

Georgia Department of Education

**FOURTH GRADE MATHEMATICS**

**UNIT 6 STANDARDS**

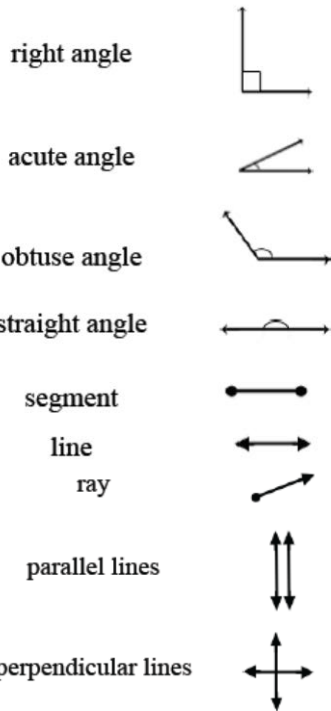
Dear Parents,

We want to make sure that you have an understanding of the mathematics your child will be learning this year. Below you will find the standards we will be learning in Unit Six. Each standard is in bold print and underlined and below it is an explanation with student examples. Your child is not learning math the way we did when we were in school, so hopefully this will assist you when you help your child at home. Please let your teacher know if you have any questions. 😊

**MGSE.4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.**

This standard asks students to draw two-dimensional geometric objects and to also identify them in two-dimensional figures. This is the first time that students are exposed to rays, angles, and perpendicular and parallel lines. Examples of points, line segments, lines, angles, parallelism, and perpendicularity can be seen daily.

Students do not easily identify lines and rays because they are more abstract.



Example:

Draw two different types of quadrilaterals that have two pairs of parallel sides?

Is it possible to have an acute right triangle? Justify your reasoning using pictures and words.

Examples:

How many acute, obtuse and right angles are in this shape?



Draw and list the properties of a parallelogram. Draw and list the properties of a rectangle. How are your drawings and lists alike? How are they different? Be ready to share your thinking with the class.

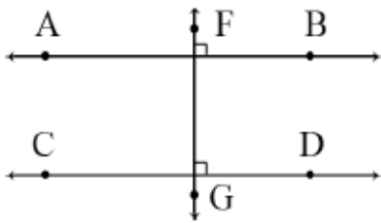
**MGSE4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.**

Two-dimensional figures may be classified using different characteristics such as, parallel or perpendicular lines or by angle measurement.

**Parallel or Perpendicular Lines:**

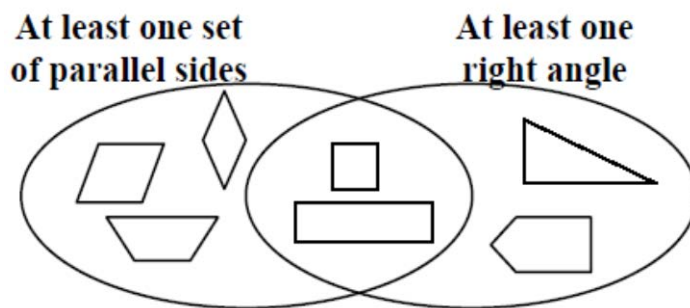
Students should become familiar with the concept of parallel and perpendicular lines. Two lines are parallel if they never intersect and are always equidistant. Two lines are perpendicular if they intersect in right angles ( $90^\circ$ ). Students may use transparencies with lines to arrange two lines in different ways to determine that the 2 lines might intersect in one point or may never intersect. Further investigations may be initiated using geometry software. These types of explorations may lead to a discussion on angles.

Parallel and perpendicular lines are shown below:



This standard calls for students to sort objects based on parallelism, perpendicularity and angle types.

Example:



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Do you agree with the label on each of the circles in the Venn diagram above? Describe why some shapes fall in the overlapping sections of the circles.

Example:

Draw and name a figure that has two parallel sides and exactly 2 right angles.

Example:

For each of the following, sketch an example if it is possible. If it is impossible, say so, and explain why or show a counterexample.

- A parallelogram with exactly one right angle.
- An isosceles right triangle.
- A rectangle that is *not* a parallelogram. (*impossible*)
- Every square is a quadrilateral.
- Every trapezoid is a parallelogram.

Example:

Identify which of these shapes have perpendicular or parallel sides and justify your selection.



A possible justification that students might give is: "The square has perpendicular lines because the sides meet at a corner, forming right angles."

### Angle Measurement:

This expectation is closely connected to CCGPS.4.MD.5, CCGPS.4.MD.6, and CCGPS.4.G.1. Students' experiences with drawing and identifying right, acute, and obtuse angles support them in classifying two-dimensional figures based on specified angle measurements. They use the benchmark angles of  $90^\circ$ ,  $180^\circ$ , and  $360^\circ$  to approximate the measurement of angles.

Right triangles can be a category for classification. A right triangle has one right angle. There are different types of right triangles. An isosceles right triangle has two or more congruent sides and a scalene right triangle has no congruent sides.

### **MGSE4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.**

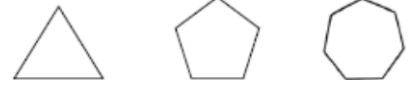
Students need experiences with figures which are symmetrical and non-symmetrical. Figures include both regular and non-regular polygons. Folding cut-out figures will help students determine whether a figure has one or more lines of symmetry.

This standard only includes line symmetry, not rotational symmetry.

Example:

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For each figure at the right, draw all of the lines of symmetry. What pattern do you notice? How many lines of symmetry do you think there would be for regular polygons with 9 and 11 sides. Sketch each figure and check your predictions.



Polygons with an odd number of sides have lines of symmetry that go from a midpoint of a side through a vertex.

### Common Misconceptions

Students believe a wide angle with short sides may seem smaller than a narrow angle with long sides.

Students can compare two angles by tracing one and placing it over the other. Students will then realize that the length of the sides does not determine whether one angle is larger or smaller than another angle. The measure of the angle does not change.