Unit A - *A Introduction to Geometry*

Overview

This unit introduces students to the majority of terminology used in Geometry. Transformations, logical thinking and proofs are all part of the unit and will be referred to throughout the course. Students will be able to complete a two-column geometric proof by the end of the unit. Geometric software, along with compass and straightedge, will be used for constructions.

21st Century Capacities: Analyzing , Collective Intelligence

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense of problems and persevere in solving them
MP3 Construct viable arguments and critique the reasoning of others
MP6 Attend to precision
MP7 Look for and make use of structure

CCSS.MATH.CONTENT.HSA.CED.A.1
Create equations and inequalities in one variable and use them to solve problems.

CCSS.MATH.CONTENT.HSA.REI.B.3
Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

CCSS.MATH.CONTENT.HSG.CO.A.1
Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular

Transfer:

Students will be able to independently use their learning in new situations to...

1. Draw conclusions about graphs, shapes, equations, or objects.(Analyzing)
2. Justify reasoning using clear and appropriate mathematical language.
3. Work respectfully and responsibly with others, exchanging and evaluating ideas to achieve a common objective (Collective Intelligence)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians analyze characteristics and properties of geometric shapes to develop mathematical arguments about geometric relationships.
2. Mathematicians compare the effectiveness of various arguments, by analyzing and critiquing solution pathways.
3. Mathematicians flexibly use different tools, strategies, symbols, and operations to build conceptual knowledge or solve problems.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. How can I use symbols to communicate?
B. How does classifying bring clarity?
C. How can I use what I know to help me find what is missing?
D. What do I need to support my answer?

	Acquisition:	
arc. CCSS.MATH.CONTENT.HSG.CO.C.9 Prove theorems about lines and angles. CCSS.MATH.CONTENT.HSG.CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). CCSS.MATH.CONTENT.HSG.GPE.B.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio. CCSS.MATH.CONTENT.HSS.CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). CCSS.MATH.CONTENT.HSS.CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. CCSS.MATH.CONTENT.HSS.CP.B.6 Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model. CCSS.MATH.CONTENT.HSS.CP.B.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model	*Students will know….* 1. In Euclidian Geometry points, lines and planes are undefined 2. that lines and planes are sets of points 3. how to identify congruent segments and angles on a diagram with tic marks 4. what can be assumed from a diagram and what cannot 5. the sum of the lengths of any two sides of a triangle is greater than the length of the third side 6. the definition of congruence in terms of transformations 7. that a counterexample can show that a conclusion is false 8. postulate and theorems are not always reversible 9. definitions are always reversible 10. that if a conditional statement is true, then the contrapositive of the statement of the statement is also true 11. the Addition, Subtraction, Multiplication and Division Property for Angles and Segments 12. that vertical angles are congruent 13. which assumptions we can and cannot make from a diagram 14. **Vocabulary:** point, line, segment, ray, endpoints, angles, sides, vertex, union, intersection, acute, right, obtuse, straight, collinear, noncollinear, theorem, proof, bisector, midpoint, trisect, trisection point, postulate, definition, conditional statement, implication, hypothesis, conclusion, converse, negation, contrapositive, perpendicular, probability, opposite rays,	*Students will be skilled at…* 1. naming and recognizing points, lines, rays, angles, line segment, triangles 2. finding the distance between two points on number lines using subtraction and absolute values 3. correctly interpreting geometric diagrams 4. converting between degrees, minutes and seconds and decimal degrees 5. If two angles are straight(right) angles, then they are congruent. 6. writing the converse, negation, inverse and contrapositive of a conditional statement 7. using the chain rule to draw conclusions 8. finding the complement or supplement of an angle given in degrees, minutes, seconds 9. solving algebraic problems involving angles 10. using theorems about angles and segments to solve basic proofs 11. using transitive and substitution property in basic proofs 12. constructing the copy of a segment 13. constructing the copy of an angle