Dear Parents,

We will begin our next unit of study in math soon. The information below will serve as an overview of the unit as you work to support your child at home. If you have any questions, please feel free to contact me. I appreciate your ongoing support.

Sincerely,

Your Child's Teacher

Unit Name: Apply Geometric Concepts

North Carolina Content State Standards:

NC.4.G.1 Draw and identify points, lines, line segments, rays, angles, and perpendicular and parallel lines.

NC.4.G.2 Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.

NC.4.G.3 Recognize symmetry in a two-dimensional figure, and identify and draw lines of symmetry.

NC.4.MD.6 Develop an understanding of angles and angle measurement.
- Understand angles as geometric shapes that are formed wherever two rays share a common endpoint, and are measured in degrees.
- Measure and sketch angles in whole-number degrees using a protractor.
- Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.

Supporting Standards

NC.4.OA.3 Solve two-step word problems involving the four operations with whole numbers.
- Use estimation strategies to assess reasonableness of answers.
- Interpret remainders in word problems.
- Represent problems using equations with a letter standing for unknown quantity.

NC4.OA.5 Generate and analyze a number or shape pattern that follows a given rule.

Math Language:

- Lines
- Points
- Perpendicular
- Triangles
- Trapezoids
- Acute Angle
- Right Angle
- Equilateral
- Constant
- Rule

- Line Segments
- Vertex/Vertices
- Parallel Lines
- Squares
- Rhombus
- Obtuse Angle
- Degrees
- Scalene
- Variable

- Rays
- Shapes
- Polygon
- Rectangles
- Symmetry
- Mirror Image
- Protractor
- Isosceles
- Pattern

- Angles
- Geometric Figures
- Quadrilaterals
- Parallelograms
- Symmetrical
- Line of Symmetry
- Two-dimensional Figures
- Complementary Angle
- Supplemental Angle

Unit Overview:

This unit uses symmetry, angles, perpendicular lines, and parallel lines as a platform to classify shapes and develop spatial sense and geometric reasoning. Students build spatial sense by noticing symmetry and attributes of two-dimensional shapes regardless of their size or orientation, and use these attributes to identify and classify them. The focus is on classifying and identifying quadrilaterals and triangles based on their attributes. Students build a conceptual understanding of shape attributes, and show this when describing and categorizing their sorting results, and justifying and making conjectures based on their

thinking. Memorizing names of shapes without understanding attributes that define the shape can leave students with misconceptions.

Students will also identify angles and be able to explain the different types of angles. This is the first time students will be exposed to rays, angles, and perpendicular and parallel lines. They will use this knowledge of parallel and perpendicular lines to classify shapes by attributes. As students continue to explore two-dimensional figures, they will learn about symmetry and line of symmetry for the first time. Students have explored dividing shapes into equal pieces since 1st grade. Now students will build upon this concept with symmetry. Additionally, students will be exposed to using a protractor to measure and sketch angles for the first time. Students will use the understanding of benchmark angles such as 45°, 90°, and 180° to help assess the reasonableness of angle measurements, as well as make angle estimates Students will learn a circle is made up of 360 one-degree angles. Students will learn to reason about angles using complementary angles. They will utilize this information in order to decompose (break apart) angles into smaller angles. For example, a 40 degree angle = 40 one-degree angles = 25 degree angle + 15 degree angle, etc. Students will solve word problems involving angle measurements and other geometric concepts.

Finally, students will apply their understanding of patterns with numbers and shapes from previous grades. They will also build upon an understanding of multiples and factors in order for students to see patterns and form a rule based on those patterns.

Skills/Strategies:
Students will be able to:
- Identify points, lines, segments, rays, angles, parallel and perpendicular lines
- Use tools to draw points, lines, segments, rays, angles, parallel and perpendicular lines
- Identify and classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines
- Identify and draw lines of symmetry
- Identify and draw right, acute, obtuse, and straight angles
- Use a protractor to measure and draw angles
- Solve for unknown angle measures
- Estimate to assess reasonableness of the angle measure

Strategies Students Will Learn:
Students will learn to use their understanding of parallel and perpendicular lines to further classify two-dimensional shapes. For example, they will be able to describe a trapezoid as a quadrilateral that has exactly one pair of parallel lines. Both of the following shapes below are trapezoids since the top line of each shape is parallel to the bottom line.

They will use their measurement skills to reason about the size of angles, using benchmark angles of 45°, 90°, and 180°. In the diagram below, the benchmark of a right angle (90°) will help students determine whether an angle is acute or obtuse before using the protractor to measure it.

This is an obtuse angle. It is greater than a right angle.
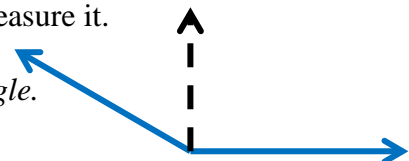
Video Support:

Video support can be found on LearnZillion. https://learnzillion.com/
- Draw points, lines, and line segments
- Classify and draw various types of angles
- Label and name points, lines, rays and angles using math notation
- Classify two-dimensional figures by examining their properties
    - Note: We only classify Quadrilaterals and Triangles.
- Classify triangles by examining their properties
- Identify line symmetry in regular polygons
- Introduction to protractors
- Measure angles to the nearest degree with protractor
- Compose and decompose angles

Additional Resources:
- NCDPI Additional Resources

Questions to Ask When Helping Your Child with Math Homework

Keep in mind that homework in elementary schools is designed as practice. If your child is having problems, please let the classroom teacher know. When helping your child with his/her math homework, you don't have to know all the answers! Instead, we encourage you to ask probing questions so your child can work through the challenges independently. Some examples may include the following:
- What is the problem you're working on?
- What do the directions say?
- What do you already know that can help you solve the problem?
- What have you done so far and where are you stuck?
- Where can we find help in your notes?
- Are there manipulatives, pictures, or models that would help?
- Can you explain what you did in class today?
- Did your teacher work examples that you could use?
- Can you go onto another problem & come back to this one later?
- Can you mark this problem so you can ask the teacher for an explanation tomorrow?