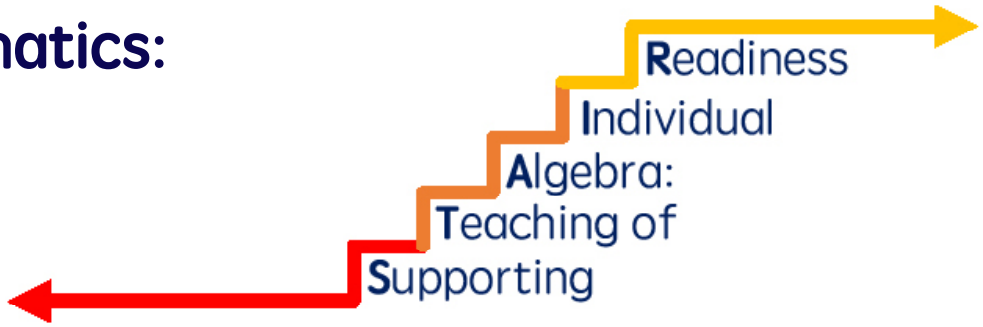
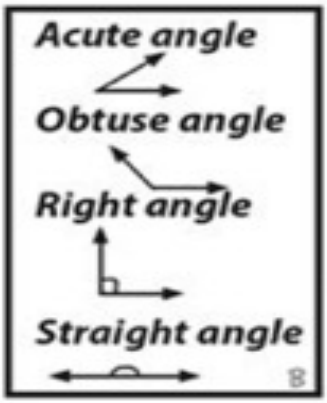
Ideas in Mathematics:
Triangle Properties



Concepts to Know

- The interior angles of a triangle will always add to 180 degrees.
- The sum of the length of any two sides of a triangle is greater than the length of the third side.
  - –side a + side b > side c
  - –When two sides are added together to the exact value of the third side, you just have two parallel lines.
- The side opposite to the largest angle of a triangle is the largest side.
- Any exterior angle of the triangle is equal to the sum of its interior opposite angles. This is called the exterior angle property of a triangle

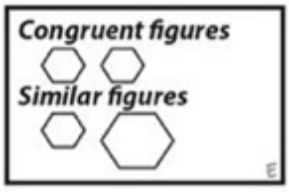


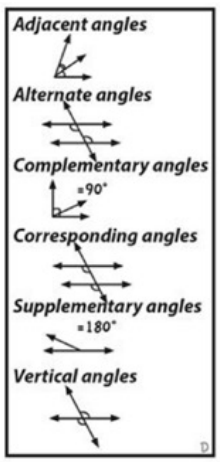
Strategies to Teach Triangle Properties

Be sure to teach the vocabulary associated with triangles including:

- **Acute angle** – less than 90 degrees
- **Adjacent angles** – two angles that have a common vertex but do not overlap
- **Complementary angles** – the sum of the two angles are 90 degrees
- **Congruent angles** – the exact same; when two triangles have the same three sides and same three angles, they are congruent
- **Interior angle of a triangle** – an angle formed by two sides of a triangle such that the angle is on the inside of the triangle
- **Obtuse angle** – greater than 90 degrees
- **Right angle** – exactly 90 degrees\
- **Supplementary angles** – two angles whose sum is 180 degrees

Allow students to practice making angles and triangles using virtual





Powell et al., (2018)

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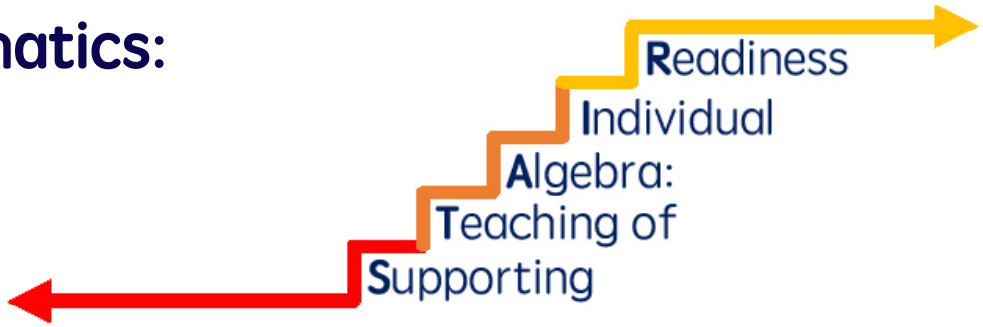

Activities to Try

Angle Sum in a Triangle

- Distribute a set of three congruent triangles and have students label each angle A, B, and C making sure the corresponding angles on the equivalent triangles have the same letters.
- Ask students to place one triangle on a line and the second directly next to it in the same orientation.
- Place the third triangle in the space between the triangles. Ask students, "Will this relationship be true for any kind of triangle?"
- Test other sets of different equivalent triangles.

