Curriculum Sample Template

Max. 8 Pages

Grade Level	9th Grade	**Content Area**	Mathematics
Course Title (grades 9-12 Only)	Algebra 1		
Expected Prior Knowledge *List the knowledge/skills mastered earlier in the year foundational to the mastery of the Required Standard(s).*	Students are expected to have prior knowledge of and/or skills mastered to: **N-Q.A.2:** Define appropriate quantities for the purpose of descriptive modeling. **N-Q.A.3:** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **S-ID.A.1:** Represent data with plots on the real number line (dot plots, histograms, and box plots).		
Alignment to Program of Instruction *Describe how the methods of instruction found in this sequence of lessons that align to the Program of Instruction described in the application package.*	Mathematics lessons focus on problem solving, critical thinking, and practical mathematical applications. Direct Instruction includes lecture (structured overview, review), small-group (peer partners), and teacher-directed (guided instruction) learning activities. Formative assessments include visual presentation of direct instruction, Cornell Notes and graphic organizers, and collaborative activities. Summative assessments designed for student mastery of content.		
Standard Number* and Description *The standard number and description of the Required Standard(s) being instructed and assessed to mastery in the curriculum sample.*	N-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.		
Materials/Resources Needed *List all items the teacher and students will need for the entire sequence of instruction (excluding common consumables).*	The Measurement Equivalency Chart; Math Dictionary		

* ***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)	**Instructional Strategies**	**Student Activities**
1	**Working with Units - Conversions** (1) Teacher will review metric system conversions and English system conversions. (2) Teacher will review warm-up problems to assess prior knowledge and provide re-teaching assignments as needed. (3) Teacher will introduce key vocabulary: equivalent values, significant figures or digits, conversion ratio or unit factor, and dimensional analysis or unit factor method. (4) Teacher will present structured overview of: (a) the rules for significant figures; (b) arithmetic with significant figures; and (c) The Measurement Equivalency Chart. (5) Teacher will present guided instruction to: (a) convert ratios of measurement in the metric system; (b) convert ratios of measurement in the English system; and (c) convert ratios of measurement between the systems.	(1) Students will access prior knowledge by completing warm-up problems for: (a) metric system conversions and (b) English system conversions. (2) Students will document key vocabulary and meanings in their Math Dictionary. (3) Students will take Cornell Notes for: (a) the rules for significant figures; (b) arithmetic with significant figures; and (c) the Measurement Equivalency Chart. (4) Students will work with peer partner to solve problems for each concept, after it is presented in guided instruction. (see Instructional Strategies 5a-c) (5) Students will complete four-six practice problems for each concept presented in the lesson. (see Instructional Strategies 5a-c)
2	**Working with Units - Conversions** (1) Teacher will review guided instruction for conversion ratio and dimensional analysis.	(1) **Summative Assessment:** Students will complete Working with Units - Conversions Quiz. (2) **Summative Assessment:** Students will complete Working with Units - Conversions Mathematical Applications.
3	**Working with Units - Error in Measurement** (1) Teacher will introduce key vocabulary: precision, accuracy, valid system, greatest possible error, tolerance error. (2) Teacher will present structured overview of: (a) absolute error; (b) relative error; and (c) percent error. (3) Teacher will present guided instruction to: (a) calculate the absolute error in measurement; (b) calculate the relative error in measurement; and (c) calculate the percent error in measurement.	(1) Students will document key vocabulary and meanings in their Math Dictionary. (2) Students will take Cornell Notes for: (a) absolute error; (b) relative error; and (c) percent error. (3) Students will work with peer partner to solve problems for each concept, after it is presented in guided instruction. (see Instructional Strategies 3a-c) (4) Students will complete four-six practice problems for each concept presented in the lesson. (see Instructional Strategies 3a-c)

4	**Working with Units - Error in Measurement** (1) Teacher will review guided instruction for error in measurement. **Working with Units - Graphs and Data Displays** (1) Teacher will present guided instruction to: (a) determine scale and units of measurement for problem-solving and (b) interpret graphs and data displays containing units of measurement for problem-solving.	(1) **Summative Assessment:** Students will complete Working with Units - Error in Measurement Quiz. (1) Students will work with peer partner to solve problems for each concept, after it is presented in guided instruction. (see Instructional Strategies 1a-b) (2) Students will complete four-six practice problems for each concept presented in the lesson. (see Instructional Strategies 1a-b) (3) **Summative Assessment:** Students will complete Working with Units - Graphs and Data Displays Mathematical Applications.

