Summer 6-2015

The Basics: Geometric Structure

Danielle Kendrick
Trinity University

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Repository Citation

Kendrick, Danielle, "The Basics: Geometric Structure" (2015). *Understanding by Design: Complete Collection*. 311.
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UbD Template 2.0

Stage 1 – Desired Results

Transfer

Students will independently use their learning to…

Create an image that uses each of the vocabulary terms learned during the unit.

Meaning

Understandings	Essential Questions
Students will understand that…. -Geometric models are used to interact with and study the physical world. -Geometric structures aid problem solving by making abstract concepts concrete.	-How and why are geometric shapes used to model the physical world? -How are geometric structures used to solve problems?

Established Goals (e.g., standards)

G4A. distinguish between undefined terms, definitions, postulates, conjectures, and theorems;
G4C. verify that a conjecture is false using a counterexample
G4D. compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle.
G5A. investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;
G5B. construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;
G5C. use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships;

Acquisition

Knowledge	Skills
Students will know… Vocab: -model -construction -undefined term -definition -Euclidean -Non Euclidean -Spherical -point -line -plane -segment -Angle -ray -acute -obtuse -complementary -supplementary -bisector -angle bisector -segment bisector -midpoint -distance -Postulate -Segment Addition Postulate- If A, B, and C are collinear such that B is between A and C, then AB+ BC=AC. -Angle Addition Postulate- Given <ABC with point D in the interior, m<ABD+m<DBC=m<ABC	*Students will be able to…* -Constructions: (using a compass and ruler) • Congruent segments • Congruent angles • Segment bisector • Angle bisector -Name points, lines, line segments, planes, and rays using appropriate symbolic notation -Name points, lines, line segments, planes, and rays verbally using appropriate academic language. -use the segment and angle addition postulates to solve for missing measurements.

Stage 2 – Evidence

CODE (M or T)	Evaluative Criteria	

	(for rubric)	
T	See Rubric	**Performance Task(s)** *Students will demonstrate meaning-making and transfer by…* drawing an image incorporating at least one example of each of the vocabulary terms OR choosing a magazine image and identifying at least one example of each of the vocabulary terms in it. -- **Other Evidence (e.g., formative)** Daily exit tickets Weekly Quiz Informal checks for understanding

Stage 3 – Learning Plan

CODE **(A, M, T)**	Pre-Assessment *How will you check students' prior knowledge, skill levels, and potential misconceptions?* Written Pre-assessment in the form of the exam.	
	Learning Activities	Progress Monitoring (e.g., formative data)
A/M	**Day 1: Intro to Geometry and Symmetry** Objective: SWBAT explain why we study geometry. SWBAT identify rotational and reflectional symmetry in a given image. Essential Question: <mark>How and why are geometric shapes used to model the physical world?</mark> Do now: Do Now: Symmetry Lesson: We will complete the Symmetry notes together as a class. Art and Math connect: Students will identify symmetry in art. Students will complete the "Create your own symmetry" activity. Exit: 5 question exit ticket	Exit ticket Create your own symmetry drawing
A	**Day 2: Basic terms of Geometry** Objective: SWBAT identify and name basic geometry objects using appropriate academic vocabulary and notation. Essential Question: <mark>How and why are geometric shapes used to model the physical world?</mark> Do now: Students prior knowledge will be assessed by having them complete as much of the first column of the Basic Terms of Geometry Notes chart as possible.	Exit ticket

A/M	Lesson: We will complete the Basic Terms of Geometry Notes. Students will be given play-doh so that they can model each term as we proceed through the notes. Students understanding and retention will be checked at the end of the vocab using the play-doh to play "Simon Says". Exit: 5 question exit ticket. **Day 3: Intro to Geometric Constructions** Objective: SWBAT construct congruent segments and angles using a compass and straight edge. Essential Question: <mark>How and why are geometric shapes used to model the physical world?</mark> Do now: In order to familiarize students with the new materials, have students draw a picture using the ruler, compass, and a pencil. After approx. 3 minutes of free drawing have students share their picture with a partner for about a minute. Ask several students to share their picture with the class. Ask students to name the tools and ask if they know what they are used for in geometry class. Lesson: Name each tool and explain how to use them correctly. Have the students draw a couple of practice arcs with the compass. Give several minutes to do this since kids tend to struggle a lot to use plastic compasses without changing the radius. As a class, complete the Introduction to Constructions notes. Have students construct several segments and angles on their own. Exit: 2 question exit ticket (construct one segment and one angle.) Notes may be used.	Exit ticket
A	**Day 4: Distance formula** Objective: SWBAT apply the distance formula to calculate the distance between two points on a coordinate grid. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Students will complete the Do Now: Distance handout. Lesson: Segue from the Do Now to the lesson by deriving the distance formula from Pythagorean theorem. [Connection to prior knowledge: students learned Pythagorean theorem in algebra]. Completion of the Distance problem Notes and Guided practice.	Exit ticket

