**Supplementary Activities**

**Unit 2 Investigation 5**

**Vertical Angles**

Open the file: <http://tube.geogebra.org/material/simple/id/2599367>

**Definition:** **Vertical Angles** are angles whose sides form 2 pairs of opposite rays. When 2 lines intersect, 2 pairs of vertical angles are formed. One pair of vertical angles is shown in the applet. (Click the other checkbox on the right to display the other pair of vertical angles.) Interact with the applet for a few minutes, then answer these questions.

1. Complete the following statement (based upon your observations). **Vertical angles are always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
2. Suppose the pink angle above measures 140 degrees. What would the measure of its vertical angle? What would be the measure of the other 2 (gray) angles?

**Naming angles formed by two lines and a transversal**

Open the file: <http://tube.geogebra.org/material/simple/id/1495405>

Definition: A **transversal** is a line that intersects 2 other lines at 2 distinct points. In the applet, think of the dashed line below as the transversal.

When a transversal intersects 2 other lines, special names are given to certain pairs of angles. These angle pairs are called **corresponding angles, alternate interior angles, alternate exterior angles, same-side interior angles, and same-side exterior angles**. Explore these angle pairs within the applet. Then, answer these questions:

1. What does the term "same-side" mean in the phrases "same-side interior angles" and "same-side exterior angles"?
2. What does the term "alternate" mean in the phrases "alternate interior angles" and "alternate exterior angles"?
3. Which of the four displayed angles would be considered "interior" angles? Why is this?
4. Which of the four displayed angles would be considered "exterior" angles? Why is this?

1. How would you describe, in your own words, what it means for a pair of angles to be described as "corresponding angles"?

**Corresponding Angles (formed by parallel lines and a transversal)**

Open the file: <http://tube.geogebra.org/material/simple/id/2598831>

In the applet a **transversal** intersects **2 parallel lines**. When this happens, there are 4 pairs of **corresponding angles** that are formed. Interact with the applet below for a few minutes, then answer these questions:.

1. Complete the following statement: I**f a transversal intersects 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, then corresponding angles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

2. If the pink angle measures 52 degrees, what would the measure of its corresponding angle be?  What would the measure of the gray angle be?

3. As you moved the black slider, what transformation took place?

4. Describe the effects of moving:

1. the blue slider
2. the green slider
3. the pink slider

**Alternate Interior Angles (formed by parallel lines and a transversal)**

Open the file: <http://tube.geogebra.org/material/simple/id/2953705>

In the applet a **transversal** intersects **2 parallel lines**. When this happens, there are 2 pairs of **alternate interior angles** that are formed. Interact with the applet for a few minutes, then answer these questions

1. Complete the following statement: I**f a transversal intersects 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, then alternate interior angles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

2. If the pink angle measures 156 degrees:

1. what would be the measure of its alternate interior angle?
2. what would be the measure of the gray angle?

3. As you moved the black slider, what transformation(s) took place?

4. Describe the effects of moving:

1. the blue slider
2. the green slider
3. the pink slider

**Alternate Exterior Angles (formed by parallel lines and a transversal)**

Open this file: <http://tube.geogebra.org/material/simple/id/2970253>

In the applet a **transversal** intersects **2 parallel lines**. When this happens, there are 2 pairs of **alternate exterior angles** that are formed. Interact with the applet for a few minutes, then answer these questions

1. Complete the following statement: I**f a transversal intersects 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, then alternate exterior angles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

2. If the pink angle measures 146 degrees:

1. what would be the measure of its alternate exterior angle?
2. what would be the measure of the gray angle?

3. As you moved the black slider, what transformation(s) took place?

4. Describe the effects of moving:

1. the blue slider
2. the green slider
3. the pink slider

**Same Side Interior Angles (formed by parallel lines and a transversal)**

Open the file: <http://tube.geogebra.org/material/simple/id/2601527>

In the applet a **transversal** intersects **2 parallel lines**. When this happens, there are 2 pairs of **same-side interior angles** that are formed. Interact with the applet for a few minutes, then answer these questions.

1. Complete the following statement: I**f a transversal intersects 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, then same-side interior angles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
2. If the gray angle measures 120 degrees, what would be the measure of its same-side interior angle?
3. As you moved the slider, what transformation(s) took place?

**Same Side Exterior Angles (formed by parallel lines and a transversal)**

Open the file: <http://tube.geogebra.org/material/simple/id/2601585>

In the applet a **transversal** intersects **2 parallel lines**. When this happens, there are 2 pairs of **same-side exterior angles** that are formed. Interact with the applet for a few minutes, then answer these questions.

1. Complete the following statement: I**f a transversal intersects 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_, then same-side exterior angles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
2. If the gray angle above measures 110 degrees, what would be the measure of its same-side exterior angle be?
3. As you moved the slider, what transformation(s) took place?