Objective:
Prove right triangles congruent using the Hypotenuse-Leg Theorem

G.SRT.5:
Use congruence...criteria to solve problems and prove relationships in geometric figures.
**Vocabulary Builder**

**hypotenuse** (noun) **hy PAH tuh noos**

**Related Word:** leg

**Definition:** The hypotenuse is the side opposite the right angle in a right triangle.

**Main Idea:** The hypotenuse is the longest side in a right triangle.

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**Theorem 4-6  Hypotenuse-Leg (HL) Theorem and Conditions**

**Theorem**

If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and leg of another right triangle, then the triangles are congruent.

**If . . .**

$\triangle PQR$ and $\triangle XYZ$ are right triangles, $\overline{PR} \cong \overline{XZ}$, and $\overline{PQ} \cong \overline{XY}$

**Then . . .**

$\triangle PQR \cong \triangle XYZ$
To use the HL Theorem, the triangles must meet three conditions. Complete each sentence with right or congruent.

There are two __ triangles.

The triangles have __ hypotenuses.

There is one pair of __ legs.

**Problem 1** Using the HL Theorem

**Got It?** Given: \(\angle PRS\) and \(\angle RPQ\) are right angles, \(\overline{SP} \cong \overline{QR}\)

Prove: \(\triangle PRS \cong \triangle RPQ\)

13. Complete each step of the proof.

- **Given**
  - \(\angle PRS\) and \(\angle RPQ\) are right angles.
  - \(\overline{SP} \cong \overline{QR}\)
  - Reflexive Prop. of \(\cong\)
  - \(\overline{PR} \cong \overline{PR}\)

- **Definition of right triangle**
  - \(\triangle PRS\) and \(\triangle RPQ\) are right triangles.

- **HL Theorem**
  - \(\triangle PRS \cong \triangle RPQ\)
Problem 2: Writing a Proof Using the HL Theorem

Got It? Given: $\overline{CD} \cong \overline{EA}$, $\overline{AD}$ is the perpendicular bisector of $\overline{CE}$
Prove: $\triangle CBD \cong \triangle EBA$

14. Circle what you know because $\overline{AD}$ is the perpendicular bisector of $\overline{CE}$.

- $\angle CBD$ and $\angle EBA$ are right angles
- $\angle CBD$ and $\angle EBA$ are acute angles.
- $B$ is the midpoint of $\overline{AD}$.
- $B$ is the midpoint of $\overline{CE}$.

15. Circle the congruent legs.

- $\overline{AB}$
- $\overline{CB}$
- $\overline{DB}$
- $\overline{EB}$

16. Write the hypotenuse of each triangle.

- $\triangle CBD$ $\overline{CD}$
- $\triangle EBA$ $\overline{EA}$

17. Complete the proof.

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<td>1) Given</td>
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<td>2) $\angle CBD$ and $\angle EBA$ are right $\angle$ s.</td>
<td>2) Definition of $\perp$ bisector</td>
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