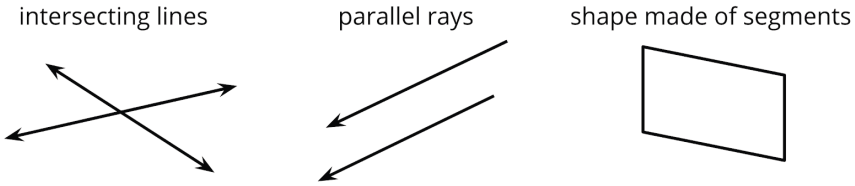
Unit 7 Family Support Materials

Angles and Angle Measurement

In this unit, students learn new language for describing parts of geometric figures and practice identifying and drawing them. They also learn to talk about angles, measure the sizes of angles, and draw angles of different measurements.

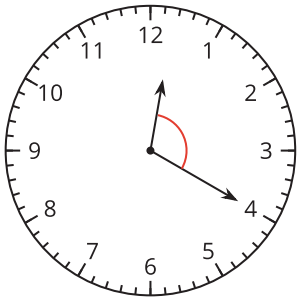
Section A: Points, Lines, Segments, Rays, and Angles

This section introduces students to some building blocks of geometric figures—points, rays, segments, angles, and lines. Students learn to distinguish points as locations in space, rays as lines that are bounded by one point, and line segments as lines that are bounded by two points. Students learn about parallel lines (lines that never intersect) and perpendicular lines (lines that meet or intersect at a right angle).



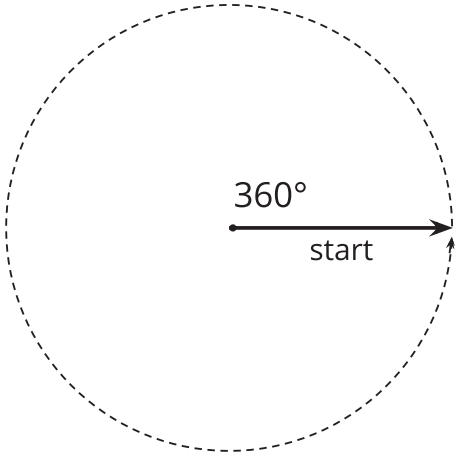
They also learn that an angle is a figure that is made up of two rays that share the same starting point, called the "vertex" of the angle. Students practice identifying angles and notice that angles are all around us and can have different sizes.

Section B: The Size of an Angle



In this section, students compare and describe the sizes of angles. They begin by comparing angles visually, for example, by considering ways to describe the size of an angle on a clock. The hands of a clock help to show that an angle is formed when one ray rotates around a point shared with another ray.

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Students then learn that angles can be measured, with degrees (°) as the unit of measurement, and that angles can be composed and decomposed, and are therefore additive.

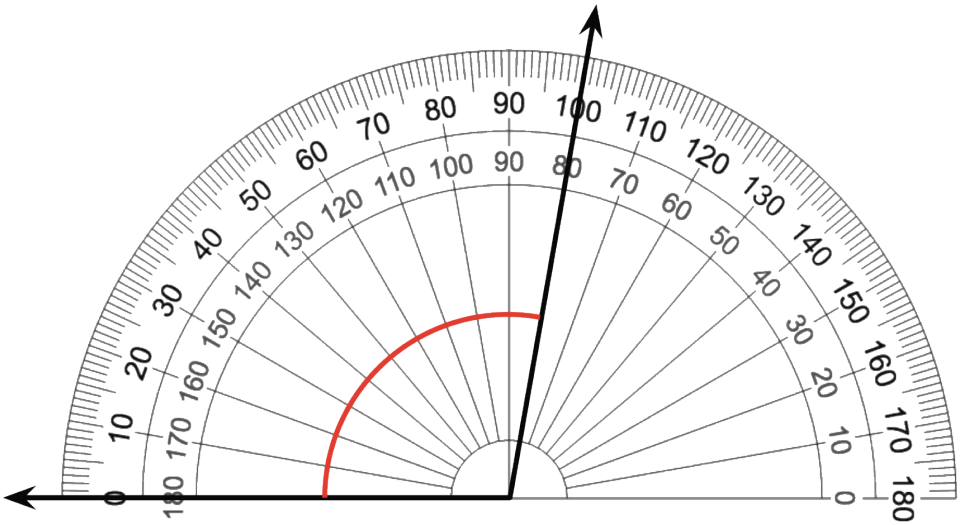
They learn that a ray that rotates a full turn around a point makes a 360° angle.

