

Probability, Statistics & Trigonometry: Logic

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Students will demonstrate the ability to decontextualize (represent symbols) and contextualize (understand the meaning of quantities) by converting real-world situations into mathematical symbols for manipulation, and interpreting symbolic results back into practical contexts. - Students will demonstrate logical thinking and communication skills by building justified mathematical arguments, comprehending the justification of others, and critiquing their reasoning. - Students will demonstrate structural awareness by discerning patterns and functional relationships within complex mathematical concepts to simplify and solve problems. - Students will demonstrate the ability to notice repetitive calculations or patterns, evaluate the reasonableness of results, and formulate general methods, formulas, or shortcuts while maintaining oversight of the process. - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> - A.SSE.A.1.A Interpret parts of an expression, such as terms, factors, and coefficients. - F.IF.C.8.B Use the properties of exponents to interpret expressions for exponential functions. - F.BF.A.1.A Determine an explicit expression, a recursive process, or steps for calculation from a context. - MP2 Reason abstractly and quantitatively. - MP4 Model with mathematics. - MP7 Look for and make use of structure. - MP8 Look for and express regularity in repeated reasoning.	Transfer	
	<i>Students will be able to independently use their learning to make informed decisions based upon their understanding of the rules of Logic.</i>	
	Meaning	
	ENDURING UNDERSTANDINGS <i>Students will understand that...</i> The study of logic forms the underlying basis for many things we use every day, including our smartphones, computers, cars and all other technology involving programming.	ESSENTIAL QUESTIONS - How can the study of Logics be used to assess if someone is making a valid or invalid argument? - Why is the language of Logic so important when making a valid argument?
	Acquisition	
	<i>Students will know...</i> - The rules of logic give precise meaning to mathematical statements and are used to distinguish between valid and invalid arguments. - Predicate logic can be used to express the meaning of a wide range of statements in mathematics and computer science in ways that permit us to reason and explore relationships between objects. - Existential, universal, and nested quantifiers can be used to represent mathematical statements and can be used to translate English sentences into mathematical statements. <i>vocabulary: logic statements, connectives, truth tables, logical equivalence, contradictions, conditional statements, converse, inverse, contrapositive, arguments, logic circuits, DeMorgan's Law</i>	<i>Students will be skilled at...</i> - creating and understanding logic statements and connectives. - translating to and from symbolic notation. - reading and writing truth tables. - understanding logical equivalence. - constructing tautologies and contradictions. - writing and interpreting conditional statements and their negations. - understanding and writing biconditionals. - distinguishing between valid and invalid arguments. - understanding logic circuits. - understanding and interpreting quantifiers and their negations. - analyzing mathematical statements using propositional and predicate logic. - applying propositional logic to translations of English sentences and to Boolean searches, logic puzzles, and logic circuits. - analyzing and constructing tautologies and contradictions. - applying the rules of inferences in propositional logic and for quantified statements in order to produce valid argument.

Content Area Literacy Standards		21st Century Skills
• RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. • RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. • RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11-12 texts and topics</i>.		• <i>reason effectively</i> • <i>use systems thinking</i> • <i>apply technology effectively</i> • <i>make judgments and decisions</i> • <i>solve problems</i> • <i>access and evaluate information</i>

Stage 2 - Evidence	
<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

Language Arts Integration

- 1.OA.1 Use

Mathematics Integration

- 1.OA.1 Use

Technology Integration

- 1.OA.1 Use

District Materials