

BALTIMORE COUNTY PUBLIC SCHOOLS
OFFICE OF MATHEMATICS

Penny Booth, Coordinator

Pat Baltzley, Supervisor

EXPLORATION USING TECHNOLOGY

GEOMETRY BASICS

Written by:

John W. Staley

GEOMETRY BASICS

Geometry Basics is targeted for geometry students who are in the process of studying the basic geometric definitions and properties of lines and angles. The lesson requires students to investigate the following topics:

1. Lines: midpoints, perpendicular bisector, parallel lines
2. Angles: angle bisector, complementary and supplementary angles, alternate interior angles, corresponding and vertical angles

Students should know how to perform basic constructions using traditional tools. This lesson is designed to be utilized with a Geometry sketch program on the computer or calculator. Note: Codes have been included in the steps to assist those students using the TI92.

Core Learning Goal: 2. Geometry, Measurement and Reasoning

Learning Outcome: 2.1.4. The student will validate properties of geometric figures using appropriate tools and technology.

Lesson Objective: The student will investigate and validate several geometric properties using technology.

Teaching Strategies: The teacher should carefully model problems 1 to 3 leaving the REDO part for the students to do later during class. Neatness and accuracy should be emphasized so that students can make correct conclusions. Students should work in pairs, taking turns as they investigate each hypothesis.

Assessment: Assessment should be ongoing, closely monitoring students as they proceed. All hypothesis are true and the students should justify their conclusions from the measurements recorded on their lab sheets.

Scoring Rubric

3 points

- Student accurately draws, labels and measures with technology.
- Sketches are accurately drawn with no mistakes.
- Conclusion is true with justification that utilizes information from the sketch.

2 points

- Student uses technology with some accuracy to complete assignment.
- Sketches are done with limited mistakes.
- Conclusion is true with vague justification.

1 point

- Limited use of technology to complete assignment.
- Sketches are done with little accuracy.
- Conclusion is false or true.

0 point

- No use of technology to complete assignment.
- Sketches are inaccurate.
- Conclusion is false.

GEOMETRY BASICS

Today you will investigate several geometric properties using technology. The goal is for you to determine the true and false hypothesis based on your investigations.

DIRECTIONS:

1. Read each hypothesis and underline true or false.
2. Carefully perform the investigation.
3. Label and measure all items as you perform your investigation.
4. Draw your final picture on your lab sheet.
5. Now circle True or False and justify your conclusion.

-
1. Hypothesis: If a point is a **midpoint** then it divides a line segment into two equal parts.
 - a. Draw and measure line segment AB. (F2:5) (F7:4)
 - b. Find and label the midpoint C of line and redraw each part. (F4:3)
 - c. Hide the original line segment (F7:1)
 - d. Measure the remaining segments AC and BC. (F6:1)
 - e. Draw a picture of your final view screen. Label all parts and measurements.

REDO using a different length and position for AB.

Conclusion: True or false.

2. Hypothesis: If a line is a **perpendicular bisector** of a line segment then it bisects a line segment into two parts and also forms right angles with the line segment.
 - a. Draw and measure line segment. Label it GH.
 - b. Find and label the perpendicular bisector segment and redraw each part. (F4:4)
 - c. Measure the remaining segments and each angle. (F6:3)
 - d. Draw a picture of your final view screen. Label all parts and measurements.

REDO using line IJ in a different position and different length.

Conclusion: True or false.

3. Hypothesis: If a line is the **bisector of an angle** then it divides the angle into two equal parts.
- Draw an acute angle and measure it. (F2:5)
 - Bisect the angle then measure each part. (F4:5)
 - Compare angle measurements.
 - Draw a picture of your final view screen. Label all parts and measurements.

REDO using an obtuse angle.

REDO using a right angle.

Conclusion: True or false.

4. Hypothesis: If two angles are complementary then the sum of the angles is a right angle.
- Draw a line segment AB and a line perpendicular to it through point A. (F4:2)
 - Draw a point C on the perpendicular line and redraw it.
 - Hide the perpendicular line.
 - Draw a ray AD inside of the angle then measure each angle. (F2:7)
 - Find the sum of the two angles and compare it to the measure of your right angle.
 - Draw a picture of your final view screen. Label all parts and measurements.

REDO using a different size and position for your line segment.

Conclusion: True or false.

5. Hypothesis: If two angles are supplementary then the sum of the angles is a straight angle.
- Draw a straight angle DEF.
 - Draw a ray EM from point E.
 - Label and measure each angle.
 - Find the sum of the two angles and compare it to the measure of your straight angle.
 - Draw a picture of your final view screen. Label all parts and measurements.

REDO using a different position for your straight angle and ray.

Conclusion: True or false.

6. Hypothesis: If two straight lines intersect then the **vertical angles** formed are equal.
- Draw two intersecting lines.
 - Label and measure each angle.
 - Compare all angles, especially the vertical angles.
 - Draw a picture of your final view screen. Label all parts and measurements.

REDO having the lines form different looking angles.

Conclusion: True or false.

7. Hypothesis: If two parallel lines are cut by a transversal then the **alternate interior angles** are equal.
- Draw a line **m** and construct a line **n** parallel to it. (F4:2)
 - Construct a transversal **t** to the parallel lines.
 - Label and measure each angle.
 - Compare alternate interior angles.
 - Draw a picture of your final view screen. Label all parts and measurements.

REDO using a different position for your parallel lines and the transversal.

Conclusion: True or false.

8. Hypothesis: If two parallel lines are cut by a transversal then the **corresponding angles** are equal.
- Draw line **m** and construct a line **n** parallel to it.
 - Construct the transversal **t** to the parallel lines.
 - Label and measure each angle.
 - Compare corresponding angles.
 - Draw a picture of your final view screen. Label all parts and measurements.

REDO using a different position for your parallel lines and the transversal.

Conclusion: True or false.

9. Hypothesis: If a line is perpendicular to one of two parallel lines then it is perpendicular to the other also.
- a. Draw a line AB and construct line DE parallel to it.
 - b. Construct a perpendicular line to AB through B.
 - c. Label and measure each angle.
 - d. Draw a picture of your final view screen. Label all parts and measurements.

REDO using a different position for your parallel lines and point A.

Conclusion: True or false.

SUMMARY

Record the number of True _____ and False _____ responses.

Complete the following statement.

The use of technology...

<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>