Curriculum Sample Template

Max. 8 Pages

Grade Level	11	**Content Area**	Mathematics (Algebra II)
Course Title (grades 9-12 Only)	Algebra II		
Length of Unit	7 days (4 for lessons, 3 for project)	**Time of Year**	Block 4 of 10
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students will be familiar with exponents and how to simplify exponent expressions		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Students will be asked to provide a brochure of how logs are used in the real-world. The brochure will include information about the history of how the log and scale is used, and sample calculations. Students will be using their knowledge of logs and exponents from class to explain their brochure. Students will choose scales that are logarithmic (pH, decibels, radio-active decay, Richter scale, etc...). Applying their knowledge to real world experiences aligns with the Program of Instruction		
Standard Number and Description *List the Number* and full description for the required Standard.*	HS.F-BF.5. Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.		
Summative Assessment *Describe a cumulative and comprehensive activity, clearly separate from instruction and guided or independent practice, which allows each student to individually demonstrate mastery of the required Standard. A copy of the summative assessment must be attached to the curriculum sample.*	For the summative assessment students will be solving problems involving logs and exponents.		
Scoring Scale and Mastery Level *Explain how the assessment is scored, to include points per question, how points are awarded, total points possible, criteria necessary to demonstrate mastery, and grading scale. A copy of the answer key and scoring rubric (whichever applicable) must be attached to the curriculum sample.*	There will be 10 questions on the assessment. Each problem will be worth 1 point. The following will be the grade scale: 0-6 = No Grade (required retake), 7 = C, 8 = B, 9-10 = A. Students will demonstrate mastery by scoring 7 (70%) or better.		
Materials/Resources Needed	Scientific calculator, graph paper, document camera and projector, computer with Internet access and publisher		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	**Instruction**	**Student Activities**
1	Students will have bell work that reviews exponents. After the bell work students will be told that they are going to be learning about logarithms and how they are related to exponents. Students will be informed that logs are used in several places in our everyday life and that students will be creating a brochure that details 1 way logs are used. In order to be able to complete the brochure assignment students will need to know more about logs and exponents. Students will then be introduced to what logs are ($y = b^x$ and $\log_b y = x$ are the same). Students will practice writing logs as exponents and exponents as logs. The class will complete it all together first, then in small teams, and finally as individuals. Students will be given homework where they change logs to exponents and exponents to logs. There will be a separate rubric for the brochure not included in this curriculum sample. The assignment is included to show how the sample relates to the Program of Instruction.	Students will review exponents Students will take notes on converting logs to exponents. Students will, as a class, in teams, and as individuals convert exponents to logs and logs to exponents. Example: convert to log ; $4^5 = 1024$ answer; $\log_4 1024 =$
2	Students will have bell work in which they review the previous day work. Students will then be introduced to algebra problems involving logs. Students will then be given problems in groups that involve logs. Teacher will circulate to help students that have individual needs. Students will present their solutions. Students will graph an exponential function by plotting points, then graph the log of the function. This graph will create a straight line. Students will be told that this is why log functions are used to make scales for exponential functions (like pH, radioactive decay, Richter scale etc...). For homework students will have practice problems for solving logs.	Students will convert exponents to logs and logs to exponents Students will take notes on solving algebra problems with logs Students will work in teams to solve problems with logs Students will graph exponential function and log functions Students will individually solve problems with logs example: $\log_4 2x = 3$ $4^3 = 2x$ $64 = 2x$ $x = 32$

3	Students will complete bell work in which they will solve problems using logs. Students will be shown how their calculator has a log function that is base 10. Students will solve some problems with logs using calculators. Students will then receive review questions for the assessment. Students will finish review at home.	Students will solve algebra problems with logs Students will use calculator to solve log problems with base 10 Students will have a review assignment for their test (converting exponents to logs, solving problems with logs)
4	Students will have a quick review for their bell work on logs. Students will take the assessment involving logs and exponents. When finished students can begin research for project.	Students will complete the assessment

Paste Summative Assessment Here:

Logs and Exponents

1. Convert from an exponent to a log: $216 = 6^3$
2. Convert from a log to an exponent: $\log_8 4096 = 4$
3. Use your calculator to solve for x: $\log 123 = x$
4. Use your calculator to solve for x: $\log 67 = x$
5. Solve: $\log_3(18-9x) = 4$
6. Solve: $\log_5(3x+5) = 3$
7. Solve: $\log_6(-2x+4) = 2$
8. Solve using your calculator: $1000 = 10^{(x+4)}$
9. Solve using your calculator: $46 = 10^{(2x-7)}$
10. Solve using your calculator: $158 = 10^{(4x+1)}$

Paste Answer Key/Scoring Rubric Here:

There will be 10 questions on the assessment. Each problem will be worth 1 point. The following will be the grade scale: 0-6 = No Grade (required retake), 7 = C, 8 = B, 9-10 = A. Students will demonstrate mastery by scoring 7 (70%) or better.

Key for logs and exponents assessment

1. $\log_6 216 = 3$
2. $8^4 = 4096$
3. $\log 123 = 2.09$
4. $\log 67 = 1.83$
5. $3^4 = 18 - 9x$

$81 = 18 - 9x$
$63 = -9x$
$x = -7$

6. $5^3 = 3x + 5$

$125 = 3x + 5$
$120 = 3x$
$x = 40$

7. $6^2 = -2x + 4$

$36 = -2x + 4$
$32 = -2x$
$x = -16$

8. $\log 1000 = x+4$

$3 = x + 4$
$x = -1$

9. $\log 46 = 2x - 7$

$1.66 = 2x - 7$
$8.66 = 2x$
$x = 4.33$

10. $\log 158 = 4x + 1$

$2.17 = 4x + 1$
$1.17 = 4x$
$x = 0.29$