***Exploring****Parallel Lines with GSP*

**In this activity we will be exploring parallel lines and making some conjectures about the angles that are formed by parallel lines and transversals.**

**Directions:** Use Geometer’s Sketchpad to make the construction in Part A, then use your construction to answer the questions with your observations.

# Part A: Constructing Parallel Lines in GSP

1. Parallel Lines
	1. Draw line$\overleftrightarrow{AB}$
	2. Draw point $C$ above this line.
	3. Select the line and point *C*, then construct parallel lines
	4. Construct one new point *on* each line and label them *D* and *E.*
	5. Select points *D*and *E* and choose [Line] from the [Construct] menu
	(this line is called a transversal).
	6. Now construct and label points *F, G,* and *H* as shown to the right.

Line $\overleftrightarrow{AB}$ is parallel to line $\overleftrightarrow{CF}$. Using symbols, we can say:$\overleftrightarrow{AB}∥\overleftrightarrow{CF}$ . We call $\overleftrightarrow{DE}$.a **transversal**.

# Part B: Measuring Angles.

The transversal makes 2 groups of four angles. Let’s call 1,2,3,4 the “upper group” and 5,6,7,8 the “lower group”.



***8***

***7***

***6***

***5***

***1***

***2***

***4***

***3***

1. **Measure Angles:** On sketchpad, measure all 8 of the angles and move their measurements into the interior of each angle so you can read it easily.
2. **Corresponding angles:** $∠1$ and ∠5 are called ***corresponding angles*** because they are the “top-left” angles in each group (i.e. they are in the same position).
	1. Name 3 other pairs of corresponding angles:
	2. Observe the measurements of the angles in each of the pairs of corresponding angles.
	Write a conjecture about the measures of corresponding angles:

Move points *A* or *B* to verify that your conjecture is true.

***m***

***n***

***t***

***1***

***2***

***8***

***7***

***6***

***5***

***4***

***3***

***Interior angles***

***Exterior angles***

***Exterior angles***

1. **Alternate Interior Angles:** ∠3 and ∠6 are called ***alternate interior angles***

	1. Name another pair of alternate interior angles:
	2. Observe the measurements of each pair of alternate interior angles.
	 Write a conjecture about the measurements of alternate interior angles:

	Move points *A* or *B* to verify that your conjecture is true.
2. **Same Side Interior Angles:** ∠3 and ∠5 are called ***same-side interior angles***

	1. Name another pair of same-side interior angles:
	2. Observe the measurements of each pair of same-side interior angles.
	Write a conjecture about the measurements of same-side interior angles.

	Move points *A* or *B* to verify that your conjecture is true.
3. Use the ideas of (3) and (4) to describe **Alternate Exterior Angles:**
	1. Name two pairs of angles that could be called “Alternate Exterior Angles”:
	2. Observe the measurements of each of these pairs of angles. Write a conjecture about the measurements of alternate exterior angles:

	Move points *A* or *B* to verify that your conjecture is true.
4. Explain how you could use all of the ideas in questions 1 through 5 to prove that ∠2 and ∠8 are supplementary?