

BACK TO THE BASICS: GEOMETRY

Grade Level or Special Area: 4th Grade

Written by: Amy Beling, Littleton Academy, Littleton, Colorado

Length of Unit: Five lessons (approximately five days, one day = 45 minutes)

I. ABSTRACT

This unit was written with the intent to give assistance to those students struggling with the basic terminology and concepts of geometry. Through guided practice and independent worksheet practice, the students will strengthen their foundational knowledge for basic geometry concepts.

II. OVERVIEW

A. Concept Objectives

1. Students will understand and use appropriate vocabulary when working with geometric figures.
2. Students understand how to use geometric concepts, properties, and relationships in problem-solving, situations and communicate the reasoning used in solving these problems. (Colorado Mathematics Standard Four)

B. Content from the *Core Knowledge Sequence*

1. 4th Grade Mathematics: Geometry (page 103)
 - a. Identify and draw points, segments, rays, lines.
 - b. Identify and draw lines: horizontal, vertical; perpendicular; parallel; intersecting.
 - c. Identify angles; identify angles as right, acute, or obtuse.
 - d. Identify polygons:
 - i. Triangle, quadrilateral, pentagon, hexagon, and octagon (regular)
 - ii. Parallelogram, trapezoid, rectangle, square

C. Skill Objectives

1. The students will evaluate their present knowledge of basic geometric concepts with a benchmark quiz.
2. The students will identify and draw points, line segments, rays, and lines.
3. The students will classify lines as parallel, intersecting, or perpendicular.
4. The students will solve independent practice problems with lines, line segments, rays, and points.
5. The students will classify angles as acute, obtuse, or right.
6. The students will solve independent practice problems with angles.
7. The students will identify polygons and non-polygons.
8. The students will name regular polygons.
9. The students will solve independent practice problems with polygons.
10. The students will evaluate their acquired knowledge of basic geometric concepts with a final test.

III. BACKGROUND KNOWLEDGE

A. For Teachers

1. *Math to Know: A Mathematical Handbook* by Mary C. Cavanagh
2. *Janice VanCleave's Geometry for Every Kid: Easy Activities that Make Learning Geometry Fun* by Janice VanCleave
3. *Just in Time: Geometry* by Catherine V. Jeremko

B. For Students

1. Students should have prior knowledge of basic geometric terminology from studying them in first, second and third grades.

2. Students should have previous knowledge about lines, line segments, angles, and polygon identification from studying about them in third grade.

IV. RESOURCES

- A. Student notebooks – these are student notebooks used for note-taking (Lessons Two through Five)
- B. *What's Your Angle Pythagoras? A Math Adventure* by Julie Ellis (Lesson Three)
- C. *Sir Cumference and the First Round Table: A Math Adventure* by Cindy Neuschwander (Lesson Four)

V. LESSONS

Lesson One: Pre-Test on Basic Geometric Concepts (approximately 45 minutes)

- A. *Daily Objectives*
 1. Concept Objective(s)
 - a. Students will understand and use appropriate vocabulary when working with geometric figures.
 - b. Students understand how to use geometric concepts, properties, and relationships in problem-solving, situations and communicate the reasoning used in solving these problems.
 2. Lesson Content
 - a. Identify and draw points, segments, rays, lines
 - b. Identify and draw lines: horizontal, vertical; perpendicular; parallel; intersecting.
 - c. Identify angles; identify angles as right, acute, or obtuse.
 - d. Identify polygons:
 - i. Triangle, quadrilateral, pentagon, hexagon, and octagon (regular)
 - ii. Parallelogram, trapezoid, rectangle, square
 3. Skill Objective(s)
 - a. The students will evaluate their present knowledge of basic geometric concepts with a benchmark quiz.
- B. *Materials*
 1. Appendix A (one per student)
 2. Appendix B (one per teacher)
 3. Appendix C (one per student)
 4. Appendix D (one per student)
- C. *Key Vocabulary*

None
- D. *Procedures/Activities*
 1. Begin this unit on geometry by taking a benchmark quiz. Use this quiz to determine each student's current level of familiarity with basic geometry concepts.
 2. Pass out the quiz to the students (Appendix A).
 3. Review directions and answer any questions.
 4. Collect the quizzes at the end of the period.
 5. Grade this test and keep for comparison purposes, but do not review the correct answers with the students. This quiz will be given again at the end of this unit.
 6. Give a copy of Appendix C to every student to work on once he or she has completed the quiz.
- E. *Assessment/Evaluation*
 1. Students will be evaluated by their correct responses on the quiz (use Appendix B to grade).

