Vertical and Adjacent Angles
ID: 10894

Activity Overview
In this introductory or review activity, students will explore vertical and adjacent angles. They will define and identify pairs of angles. Then they will change the intersecting lines of a geometric model to make conjectures about the relationships of the pairs of angles.

Topic: Points, Lines & Planes
- *Congruency of vertical angles*
- *Adjacent angles formed by two intersecting lines are supplementary.*

Teacher Preparation and Notes
- *This activity was written to be explored with the TI-Nspire and can be used as a paperless document, if desired.*
- *This is an introductory activity where students will need to know how to change between pages and grab points.*
- *The multiple choice items are self-check and students can check them by pressing* (ctrl) + ▲.
- ***To download the student TI-Nspire document (.tns file) and student worksheet, go to education.ti.com/exchange and enter "10894" in the quick search box.***

Associated Materials
- *VerticalAdjacent.tns*
- *VerticalAdjacent_Student.doc*

Suggested Related Activities
To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

- *Angle Relationships (TI-Nspire technology) — 8670*
- *Intersecting Lines and Vertical Angles (TI-84 Plus) — 6858*

Problem 1 – Exploring Vertical Angles

Students should first define the term vertical angles using their textbook or other source. On page 1.3, introduce the geometric model (two intersecting lines).

Students should name the two pairs of vertical angles on page 1.3. The angle symbol ($\angle$)can be accessed by pressing ⓒⓣⓡⓛ + 😊.

On page 1.5, direct students to explore the model independently, by grabbing and dragging points *B* and/or *D*. Then they need to answer the questions either on the .tns file or on the worksheet.

Note that the multiple choice questions are self check, but the open response questions are not.
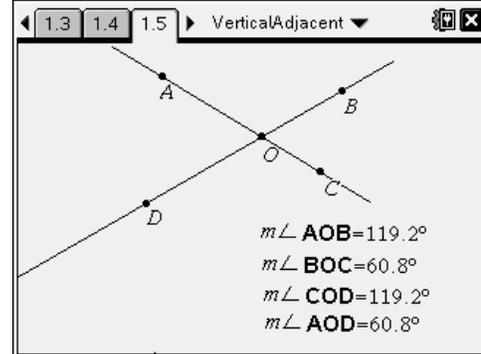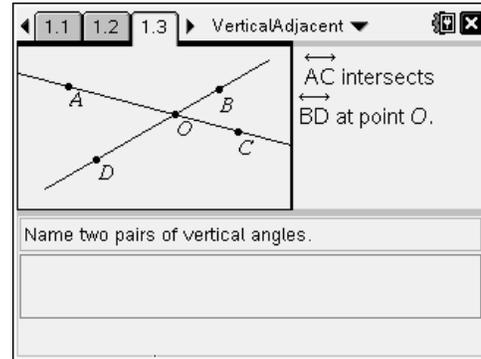
Problem 2 – Exploring Adjacent Angles

Students are to repeat the steps from Problem 1 with adjacent angles. They will need to first define the term adjacent angles using a textbook or other source.

Page 2.2 and 2.4 show the same geometric model of intersecting lines from Problem 1. Students should name the four pairs of adjacent angles.

Students can then independently explore the model to make a conjecture about adjacent angles.

They can also use the **Text** and **Calculate** tools from the Actions menu to add the pairs of angles confirming that adjacent angles are supplementary.
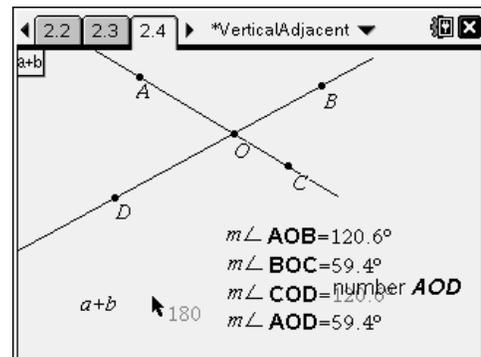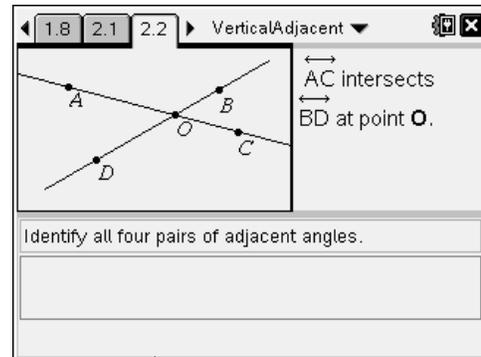
Solutions – Student worksheet

1. Two angles whose sides are opposite rays.

2. $\angle AOB$ and $\angle COD$; $\angle BOC$ and $\angle AOD$

3. Sample answers.

Location	1st	2nd	3rd	4th
$m\angle AOB$	130.6	118.5	90.4	79.4
$m\angle BOC$	49.4	61.5	89.6	110.6
$m\angle COD$	130.6	118.5	90.4	79.4
$m\angle AOD$	49.4	61.5	89.6	100.6

4. If $\angle AOD$ and $\angle BOC$ are vertical angles, then the $m\angle AOD = m\angle BOC$.

5. If $\angle AOB$ and $\angle COD$ are vertical angles, then the $m\angle AOB = m\angle COD$.

6. Vertical angles are congruent.

7. Adjacent angles are two coplanar angles that have a common side and a common vertex but no common interior points.

8. $\angle AOB$ and $\angle BOC;$ $\angle BOC$ and $\angle COD;$ $\angle AOD$ and $\angle COD;$ $\angle AOD$ and $\angle AOB$

9. Adjacent angles formed by two intersecting lines are supplementary.

10. If $\angle AOB$ and $\angle BOC$ are adjacent angles formed by two intersecting lines, then $\angle AOB$ and $\angle BOC$ are supplementary.

11. $3x = 75$

    $x = 25$
    $y = 180 - 75 = 105$

12. $x + 10 = 4x - 35$

    $3x = 45$
    $x = 15$