NEW

Geometry

Framework for **FORMATIVE/CLASSROOM** Instruction and Assessment

English language learners communicate information, ideas, and concepts necessary for academic success in the content area of **MATHEMATICS.**

PA Academic Standard(s)

Develop content appropriate for the topic. 1.5.11.B.

- Gather, organize and determine validity and reliability of information.
- Employ the most effective format for purpose and audience.
- Write fully developed paragraphs that have details and information specific to the topic and relevant to the focus.

Demonstrate awareness of audience using appropriate volume and clarity in formal speaking presentations. 1.6.11.B.
Use statements, converses, inverses, and contrapositives to construct valid arguments or to validate arguments relating to geometric theorems. 2.4.G.B.
Identify and use properties and relations of geometric figures; create justifications for arguments related to geometric relations. 2.9.G.A.
Use arguments based on transformations to establish congruence or similarity of 2- dimensional shapes. 2.9.G.B.
Use techniques from coordinate geometry to establish properties of lines, 2-dimensional shapes. 2.9.G.C.
Write formal proofs (direct proofs, indirect proofs/proofs by contradiction, use of counter-examples, truth tables, etc.) to validate conjectures or arguments. 2.4.G.A.

Speaking

Concepts	Competencies	Vocabulary	Level 1 Entering	Level 2 Beginning	Level 3 Developing	Level 4 Expanding	Level 5 Bridging	
Geometric Representations 2- and 3-dimensional figures Reasoning and Proof Geometric Relations: Congruence and Similarity Analytic Geometry Trigonometric Ratios	Define and describe types of geometrical reasoning and proof, using them to verify valid conjectures as they surface in the study of geometry; develop a counterexample to refute an invalid conjecture. Define, describe, and analyze 2- and 3-dimensional figures, their properties and relationships, including how a change in one measurement will affect other measurements of that figure. Use concepts of congruence and similarity to relate and compare 2- and 3-dimensional figures, including trigonometric ratios. Use coordinates and algebraic	Combination Congruent Conjecture Contrapositive Converse Equation Expression Inequality Inverse Irrational number Polygon Probability Proof by contradiction Similarity Systems of equations Transformation Trigonometric functions	Can string one-word note cards into grammatically correct mathematical conditional statements/ mathematical sentences and speak them to answer questions.	Refute a statement with a counter example based soundly on text or geometric representations.	Verbally identify the consequences associated with playing a game, formulating conjectures, conditional statements and refuting statements orally.	Orally present a flow proof with a partner with no textual support/notes.	Present a series of valid arguments that lead logically to a desired conclusion in mathematics and other contexts.	**Level 6- Reaching**

	techniques to interpret, represent and verify geometric relationship.	Valid argument Variable						
Writing								
Concepts	**Competencies**	**Vocabulary**	**Level 1 Entering**	**Level 2 Beginning**	**Level 3 Developing**	**Level 4 Expanding**	**Level 5 Bridging**	
			Fill in the blanks of a conditional statement or mathematical vocabulary using a word bank.	Write a conditional statement, identify the parts of a geometric sketch using correct notation with vocabulary support.	Write small formal proofs with a partner.	Write persuasively to refute an argument based on counter-examples and valid arguments.	Disprove by way of contradiction.	**Level 6- Reaching**
			Content Stems					
			Conditional statements Geometric reasoning Counter examples Problem solving Write math language Communicate mathematically Logic	Proof recognizing real-world scenarios Write math language Communicate mathematically	Conjecture valid argument Engage in mathematical discourse Make predictions Test theories	Read mathematical writing and technical text Find and correct errors in mathematical thinking	Proof by contradiction Find the best solution Make recommendations Mathematical reasoning	
			Instructional Support					
			Personal dictionaries Picture dictionaries Teacher-created visual aids Real-life	Personal dictionaries Picture dictionaries Teacher-created visual aids Real-life	Personal dictionaries Picture dictionaries Teacher-created visual aids Real-life	Personal dictionaries Picture dictionaries Teacher-created visual aids Real-life	Personal dictionaries Picture dictionaries Teacher-created Visual aids Real-life objects Direct translation	

			objects Direct translation dictionaries Think-pair share Cooperative learning	objects Direct translation dictionaries Think-pair-share Cooperative learning	objects Direct translation dictionaries Think-pair-share Cooperative learning	objects Direct translation dictionaries Think-pair-share Cooperative learning	dictionaries Think-pair-share Cooperative learning	
			Language Use					
			Speaking Answer Y/N Repeat words and short phrases Respond to visuals	**Speaking** Peer suggestions to solve problems Work in teams or groups Answer in phrases or sentences	**Speaking** Model talking to text for class Peer review work and provide feedback or corrections	**Speaking** Present projects to class Discuss and debate theory	**Speaking** Predict outcomes and construct arguments to relate content to other disciplines	
			Writing Make personal dictionaries Fill in the blank Write short phrases	**Writing** Write several sentence explanations Group words by meaning Group synonyms	**Writing** Outline details in word problems Complete cohesive explanation of steps to answer	**Writing** Complete evaluation of student work against a rubric	**Writing** Write technical or business text to persuade audience/ clientel	