Lesson Two: Points, Lines, Rays, and Line Segments (approximately 45 minutes)

A. Daily Objectives

1. Concept Objective(s)
 - a. Students will understand and use appropriate vocabulary when working with geometric figures.
 - b. Students understand how to use geometric concepts, properties, and relationships in problem-solving, situations and communicate the reasoning used in solving these problems.
2. Lesson Content
 - a. Identify and draw points, segments, rays, lines.
 - b. Identify and draw lines: horizontal, vertical; perpendicular; parallel; intersecting.
3. Skill Objective(s)
 - a. The students will identify and draw points, line segments, rays, and lines.
 - b. The students will classify lines as parallel, intersecting, or perpendicular.
 - c. The students will solve independent practice problems with lines, line segments, rays, and points.

B. Materials

1. Notebooks (one per student)
2. Appendix E (one transparency copy)
3. Appendix F (one transparency copy)
4. Appendix G (one copy per student)
5. Appendix H (one copy per teacher)

C. Key Vocabulary

1. A point at the end of a line segment or ray is called an *endpoint*.
2. *Intersecting lines* are lines that meet or cross each other and have only one point in common.
3. The geometric definition of a *line* is a straight path that has no definite length and goes on forever in both directions.
4. A *line segment* is a part of a line, which follows a straight path between two endpoints.
5. Any two or more lines that do not intersect and are always the same distance apart are called *parallel lines*.
6. Two lines that intersect forming a right angle are called *perpendicular lines*.
7. A position in space that has no length, width, or height is called a *point*.
8. Part of a line with one endpoint that follows a straight path and goes on forever in only one direction is called a *ray*.

D. Procedures/Activities

1. Make a “K-W-L” chart about geometry. Create a chart with three columns on a piece of butcher paper. One column is for what students already **know**. The second column is for what *you* want them to know, and the last is for what they learn. As a class, fill out the first two columns, by letting students state what they already know about geometry and then what *you* hope they will learn during this unit. The third column will be filled in as the unit progresses. Be sure to keep the butcher paper visible in the classroom throughout the duration of this unit.
2. Tell the students you are going to teach some basic terms used in geometry. They will be asked to comprehend and identify these terms and complete a worksheet at the end of the lesson.

3. On the board, list the day's vocabulary words and definitions. Talk about the words and make sure the students understand them. Have the students copy these vocabulary words and definitions into a math notebook.
 4. **Special Education Accommodation:** Have the vocabulary words and definitions typed out for this student to glue into their notebook.
 5. After the students have copied the vocabulary and definitions into their notebooks it is time to start some guided practice.
 6. Refer to transparency copies of Appendices E and F for some guided practice examples.
 7. Let the students work independently on problems (Appendix G).
- E. *Assessment/Evaluation*
1. The students will be assessed on the completion of independent practice problems (use Appendix H to grade).

Lesson Three: Classifying Angles: Right, Acute, or Obtuse (approximately 45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Students will understand and use appropriate vocabulary when working with geometric figures.
 - b. Students understand how to use geometric concepts, properties, and relationships in problem-solving, situations and communicate the reasoning used in solving these problems.
 2. Lesson Content
 - a. Identify angles; identify angles as right, acute, or obtuse.
 3. Skill Objective(s)
 - a. The students will classify angles as acute, obtuse, or right.
 - b. The students will solve independent practice problems with angles.
- B. *Materials*
1. Notebooks (one per student)
 2. *What's Your Angle Pythagoras? A Math Adventure* by Julie Ellis
 3. Appendix I (one transparency copy)
 4. Appendix J (one per student)
 5. Appendix K (one per teacher)
 6. Index Cards (one per student and teacher)
- C. *Key Vocabulary*
1. The figure formed when two straight lines meet is called an *angle*.
 2. The *vertex* (plural vertices) is the point where two or more rays meet.
 3. An *obtuse angle* is an angle that measures greater than 90 degrees.
 4. A *right angle* is an angle that measures exactly 90 degrees.
 5. An *acute angle* is an angle that measure less than 90 degrees.
- D. *Procedures/Activities*
1. Tell the students you are going to read *What's Your Angle Pythagoras? A Math Adventure* to them.
 2. Allow the class to listen to and enjoy the story.
 3. Now tell the students you are going to teach some more basic terms used in geometry. They will be asked to comprehend and identify these terms and complete a worksheet at the end of the lesson.
 4. On the board, list the day's vocabulary words and definitions. Talk about the words and make sure the students understand them. Have the students copy these vocabulary words and definitions into a math notebook.