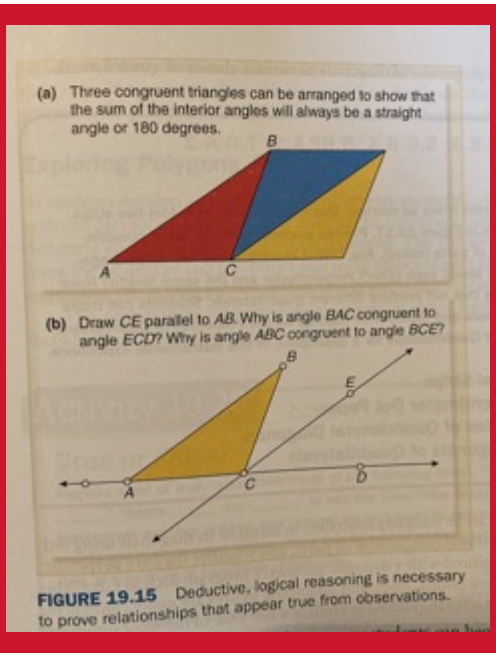

FIGURE 19.15 Deductive, logical reasoning is necessary to prove relationships that appear true from observations.

Van de Walle et al. (2019)

Manipulate Angles Using Technology

- Using the Angle Measure tool listed below, have students create triangles and then use the tool to find the value of each interior angle and ask students to add together the angles. The sum will always be 180 degrees.
- Students can match the shortest/longest sides of the triangles to their corresponding interior angle. The smallest interior angle will always be opposite to the shortest side, and the largest interior angle will always be opposite to the longest side.

Activities & Practice Opportunities:

Interactive Geometry (CK12.org)

Triangle-angle-sum- Therom

Khan Academy

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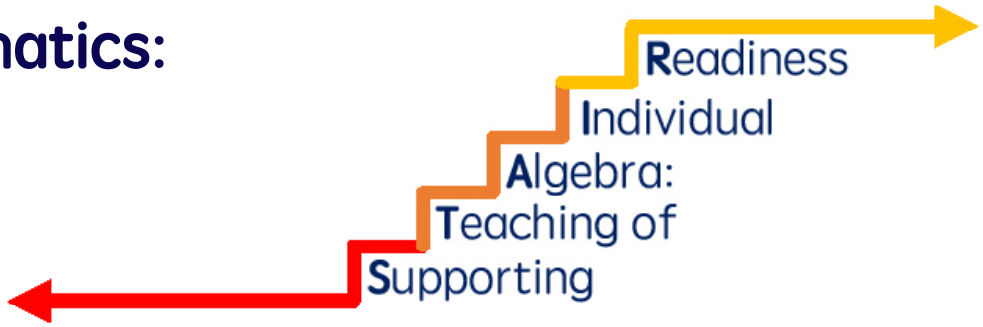
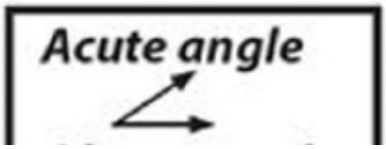
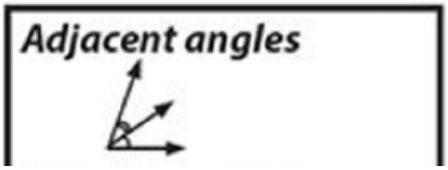
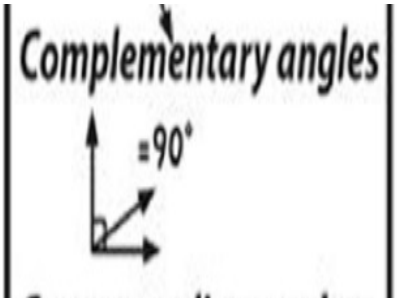
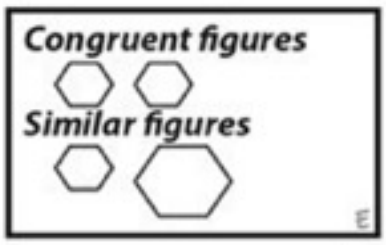


Triangle Vocabulary & Theorems

Acute Angle an angle that is less than 90 degrees	
Adjacent angles two angles that have a common vertex but do not overlap	
Complementary angles the sum of the two angles are 90 degrees	
Congruent angles the exact same; when two triangles have the same three sides and same three angles, they are congruent	