Decomposing this angle into halves gives two 180° angles. Half of a 180° angle is a 90° angle or a right angle. Composing three 90° angles gives a 270° angle.

Students then use these benchmark angles to estimate and measure the sizes of other angles. For example, decomposing a right angle into halves gives two 45° angles. Composing three copies of a 45° angle makes a 135° angle, and so on.

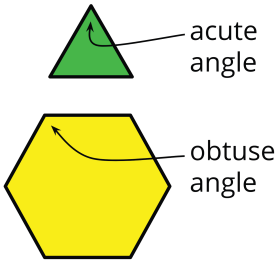
Students also learn that 90° angles are formed by perpendicular lines.

Later in the section, students learn to use a protractor to measure angles and to draw angles.



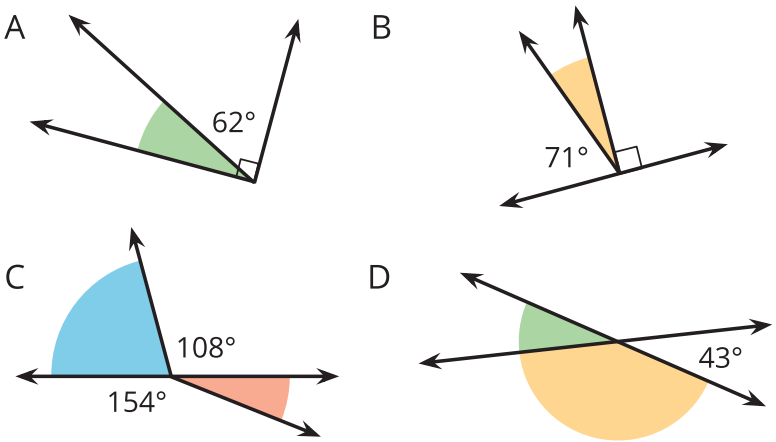
Section C: Angle Analysis

In this section, students continue to draw and analyze angles and to reason about their measurement. They classify angles by their sizes and identify angles as right (90°), acute (less than 90°), obtuse (greater than 90°), and straight (180°).



Students further develop the idea that angles can be added. To investigate this idea, they use paper cutouts, patty paper, and drawings. Students fold, cut, mark, and assemble pieces of paper to see how angles can be composed (put together) and decomposed (broken apart).

Later, students solve problems and find unknown angle measurements in different contexts.



Try it at home!

Near the end of the unit, ask your fourth grader to:

- Find an acute angle, an obtuse angle, a straight angle, a right angle, and parallel and perpendicular lines around the house.
- Describe and measure some angles found around the house.

Questions that may be helpful as they work:

- How would you describe that figure? How do you know it is a _____ ?
- How does that angle compare to a right angle (or a straight angle)?

Solution:
Answers may vary.

Sample responses:

- The scissor makes an acute angle when it is open. The remaining part of the cake makes an obtuse angle. The laptop can open to a right angle. The lines made by the tiles on the floor are parallel. I see a set of perpendicular lines on the windows.
- The corner of the side table has an angle that is 120 degrees. My slice of pizza has a 45 degree angle.
- I know it is an acute angle because it is less than 90 degrees. I know that it is a right angle because it measures exactly 90 degrees. I know that it is an obtuse angle because it is greater than 90 degrees.
- An acute angle is smaller than a right angle. An obtuse angle is greater than a right angle.

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