5. **Special Education Accommodation:** Have the vocabulary words and definitions typed out for this student to glue into their notebook.
 6. After the students have copied the vocabulary and definitions into their notebooks it is time to start some guided practice.
 7. Refer to transparency copy of Appendix I for some guided practice examples.
 8. Let the students work independently on problems (Appendix J).
- E. *Assessment/Evaluation*
1. The students will be assessed on the completion of independent practice problems (use Appendix K to grade).

Lesson Four: Polygon Classification (approximately 45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students will understand and use appropriate vocabulary when working with geometric figures.
 - b. Students understand how to use geometric concepts, properties, and relationships in problem-solving, situations and communicate the reasoning used in solving these problems.
2. Lesson Content
 - a. Identify polygons:
 - i. Triangle, quadrilateral, pentagon, hexagon, and octagon (regular)
 - ii. Parallelogram, trapezoid, rectangle, square
3. Skill Objective(s)
 - a. The students will identify polygons and non-polygons.
 - b. The students will name regular polygons.
 - c. The students will solve independent practice problems with polygons.

B. *Materials*

1. Notebooks (one per student)
2. *Sir Cumference and the First Round Table: A Math Adventure* by Cindy Neuschwander
3. Appendix L (one transparency copy)
4. Appendix M (one per student)
5. Appendix N (one per teacher)

C. *Key Vocabulary*

1. A *hexagon* is a six-sided polygon.
2. A quadrilateral that has two pairs of parallel sides is a *parallelogram*.
3. A *pentagon* is a five-sided polygon.
4. A *polygon* is a closed figure formed by three or more line segments that are joined only at the endpoints, with each endpoint connected to only two line segments.
5. *Quadrilaterals* are closed figures formed by four line segments; a four-sided polygon; can be a trapezoid or parallelogram.
6. A parallelogram that has four right angles and only opposite sides congruent is called a *rectangle*.
7. A *square* is a rectangle that has four congruent sides.
8. A quadrilateral that has one pair or parallel sides is a *trapezoid*.
9. A polygon made up of three sides is called a *triangle*.
10. An *octagon* is an eight-sided polygon.

D. *Procedures/Activities*

1. Tell the students you are going to read *Sir Cumference and the First Round Table: A Math Adventure* to them.

2. Allow the class to listen to and enjoy the story.
 3. Now tell the students you are going to teach some more basic terms used in geometry. They will be asked to comprehend and identify these terms and complete a worksheet at the end of the lesson.
 4. On the board, list the day's vocabulary words and definitions. Talk about the words and make sure the students understand them. Have the students copy these vocabulary words and definitions into a math notebook.
 5. **Special Education Accommodation:** Have the vocabulary words and definitions typed out for this student to glue into their notebook.
 6. After the students have copied the vocabulary and definitions into their notebooks it is time to start some guided practice.
 7. Refer to transparency copy of Appendix L for some guided practice examples.
 8. Let the students work independently on problems (Appendix M).
- E. *Assessment/Evaluation*
1. The students will be assessed on the completion of independent practice problems (use Appendix N to grade).

Lesson Five: Post-Test on Basic Geometric Concepts (approximately 45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Students will understand and use appropriate vocabulary when working with geometric figures.
 - b. Students understand how to use geometric concepts, properties, and relationships in problem-solving, situations and communicate the reasoning used in solving these problems.
 2. Lesson Content
 - a. Identify and draw points, segments, rays, lines
 - b. Identify and draw lines: horizontal, vertical; perpendicular; parallel; intersecting.
 - c. Identify angles; identify angles as right, acute, or obtuse.
 - d. Identify polygons:
 - i. Triangle, quadrilateral, pentagon, hexagon, and octagon (regular)
 - ii. Parallelogram, trapezoid, rectangle, square
 3. Skill Objective(s)
 - a. The students will evaluate their acquired knowledge of basic geometric concepts with a final test.
- B. *Materials*
1. Appendix A (one per student)
 2. Appendix B (one per teacher)
- C. *Key Vocabulary*
- None
- D. *Procedures/Activities*
1. End this unit on geometry by taking a final test. This test is the same as the one administered at the beginning of this unit. Use it to determine each student's level of improvement with basic geometry concepts.
 2. Pass out the test to the students (Appendix A).
 3. Review directions and answer any questions.
 4. Collect the tests at the end of the period.
- E. *Assessment/Evaluation*
1. Students will be evaluated by their correct responses on the test (use Appendix B to grade).

