume of a 3D object is the quantity of space occupied by the object

Surface area is measured in square units

Volume is measured in cubic units

Prisms and cylinders have 2 bases, while cones and pyramids only have 1

To calculate the area of the base of an object, you must know the correct formula based on the shape of the base

Finding the volume and surface area of an object with a circular base requires

Essential Questions

How can we find and approximate square roots?

How do you find the length of the hypotenuse of a right triangle if the lengths of the other two sides are known?

What is the difference between a rational number and an irrational number?

How is finding the midpoint of a segment whose two endpoints are given different from finding the distance between the two endpoints?

How are the surface area formulas for a prism and a cylinder similar?

How do you find the surface area of a cone given the area of the base and the slant height?

How many dimensions is the intersection of a plane and a three-dimensional figure? What is the intersection called?

How is the formula for the volume of a cylinder similar to the formula for the volume of a prism?

If you knew the volume of a prism with a base of B and a height h, how could you find the volume of a pyramid with the same base area and height?

New Jersey Student Learning Standards (No CCS)

MA.8.NS.A	Know that there are numbers that are not rational, and approximate them by rational numbers.
MA.8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
MA.8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).
MA.8.G.B	Understand and apply the Pythagorean Theorem.
MA.8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
MA.8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
MA.8.G.C	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
MA.8.G.C.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Interdisciplinary Connections

SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of

	technology's capacity to link to other information and to display information flexibly and dynamically.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.

SCI.7-8.5.1.8.B	Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.
9-12.HS-ETS1-1.1.1	Analyze complex real-world problems by specifying criteria and constraints for successful solutions.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.

Technology Standards

TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.2.12.C.CS2	The application of engineering design.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.

21st Century Themes/Careers

CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.

Financial Literacy Integration

PFL.9.1.8.A.2	Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.
PFL.9.1.8.A.6	Explain how income affects spending decisions.
PFL.9.1.8.B.9	Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).
PFL.9.1.8.D.1	Determine how saving contributes to financial well-being.
PFL.9.1.8.D.5	Explain the economic principle of supply and demand.
PFL.9.1.8.E.1	Explain what it means to be a responsible consumer and the factors to consider when making consumer decisions.

PFL.9.1.8.F.3	Relate the impact of business, government, and consumer fiscal responsibility to the economy and to personal finance.

Instructional Strategies & Learning Activities

- Provide access to online textbook
- Provide access to review problems/extra practice
- Provide access to answer keys for self-checking
- Tic-Tac-Toe
- Scavenger hunts
- Partner work
- Pair-Square
- Clock partners
- Supplemental worksheets
- Surface Area/Volume
- MathLibs
- Surface Area/Volume Maze

Differentiated Instruction

- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Tiered Learning Targets
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning
- Debate
- Student Data Inventories
- Game-Based Learning
- Grouping

- Rubrics
- Jigsaws
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Mentoring
- Assessment Design & Backwards Planning

Formative Assessments

- Daily homework checks
- Quiz
- Chapter Test
- Exit Tickets
- Warm-Ups

Summative Assessment

- Unit Test
- Unit Project

Benchmark Assessments

Students will take NJSLA Algebra 1 Benchmark B

Alternate Assessments

- Modified homework
- Modified quizzes
- Modified tests
- Modified projects

Resources & Technology

- Google docs, spreadsheets, slides
- TI graphing calculator
- Chromebooks
- Promethean board
- Websites: Desmos, Geogebra, EdPuzzle, Quizlet
- Google classroom

BOE Approved Texts

Holt Larson Pre-Algebra 9780547614830

Closure

- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade

would get it.

- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Kids write notes to peers describing what they learned from them during class discussions.
- Have students fill out a checklist with the objectives for the day.
- Have students complete an exit ticket without putting their name on it. Hand back exit tickets the next day in class and have students correct as a warm up.
- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice, Please," or "I Need Some Help!"
- After writing down the learning outcome, ask students to take a card, circle one of the following options, and return the card to you before they leave: "Stop (I'm totally confused. Go (I'm ready to move on.)" or "Proceed with caution (I could use some clarification on . . .)"

ELL

- Alternate Responses
- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- E-Dictionaries
- Google Translate

Special Education

- Shorten assignments to focus on mastery of key concepts.
- Specify and list exactly what the student will need to learn to pass.

- Evaluate the classroom structure against the student's needs (flexible structure, firm limits, etc.).
- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom (mobiles, etc.).
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Provide an unobstructed view of the whiteboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit as much time as needed to finish tests.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Have test materials read to the student, and allow oral responses.
- Divide tests into small sections of similar questions or problems.
- Allow the student to complete an independent project as an alternative test.
- Allow take-home or open-book tests.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Permit a student to rework missed problems for an additional credit grade.
- Average grades out when assignments are reworked, or grade on corrected work.

504

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

At Risk

- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking
- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting

- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Cue/model expected behavior
- Use peer supports and mentoring
- Chart progress and maintain data

Gifted and Talented

- Offer the Most Difficult First
- Pretest for Volunteers
- Offer choice
- Speak to Student Interests
- Allow G/T students to work together
- Tiered learning
- Focus on effort and practice
- Encourage risk taking