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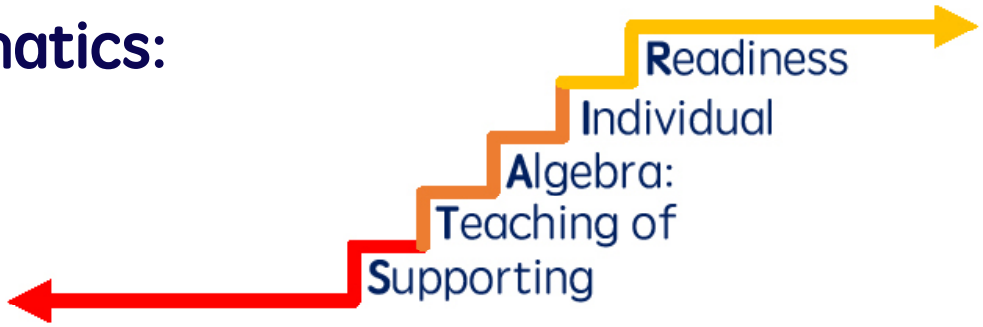
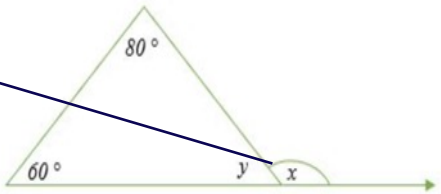


Triangle Vocabulary & Theorems

Exterior angle of a triangle

an angle formed by one side of the triangle and the extension of an adjacent side of the triangle

Angle x is an exterior angle

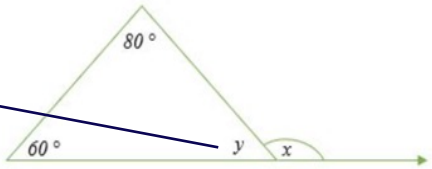


The sum of exterior angle and interior angle is equal to 180 degrees.

Interior angle of a triangle

an angle formed by two sides of a triangle such that the angle is on the inside of the triangle

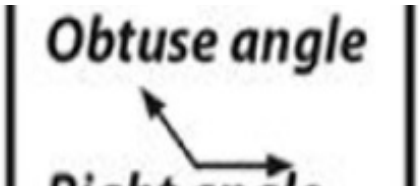
Angle y is an interior angle



The sum of exterior angle and interior angle is equal to 180 degrees.

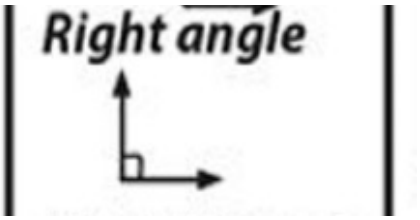
Obtuse angle

an angle that measures greater than 90 degrees



Right angle

an angle that measures greater than 90 degrees



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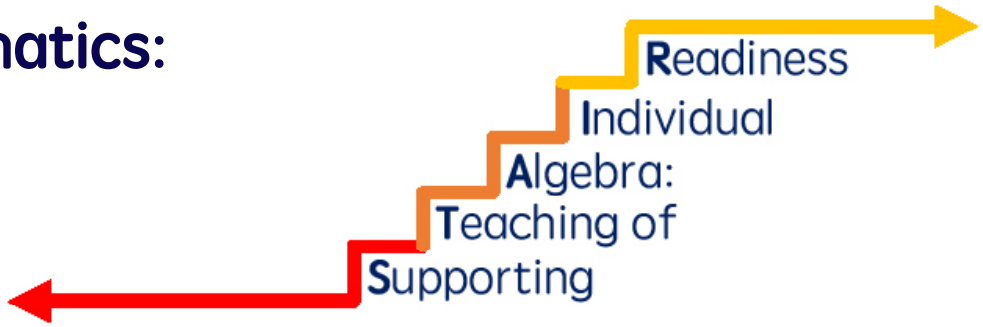
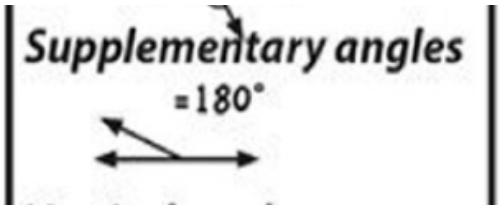


Triangle Vocabulary & Theorems

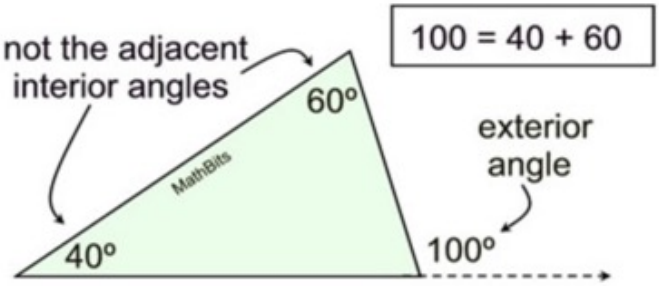
Supplementary angles

two angles whose sum is 180 degrees



Exterior Angle Theorem

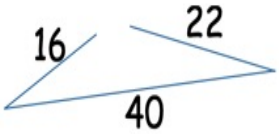
the measure of each exterior angle of a triangle is equal to the sum of the opposite and non-adjacent interior angles



Inequality Theorem

any side of a triangle must be shorter than the other two sides added together.

- If a side is **longer**, then the other two sides don't meet:



- If a side is **equal** to the other two sides it is not a triangle (just a straight line back and forth).