VI. CULMINATING ACTIVITY

- A. Revisit the KWL chart that was created the first day of this unit. As a class, add all the information to the third column of the chart, according to what the students learned during this unit.

VII. HANDOUTS/WORKSHEETS

- A. Appendix A: Geometry Benchmark Quiz
- B. Appendix B: Geometry Benchmark Quiz Answer Key
- C. Appendix C: Geometry Word Search
- D. Appendix D: Geometry Word Search Solution
- E. Appendix E: Guided Practice: Points, Lines, Rays, and Line Segments
- F. Appendix F: Guided Practice: Horizontal, Vertical; Perpendicular, Parallel, and Intersecting Lines
- G. Appendix G: Independent Practice Problems: Points, Lines, Rays, and Line Segments
- H. Appendix H: Independent Practice Problems Answer Key: Points, Lines, Rays, and Line Segments
- I. Appendix I: Guided Practice: Classifying Angles: Right, Acute, or Obtuse
- J. Appendix J: Independent Practice Problems: Classifying Angles: Right, Acute, or Obtuse
- K. Appendix K: Independent Practice Problems Answer Key: Classifying Angles: Right, Acute, or Obtuse
- L. Appendix L: Guided Practice: Polygon Classification
- M. Appendix M: Independent Practice Problems: Polygon Classification
- N. Appendix N: Independent Practice Problems Answer Key: Polygon Classification

VIII. BIBLIOGRAPHY




- A. Cavanagh, Mary C. *Math to Know: A Mathematical Handbook*. New York, NY: A Houghton Mifflin Company, 2000. 0-669-47153-4.
- B. Ellis, Julie. *What's Your Angle Pythagoras? A Math Adventure*. Watertown, MA: Charlesbridge Publishing, 2004. 1-57091-197-5.
- C. Jeremko, Catherine V. *Just in Time: Geometry*. New York, NY: Learning Express, 2004. 1-57685-514-7.
- D. Neuschwander, Cindy. *Sir Cumference and the First Round Table: A Math Adventure*. Watertown, MA: Charlesbridge Publishing, 1997. 1-57091-160-6.
- E. VanCleave, Janice. *Janice VanCleave's Geometry for Every Kid: Easy Activities that Make Learning Geometry Fun*. New York, NY: Wiley & Sons, 1994.

Appendix A, page 1
Geometry Benchmark Quiz

Name _____ Date _____

Basic Geometry Assessment

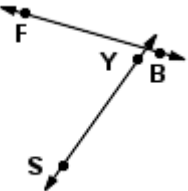


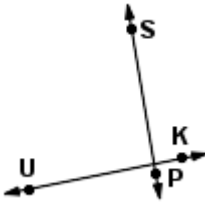
Name each figure using letters.

<p>1. </p>	<p>2. </p>	<p>3. </p>
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Draw and label an example of each.

<p>4. line segment GU</p>	<p>5. ray QX</p>	<p>6. Point H</p>
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Classify each pair of lines as *parallel*, *intersecting*, or *perpendicular*.





<p>7. </p> <p>_____</p>	<p>8. </p> <p>_____</p>	<p>9. </p> <p>_____</p>	<p>10. </p> <p>_____</p>
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Classify each angle as *acute*, *obtuse*, or *right*.

<p>11. </p> <p>_____</p>	<p>12. </p> <p>_____</p>	<p>13. </p> <p>_____</p>	<p>14. </p> <p>_____</p>
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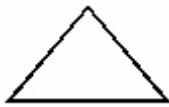
Appendix A, page 2

Write polygon or not a polygon.

<p>15.</p>  <p>_____</p>	<p>16.</p>  <p>_____</p>	<p>17.</p>  <p>_____</p>	<p>18.</p>  <p>_____</p>
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Write down the name for each polygon.

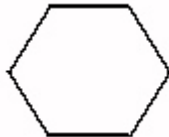
19.



20.






