Are they Special Angles?

This activity is used more to help students find conclusions using patterns. They are able to use reasoning to draw conclusions about special angle relationships concerning parallel lines cut by a transversal.

Discuss the following questions with the class. Based on what they have learned so far, are they able to reason through the question before completing the exploration.

Are there any special relationships among angles created when you have parallel lines cut by a transversal?

Load the "Are They Special Angles Activity Setting" onto each TI-Nspire handheld. Students will primarily work alone on the definition part of this activity. Continue to monitor the class and confirm that students understand the definitions of these new terms.

Using the Are they Special Angles? Activity Setting on your TI-Nspire, answer the following questions.

A line intersecting two or more other lines in the plane is called a <u>transversal</u>. A transversal creates different types of angle pairs. Three types are listed below.

A pair of <u>corresponding angles</u> is ∠1 and ∠5.

> One pair of **corresponding angles** is ∠1 and ∠5. Label another pair of corresponding angles on your paper.
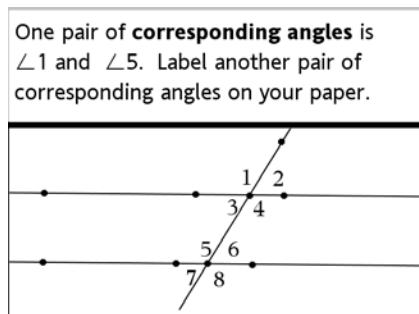
Name another pair of corresponding angles on your paper.
<u>∠3 & ∠7, ∠2 & ∠6, ∠4 & ∠8</u>

A pair of <u>alternate interior angles</u> angles is ∠3 and ∠6.

One pair of **alternate interior angles** is
∠3 and ∠6. Label another pair of
alternate interior angles on your paper.
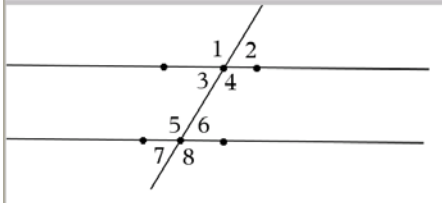
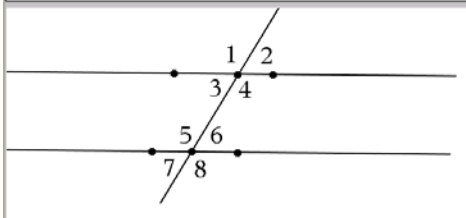Name another pair of alternate interior angles on your paper.

__∠4 & ∠5_____

A pair of __alternate exterior angles_____ angles is ∠2 and ∠7.

One pair of **alternate exterior angles** is
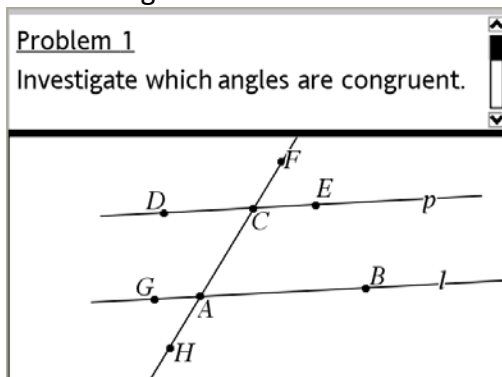∠2 and ∠7. Label another pair of
alternate exterior angles on your paper.

Name another pair of alternate exterior angles on your paper.

__∠1 & ∠8_____

When parallel lines are cut by a transversal, is there a special relationship among the angles?

Problem 1:

Investigate which angles are congruent.

Problem 1

Investigate which angles are congruent.

1. Measure the eight angles in your figure on your TI-Nspire. Record you angle measure on your paper (make sure angles are labeled correctly).

Answers may vary.

2. Drag *line l* and determine which angles remain congruent. Drag the transversal and determine if the same angles are remaining congruent.

3. List ALL angles that remain congruent on your paper.

Problem 1

Investigate which angles are congruent.
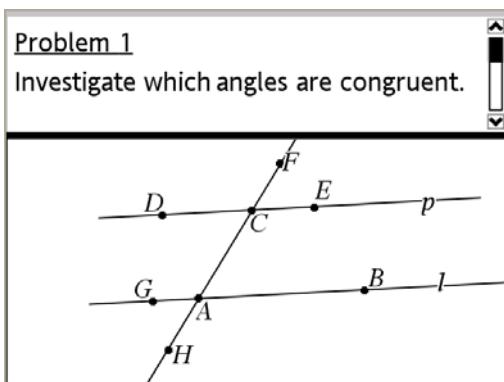
Angles FCD and CAG
Angles FCE and CAB
Angles HAB and ACE
Angles HAG and ACD
Angles DCA and BAC
Angles GAC and ECA
Angles FCE and HAG
Angles HAB and FCD

4. Angles FCE and CAB are a pair of corresponding angles.

    a. List all the pairs of corresponding angles in your construction.

    Angles FCD and CAG
    Angles FCE and CAB
    Angles HAB and ACE
    Angles HAG and ACD

    b. Write a conjecture describing what you observe about corresponding angles.

_____

Corresponding Angles:

If two parallel lines are cut by a transversal, then corresponding angles are __congruent__.

_____

5. Angles ECA and CAG are a pair of alternate interior angles.

    a. List all pairs of alternate interior angles in your construction.
      Angles DCA and BAC
      Angles GAC and ECA

    b. Write a conjecture describing what you observe about alternate interior angles.

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Alternate Interior Angles:

If two parallel lines are cut by a transversal, then alternate interior angles are congruent.

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6. Angles FCE and HAG are a pair of alternate exterior angles.

    a. List all the pairs of alternate exterior angles in your construction.

      Angles FCE and HAG
      Angles HAB and FCD

    b. Write a conjecture describing what you observe about alternate exterior angles.

___

Alternate Exterior Angles:

If two parallel lines are cut by a transversal, then alternate exterior angles are congruent.

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7. What happens if the lines you start with are not parallel? The lines below are not parallel. Move them and check whether your conjectures will work with non-parallel lines.

Do your conjectures still work for non-parallel lines cut by a transversal?
The conjecture does not work for all lines cut by a transversal.

<u>Extention</u>

Ask students to explore why sometimes the special angles are congruent and why sometimes they are not. Just allow them to use this last construction and move the lines around and see if they can find a relationship between the lines when the special angles are congruent.

They should see that the special angles remain the same when the lines are parallel.