# ACC: Unit 5: Geometry

| | |
|---|---|
| Content Area: | **Mathematics** |
| Course(s): | **Math 6 Accelerated** |
| Time Period: | **February** |
| Length: | **4 weeks** |
| Status: | **Published** |

## Unit Summary

The goal for this unit is to develop students' understanding of geometry and its applications to real life problem solving. Students will use their prior knowledge of geometric shapes to solve computational and real world problems. Students will calculate the volume and surface area of rectangular and triangular prisms and pyramids. Students will work to build special quadrilaterals and polygons by decomposing them into rectangles and/or triangles.

## Standards

| | |
|---|---|
| MA.K-12.1 | Make sense of problems and persevere in solving them. |
| MA.6.RP.A.1 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. |
| MA.K-12.2 | Reason abstractly and quantitatively. |
| MA.K-12.3 | Construct viable arguments and critique the reasoning of others. |
| MA.K-12.4 | Model with mathematics. |
| MA.K-12.5 | Use appropriate tools strategically. |
| MA.K-12.6 | Attend to precision. |
| MA.K-12.7 | Look for and make use of structure. |
| MA.6.RP.A.3d | Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. |
| MA.K-12.8 | Look for and express regularity in repeated reasoning. |
| MA.6.NS.B.2 | Fluently divide multi-digit numbers using the standard algorithm. |
| MA.6.EE.A.2a | Write expressions that record operations with numbers and with letters standing for numbers. |
| MA.6.EE.A.2b | Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. |
| MA.6.EE.A.2c | Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). |
| MA.7.G.B.4 | Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. |
| MA.7.G.B.6 | Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. |
| | For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$. |

| | |
|---|---|
| MA.6.EE.B.5 | Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. |
| MA.6.EE.B.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. |
| 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. |
| MA.6.EE.B.7 | Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p$, $q$ and $x$ are all nonnegative rational numbers. |
| MA.6.G.A | Solve real-world and mathematical problems involving area, surface area, and volume. |
| MA.6.G.A.1 | Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. |
| MA.6.G.A.2 | Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. |
| MA.6.G.A.4 | Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. |
| MA.6.SP.B.5 | Summarize numerical data sets in relation to their context, such as by: |
| MA.6.4.5.6 F | Technology |
| MA.6.4.5.6 F.1 | Use technology to gather, analyze, and communicate mathematical information. |
| MA.6.4.5.6 F.4 | Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions). |
| MA.6.4.5.6 F.5 | Use computer software to make and verify conjectures about geometric objects. |
| 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. |
| TECH.8.1.8 | Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. |
| TECH.8.1.8.A | Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations. |
| TECH.8.1.8.A.1 | Demonstrate knowledge of a real world problem using digital tools. |
| TECH.8.1.8.A.CS1 | Understand and use technology systems. |
| TECH.8.1.8.A.CS2 | Select and use applications effectively and productively. |
| TECH.8.1.8.B.CS2 | Create original works as a means of personal or group expression. |
| TECH.8.1.8.C | Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. |
| TECH.8.1.8.C.CS4 | Contribute to project teams to produce original works or solve problems. |
| TECH.8.1.8.D | Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. |
| TECH.8.1.8.D.1 | Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media. |

| TECH.8.1.8.D.CS1 | Advocate and practice safe, legal, and responsible use of information and technology. |
| TECH.8.1.8.D.CS3 | Exhibit leadership for digital citizenship. |
| TECH.8.1.8.E | Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information. |
| TECH.8.1.8.F | Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. |
| TECH.8.1.8.F.CS2 | Plan and manage activities to develop a solution or complete a project. |
| TECH.8.2.8.D.CS2 | Use and maintain technological products and systems. |

## Student Learning Objectives

- Students will learn that the area of triangle is 1/2 of the area of a parallelogram.
- Students will learn the area of a triangle and/or rectangle can be used to determine the area of special quadrilaterals and polygons.
- Students will learn to use manipulatives and/or algebra to determine the volume of a right rectangular prism.
- Students will learn that nets are a tool to determine the surface area of regular three dimensional figures.
- Students will learn the attributes of a circle.
- Students will learn the relationship between circumference and diameter.
- Students will learn the process of finding the circumference and area of a circle.

## Essential Questions

- What is the difference between two dimensions and three dimensions when working with geometric shapes and figures?
- How do we measure objects that can not be measured easily with standard measuring tools?
- How can we use geometry to analyze the characteristics and properties of two and three dimensional shapes?
- How do we use the rules of geometry to understand the relationship between shapes?

## Enduring Understandings

- Students will understand that there is a difference between the measurements of two and three dimensional geometric shapes and figures.
- Students will understand that coordinate geometry can be used to represent and verify geometric and algebraic relationships.
- Students will understand that shapes have spatially reasoning, which leads to logical reasoning about transformations.
- Students will understand that to connect geometry to number operations and measurement via notion of partitioning.
- Students will understand that algebra can be used to determine area, volume, and missing dimension.

## Application

- Students will be able to independently use their learning to determine area, surface area, and volume of geometric shapes.
- Students will be able to independently use their learning to solve for volume of a right rectangular prism using fractional edge lengths.

# Skills

Students will be skilled at:

- Solving algebraically for area and perimeter of quadrilaterals, circles, and compound figures.
- Calculating the volume of geometric shapes.
- Calculating the volume of a right rectangular prism with fractional edge lengths using V = lwh and V=Bh.
- Calculating missing dimension of a geometric shape using algebra.
- Utilizing nets to determine the surface area of polyhedra (rectangular and triangular prisms).