21.






Basic Geometry Assessment Answer Key

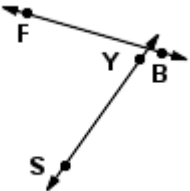


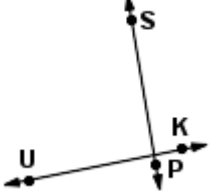
Name each figure using letters.

<p>1. </p> <p style="text-align: center;"><u>point N</u></p>	<p>2. </p> <p style="text-align: center;"><u>line segment BV or VB</u></p>	<p>3. </p> <p style="text-align: center;"><u>ray ZJ</u></p>
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Draw and label an example of each.

<p>4. line segment GU</p> 	<p>5. ray QX</p> 	<p>6. Point H</p> 
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Classify each pair of lines as *parallel*, *intersecting*, or *perpendicular*.





<p>7. </p> <p style="text-align: center;"><u>intersecting</u></p>	<p>8. </p> <p style="text-align: center;"><u>parallel</u></p>	<p>9. </p> <p style="text-align: center;"><u>parallel</u></p>	<p>10. </p> <p style="text-align: center;"><u>perpendicular</u></p>
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Classify each angle as *acute*, *obtuse*, or *right*.

<p>11. </p> <p style="text-align: center;"><u>acute angle</u></p>	<p>12. </p> <p style="text-align: center;"><u>right angle</u></p>	<p>13. </p> <p style="text-align: center;"><u>obtuse angle</u></p>	<p>14. </p> <p style="text-align: center;"><u>acute angle</u></p>
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Appendix B, page 2

Write polygon or not a polygon.

<p>15.</p>  <p><u>polygon</u></p>	<p>16.</p>  <p><u>polygon</u></p>	<p>17.</p>  <p><u>not a polygon</u></p>	<p>18.</p>  <p><u>not a polygon</u></p>
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Write down the name for each polygon.

19.



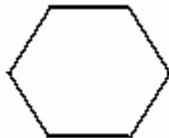
triangle

20.



pentagon

21.



hexagon

Appendix C

Back to the Basics: Geometry Word Search

ACUTE	PARALLEL	RECTANGLE
ANGLES	PARALLELOGRAM	RIGHT
HEXAGON	PENTAGON	SEGMENTS
HORIZONTAL	PERPENDICULAR	SQUARE
INTERSECTING	POINTS	TRAPEZOID
LINES	POLYGONS	TRIANGLE
OBTUSE	QUADRILATERAL	VERTICAL
OCTAGON	RAY	

O H G Q R B W V F Y R I C R I T I D Z N R Y W Y R
B Y D U W U E E J Q H J N X Z V R J Z A I Z K E V
P H M O N L P R B U K J M T W H D I L G N L C N O
W J M F X L S T D J T Y A J E O A U A U B T O O G
G Q Q U A D R I L A T E R A L R C L H N A C S G M
G S P W F U O C K M O X G N Q I S L E N G D U A P
L B J O R J H A P D J V O X D Z L E G L Y L S T P
N O W I P E S L T D J O L N W O D L C U L R E N V
N U G D X E K S D H D N E Q X N E I C T R A R E X
D H R A L I S O D Q B P L B M T F N M I I D R P E
T I G W R I R O M M R U L D L A W E H V X N B A D
F O F X K J F T N E G A A A T L L S E A X U G V P
N V F D I O Z E P A R T R S E G M E N T S P Q R E
S D H I R H Z S D A L I A T I E U V I U J E Y X R
K E H S X A T Q I G K L P S Q U A R E F D S N A E
N V L V P N R B U T M N D P N O G A T C O U K Q I
B L S G I Y R F S C X R Z R P P F E T N Y T V G T
D T J O N A V M S Z W J U S Y A R L R T Q B J T A
L B P S K A R N R G A N E U N Z A E V M C O D G I
L X A I X G O X A U Z S X C I J H C E R Q T F L E
D K D H I G N S Y G C Q D W Y F K J U Y Y A L H P
M C G F Y K H G P G X A S Y Y W P D Y T L M B T M
A O K L F W H M J Q J H E W Z U A K L N E S X N T
U S O Z W H A E G K A G C Y P I Q J F Y R U V A D
N P H R F N A P J O R N Y Y K A U L X O G K J O I