	Students will complete the distance formula independent practice problem in their interactive notebooks. Exit: 5 question exit ticket	
A	**Day 5: Midpoint formula** Objective: SWBAT apply the midpoint formula to find the midpoint of a line segment given the end points. SWBAT apply the midpoint formula to find an endpoint of a segment given the other endpoint and the midpoint. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Students will complete the Do Now: Distance and Midpoint I. Lesson: The Do Now will ask the students to find the middle of a given line segment. Students will share their methods for finding the middle. We will complete the Midpoint Notes in our INBs. As a class, we will complete several practice problems. After the guided practice students will complete several practice problems on their own. Exit: 5 question exit ticket.	Exit ticket
A	**Day 6: Practice and Quiz** Objective: SWBAT apply the distance formula to calculate the distance between two points on a coordinate grid. SWBAT apply the midpoint formula to find the midpoint of a line segment given the end points. SWBAT apply the midpoint formula to find an endpoint of a segment given the other endpoint and the midpoint. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Do Now: Distance and Midpoint II Lesson: Distance and Midpoint scavenger hunt. Students may work with a partner or individually. When they finish I will check for accuracy and work. Exit: Distance and Midpoint Formula Quiz **Day 7: Segment Addition**	Quiz Scavenger hunt

A/M	Objective: SWBAT apply the segment addition postulate to set up and solve algebraic expressions in order to find missing lengths. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Do Now: Segment Addition. During his time we will discuss what a postulate is. Lesson: Students will be given the segment addition activity segment cards and the recording sheet. We will do several practice problems together in order to discover the postulate. Students will write the postulate independently and then we will share with the group. As a class, we will complete the guided practice, taking care to insure that we are using the correct notation. (Pay particular attention to the difference between the segment name and the segment measure.) Exit: 5 question exit ticket	Exit ticket
A/M	**Day 8: Angle Intro and Vocab** Objective: SWBAT identify an angle and special angle pairs. (Not formed by parallel lines). SWBAT use special angle pairs to set up and solve algebraic equations to find missing measurements. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Angle Vocab Pre-assessment Lesson: As a class, we will complete the special angle pairs notes and angle aerobics. To check for understanding we will play a kind of angle aerobics Simon says game. Exit: 5 question exit ticket	Exit ticket
A	**Day 9: Angle Addition Postulate** Objective: SWBAT apply the angle addition postulate to set up and solve algebraic equations to find missing angle measurements. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Do Now: Angle Addition Lesson: We will examine the angle addition flipchart. [Last year, students struggled with deciding which parts were being added and which parts were the whole.] As a class, we will complete	Exit ticket

	the angle addition postulate notes and guided practice in pairs. Then students will complete the independent practice individually. Exit: 5 question exit ticket	
A	**Day 10: Segment and Angle Addition Postulate** Objective: SWBAT apply the angle addition postulate to set up and solve algebraic equations to find missing angle measurements. SWBAT apply the segment addition postulate to set up and solve algebraic expressions in order to find missing lengths. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do Now: Do Now: Segment and Angle Addition Lesson: Segment and Angle Addition Jeopardy. Students will be split into groups of 4. All work will be done on personal dry erase boards. Exit: Segment and Angle Addition Postulate quiz	Quiz Dry erase board work
A	**Day 11: Angle bisectors and Constructions** Objective: SWBAT construct an angle bisector using a compass and straight edge. Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: Do Now: Angle Bisector Lesson: As a class, we will complete the Angle Bisector Construction Notes. Students will have the opportunity to practice on their own. Exit: Angle Bisector Construction (1 problem)	Exit ticket
T	**Day 12-13 Project work days.** Students will be introduced to the project and will have 2 days to work in class. Student who finish early should work on the written unit review.	Create an image Project
M/T	**Day 12: Review** Objective: SWBAT apply all postulates and formulas learned throughout the unit to solve for missing angle and side measures.	Test Review

	Essential Question: <mark>How are geometric structures used to solve problems?</mark> Do now: 5 question quick review. Lesson: Review game Exit: Unit reflection. **Day 13: Test Day** Students will take the written Unit exam.	Exam

Unit 1 Project – DUE :

Objective: SWBAT create an image using each of the vocabulary terms presented in our first unit.