Appendix D

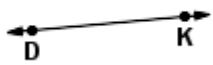


Back to the Basics: Geometry Word Search Solution

ACUTE	PARALLEL	RECTANGLE
ANGLES	PARALLELOGRAM	RIGHT
HEXAGON	PENTAGON	SEGMENTS
HORIZONTAL	PERPENDICULAR	SQUARE
INTERSECTING	POINTS	TRAPEZOID
LINES	POLYGONS	TRIANGLE
OBTUSE	QUADRILATERAL	VERTICAL
OCTAGON	RAY	

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M + + + + + + S R + + + + + L + + + + + + + +
A + + + + + + E E + + + + + E + + + + + + + +
R + T + + + + C H + L Q U A D R I L A T E R A L +
G + + R + + T E + + + G R + + + + + L + + + + E +
O + + + I A X + + + + A N + + + + + A + + + S +
L + + + N A S + + + L + + A + + + + + + R + + U +
E + + G G T N + + U + + + R + + + + + + A + T +
L + L O N + + G C + + + I + + + + + + + + P B +
L E N I + + + I L + + G + + + + + + + + + O +
A + O + + + D + + E H + + + + + + + + + + + +
R P + + + N + + + T + + + + + + + + + + + + +
A + + + E + + + + + + + + + + + + + + + + + +
P + I P + + + + + + + + + + + N S Q U A R E + + +
+ + R N + + + + + + + + + + + O + + + + + + + +
+ E + + T + + + + + + + + + G + L + + + + + + +
P + + + + E + + + + + + + + + A + I + + + + + H +
+ + + + + R D I O Z E P A R T V N + + + + + O +
S E G M E N T S + + S + + + + N E E + + + + R +
N O G A T C O + E N A + + + + E R S + + + + I +
+ + + + + + + O C + C + + + P T + + + + + Z +
S Y A R + + + G + + T + U + + + I + + + + + O +
+ + + + + Y + + + + I + T + + C + + + + + N +
+ + + + + L + + + + + N + E + A + + + + + T +
+ + + + O + + + + + + + G + + L + + + + + A +
+ + + P + + + + + + + + + + + + + + + L +
    
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Guided Practice: Points, Lines, Rays, and Line Segments

<p style="text-align: center;"><u>Points</u></p> <ul style="list-style-type: none"> • A point is an exact location in space. A point has no length or width. You cannot measure its size, but you can describe where it is. • To identify a point, you can use a dot and name it with a capital letter. <p>Examples:</p> <p style="text-align: center;">•O •S •H</p> <p>Said: point O, point S, and point H</p>	<p style="text-align: center;"><u>Lines</u></p> <ul style="list-style-type: none"> • A line is a straight path of points that never ends. It goes on forever in two directions. You cannot measure the length of a line. • When you draw a picture of a line, you can name it by using any two points on the line. Another way to name a line is to use a single small letter. <p>Example:</p> <div style="text-align: center;">  </div> <p>Said: line DK or line KD</p>
<p style="text-align: center;"><u>Rays</u></p> <ul style="list-style-type: none"> • A ray is part of a line. It has one endpoint and goes on forever in one direction. Think of a ray of light coming from a flashlight. <p>Example:</p> <div style="text-align: center;">  </div> <p>Said: ray FS (use the endpoint as the first letter when writing the name of a ray)</p>	<p style="text-align: center;"><u>Line Segments</u></p> <ul style="list-style-type: none"> • A line segment is part of a line. It has two endpoints. You can measure the length of a line segment. • You can name a line segment by using its two endpoints. <p>Example:</p> <div style="text-align: center;">  </div> <p>Said: line segment CD or line segment DC</p>

Guided Practice: Horizontal, Vertical; Perpendicular, Parallel, and Intersecting Lines

Horizontal and Vertical Lines

- A horizontal line goes straight across, like the horizon.

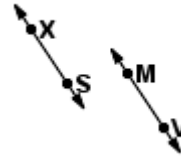


- A vertical line goes straight up and down.



Parallel Lines

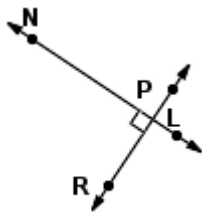
- The two rails of a railroad track are always the same distance apart. They have to be in order for the train to keep moving along them.
- If you think of each rail as a line, then the two rails represent a pair of *parallel lines*. Parallel lines are always the same distance apart and will never cross, or intersect, one another.



- Said: Line XS is parallel to line MV.

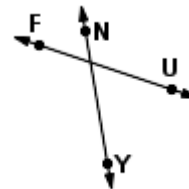
Perpendicular Lines

- When two intersecting lines meet to form square corners, they are called *perpendicular lines*.
- You can fold a piece of paper in half and in half again to make perpendicular lines.
- Said: Line NL is perpendicular to line PR.



Intersecting Lines

- *Intersecting lines* are lines that cross. For example, think about streets that meet and cross at intersections.









- Said: Line FU intersects line NY.

Appendix G

Independent Practice Problems: Points, Lines, Rays, and Line Segments

Name: _____

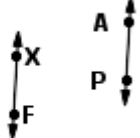
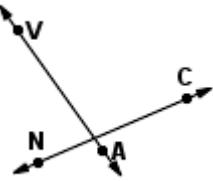
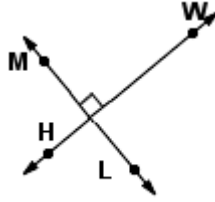

Name each figure using letters.

<p>1.  Example: Line segment TB</p>	<p>6. </p>	<p>3.  _____</p>
<p>4. </p>	<p>5. </p>	<p>6. </p>

Draw an example of each.

<p>1. ray MY</p>	<p>2. line segment HG</p>	<p>3. line PF</p>
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




Classify each pair of lines as *parallel*, *intersecting*, or *perpendicular*.

<p>1.  _____</p>	<p>2.  _____</p>	<p>3.  _____</p>	<p>4.  _____</p>
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Appendix H

Independent Practice Problems: Points, Lines, Rays, and Line Segments: ANSWER KEY

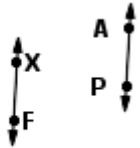
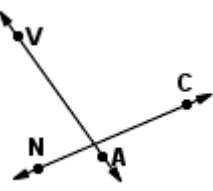
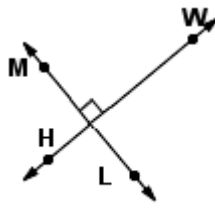

Name each figure using letters.

<p>1. </p> <p>Example: Line segment TB</p>	<p>6. </p> <p>point S</p>	<p>3. </p> <p>line segment PJ or JP</p> <hr/>
<p>4. </p> <p>line KR or RK</p>	<p>5. </p> <p>ray XC</p>	<p>6. </p> <p>line DK or KD</p>

Draw an example of each.

<p>1. ray MY</p> 	<p>2. line segment HG</p> 	<p>3. line PF</p> 
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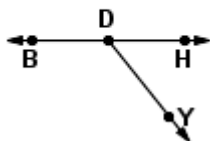
Classify each pair of lines as *parallel*, *intersecting*, or *perpendicular*.

<p>1. </p> <p>parallel</p> <hr/>	<p>2. </p> <p>intersecting</p> <hr/>	<p>3. </p> <p>perpendicular</p> <hr/>	<p>4. </p> <p>parallel</p> <hr/>
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Guided Practice: Classifying Angles: Right, Acute, or Obtuse

Angle Classification

- An *angle* is formed when two rays meet at an endpoint. The endpoint is called the *vertex* of the angle.
- You can name an angle by writing the point on one ray, the vertex, and the point on the other ray.



- Said: angle BDY; YDB or angle HDY; YDH

Right Angles

- A *right angle* is an angle that measures exactly 90 degrees.
- The back of a chair makes a right angle with the seat of the chair.
- You can use the corner of an index card to identify the kind angle. Line up the corner so that it touches the vertex of the angle and one side of the angle.
- It's a right angle if the other side of the angle goes along the edge of the index card.



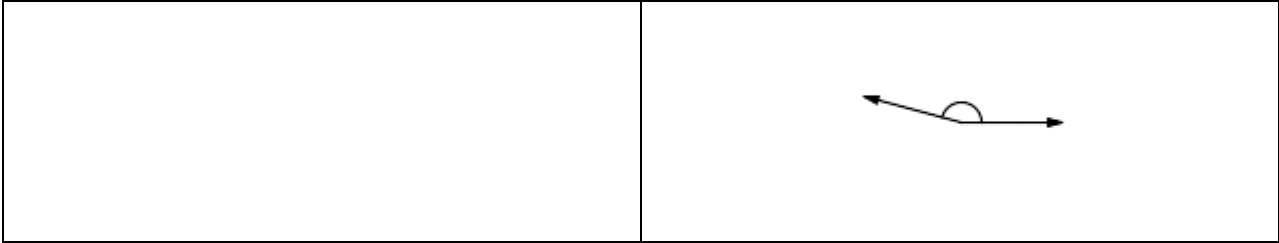
Acute Angles

- An *acute angle* is an angle that measures less than 90 degrees.
- You can use the corner of an index card to identify the kind of angle. Line up the corner so that it touches the vertex of the angle and one side of the angle.
- It's acute if you can't see all of the other side of the angle.