Task:
You will draw an image incorporating at least one example of each of the following vocabulary terms OR you will choose a magazine image and identify at least one example of each of the vocabulary terms in it. Highlight and number each vocabulary term shown in your image, and, on the chart provided, label the vocabulary term corresponding to the number (see teacher's example). You will also explain in a complete sentence, using appropriate notation and academic language, why your example fits the definition of each term.

Vocabulary terms:
- Linear pair
- Complementary angles
- Supplementary angles
- Vertical angles
- Adjacent angles
- Midpoint
- Acute angle
- Right angle
- Obtuse angle
- Collinear points
- Parallel lines
- Perpendicular lines
- Opposite rays

*All objects should be labeled with the appropriate geometric notation and measurements (including units).

CFS:
I will know that I have been successful if:

- ☐ I included at least one example of each vocabulary term in my image.
- ☐ I labeled all side lengths and angle measures are recorded on my image including appropriate units.
- ☐ I numbered and highlighted each term in my image.
- ☐ I recorded the numbers and term names on the chart.
- ☐ I provided a defense for each term on my chart using appropriate academic vocabulary and notation.

CFS Status (circle one): MET or NOT YET

Self-Assessment:

1. Did you meet all parts of our criteria for success? If not, please explain why you were unable to be successful on this assignment.

2. Are there any vocabulary terms that you are still uncomfortable with? If yes, which one(s)?

Vocab. Terms	#	Rationale
Linear Pair		
Complementary Angles		
Supplementary Angles		
Vertical Angles		
Adjacent Angles		
Midpoint		
Acute angle		
Right angle		
Obtuse angle		
Collinear points		
Parallel lines		
Perpendicular lines		
Opposite rays		

Rubric:

	4	3	2	1	0
Presence of Vocab. Terms	All 13 vocabulary terms are represented in the image. All examples are numbered and highlighted with measurements included where appropriate.	At least 10 vocabulary terms are represented in the image. All examples are numbered and highlighted with measurements included where appropriate.	At least 7 vocabulary terms are represented in the image. All examples are numbered and highlighted with measurements included where appropriate.	At least 4 vocabulary terms are represented in the image. All examples are numbered and highlighted with measurements included where appropriate.	3 or fewer vocabulary terms are represented in the image. All examples are numbered and highlighted with measurements included where appropriate.
Rationale: Completion	There is a rationale provided for all 13 examples of the vocabulary terms.	There is a rationale provided for at least 10 examples of the vocabulary terms.	There is a rationale provided for at least 7 examples of the vocabulary terms.	There is a rationale provided for at least 4 examples of the vocabulary terms.	There is a rationale provided 3 or fewer examples of the vocabulary terms.
Rationale: Accuracy	All 13 rationales are in the form of a complete sentence using accurate academic vocabulary and appropriate mathematical notation.	At least 10 rationales are in the form of a complete sentence using accurate academic vocabulary and appropriate mathematical notation	At least 7 rationales are in the form of a complete sentence using accurate academic vocabulary and appropriate mathematical notation	At least 4 rationales are in the form of a complete sentence using accurate academic vocabulary and appropriate mathematical notation	3 or fewer rationales are in the form of a complete sentence using accurate academic vocabulary and appropriate mathematical notation
Image: Completion	All 13 examples are artistically incorporated into the image.	At least 10 examples are artistically incorporated into the image.	At least 7 examples are artistically incorporated into the image.	At least 4 examples are artistically incorporated into the image.	3 or fewer examples are artistically incorporated into the image.
Neatness	All objects are drawn neatly using a compass and a straight edge where appropriate. There are 0 stray marks.	Most objects are drawn neatly using a compass and a straight edge where appropriate. There are 3 or fewer stray marks.	Some objects are drawn neatly using a compass and a straight edge where appropriate. There are 5 or fewer stray marks.	Some objects are drawn neatly using a compass and a straight edge where appropriate. There are many stray marks.	Objects are not drawn neatly using a compass and a straight edge where appropriate. There are numerous stray marks.

Score: _____/ 20 points