Obtuse Angles

- An *obtuse angle* is an angle with a measure greater than 90 degrees and less than 180 degrees. A straight angle measures exactly 180 degrees.
- You can use the corner of an index card to identify the kind of angle. Line up the corner so that it touches the vertex of the angle and one side of the angle.
- It's an obtuse angle if the other side of the angle opens past the edge of the index card.





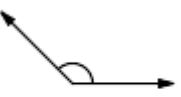









Appendix J

Independent Practice Problems: Classifying Angles: Right, Acute, or Obtuse

Name: _____





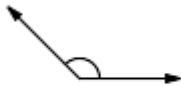
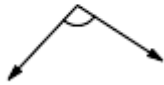






Use an index card to classify each angle as *acute*, *obtuse*, or *right*.

1.  _____	2.  _____	3.  _____	4.  _____
5.  _____	6.  _____	7.  _____	8.  _____
9.  _____	10.  _____	11.  _____	12.  _____

Appendix K

Independent Practice Problems: Classifying Angle: Right, Acute, or Obtuse: ANSWER KEY

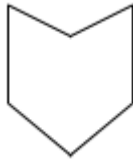
Use an index card to classify each angle as *acute*, *obtuse*, or *right*.

1.  <u>acute angle</u>	2.  <u>acute angle</u>	3.  <u>right angle</u>	4.  <u>obtuse angle</u>
5.  <u>obtuse angle</u>	6.  <u>right angle</u>	7.  <u>acute angle</u>	8.  <u>acute angle</u>
9.  <u>acute angle</u>	10.  <u>obtuse angle</u>	11.  <u>obtuse angle</u>	12.  <u>obtuse angle</u>

Guided Practice: Polygon Classification

Polygon Vs. Non-Polygon

- Figures are either open or closed.
- A polygon is a *closed* figure.
- If you place your pencil outside a closed figure, you cannot move it inside without touching part of the figure or lifting your pencil.

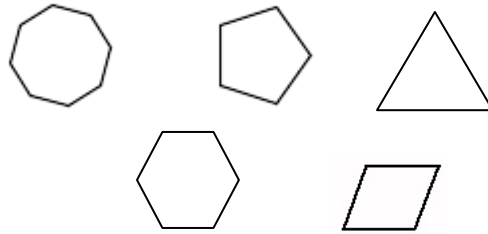


- Non-polygons are open figures.



Regular Polygons

- A polygon that has all sides the same length and all angles the same measure is a regular polygon.
- Regular polygons include:



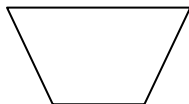
- Triangles, quadrilaterals, pentagons, hexagons, and octagons are regular polygons.
- The name of a polygon depends on the number of sides it has.

More Polygons: Parallelogram and Trapezoid

- A parallelogram has two pairs of sides that are the same length and are parallel.



- A trapezoid has exactly one pair of parallel sides.



Still More Polygons: Rectangle and Square

- A rectangle has four right angles.



- A square has four right angles and all sides are the same length.







Appendix M





Independent Practice Problems: Polygon Classification

Name: _____

Write polygon or not a polygon.

1.  _____	2.  _____	3.  _____	4.  _____
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Write down the name for each polygon.

1.  _____	2.  _____
3.  _____	4.  _____




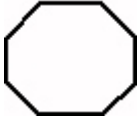
Appendix N

Independent Practice Problems: Polygon Classification ANSWER KEY

Write polygon or not a polygon.

1.  <i>polygon</i> _____	2.  <i>polygon</i> _____	3.  <i>not a polygon</i> _____	4.  <i>not a polygon</i> _____
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Write down the name for each polygon.

1.  <i>Hexagon</i>	2.  <i>Triangle</i> _____
3.  <i>Pentagon</i>	4.  <i>Octagon</i>