Summative Assessment Items and Scoring: *Below, provide at least three Summative Assessment items that together accurately measure student mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard(s). For each assessment item, provide an answer key or scoring rubric which clearly describes how assessment items are to be scored and how points will be awarded, such that mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard is clearly demonstrated by an acceptable score.*

(1) **Working with Units - Conversions Quiz:** Assessment is scored on a 25 point scale, each question is worth 5 points and partial credit may be given for free response questions. Students will score 20 out of 25 points (80%) to demonstrate mastery.
(2) **Working with Units - Conversions Mathematical Applications:** Assessment is scored on a 25 point scale, each question is worth 5 points and partial credit may be given for free-response questions. Students will score 20 out of 25 points (80%) to demonstrate mastery.*
(3) **Working with Units – Error of Measurement Quiz:** Assessment is scored on a 40 point scale, each question is worth 5 points and partial credit may be given for free response questions. Students will score 32 out of 40 points (80%) to demonstrate mastery.
(4) **Working with Units – Graphs and Data Displays Mathematical Applications:** Assessment is scored on a 20 point scale, each question is worth 5 points and partial credit may be given for free-response questions. Students will score 16 out of 20 points (80%) to demonstrate mastery.*

*assessment independent from instruction

For each summative assessment item, partial credit will be awarded as follows:

5 points for correct answer and writing of ALL mathematical calculations required to solve item.
4 points for correct answer and writing of SOME but not ALL mathematical calculations required to solve item.
3 points for correct answer and no writing of mathematical calculations required to solve item.
2 points for incorrect answer and writing of ALL mathematical calculations required to solve item.
1 point for incorrect answer and writing of SOME but not ALL mathematical calculations required to solve item.
0 points for incorrect answer and no writing of mathematical calculations required to solve item.

Working with Units – Conversions Quiz

Score: _____

Convert each of the measurements below. Be sure to show all of your work.

1. Convert 4.5 kilometers to millimeters.
2. Convert 65 miles per hour to feet per second.
3. Convert 12 yards to centimeters.
4. Convert 50 kilometers per hour to miles per hour.
5. Convert 25 milliliters to ounces.

Answer Key

1. 4,500,000 mm
2. 95.3 feet/second
3. 1096.8 cm
4. 31 miles/hour
5. 0.8474576271 oz.

Working with Units – Conversions Mathematical Applications

Score: _____

Read each problem carefully. Answer the question and provide mathematical evidence to support your answer.
Be sure to show all of your work.

1. Felicia normally sets her cruise control at the speed limit of 70mph and the freeway portion of her drive to work takes an hour and 15 minutes. Her car gets about 30 miles per gallon on the freeway and gas costs $3.50 per gallon. How much does Felicia spend per mile in gas on the freeway?

2. You are considering driving an ice cream van during the summer vacation. Your friend, who “knows everything”, tells you that “It’s easy money.” You make a few inquiries and find that the van costs $364 per week to rent. Each ice cream cone costs 40 cents to make and sells for $1.20. Assuming you work seven days per week, how many ice cream cones would you have to sell each day just to cover the cost of renting the van?

3. According to an article in Runners' World magazine: *The body of a runner is more than 60 percent water [by weight].* If the average weight of a typical male runner is 160 pounds, how many 12-fluid ounce soda cans’ worth of water is in his body? (1 fluid ounce = 1.043 ounces).

4. Sadie has a cousin Nanette in Germany. Both families recently bought new cars and the two girls are comparing how fuel efficient the two cars are. Sadie tells Nanette that her family's car is getting 42 miles per gallon. Nanette has no idea how that compares to her family's car because in Germany mileage is measured differently. She tells Sadie that her family's car uses 6 liters per 100 km. Which car is more fuel efficient? (Use miles per gallon to measure fuel efficiency)

5. The price of copper fluctuates. Between 2002 and 2011, there were times when its price was lower than $1.00 per pound and other times when its price was higher than $4.00 per pound. A penny contains 95% copper and 5% zinc by weight and each penny weighs 3.11 grams. At what price per pound of the copper in a penny contain exactly one cent worth of copper? (There are 454 grams in one pound.)

Answer Key

1. The cost per mile is 12 cents.
2. You would have to sell 455 ice cream cones per week or 65 ice cream cones per day.
3. A runner's body would contain the equivalent of 123 soda cans of water.
4. Sadie's family car gets 42 mpg. Nanette's family car gets 39.26 mpg. Sadie's is more fuel efficient.
5. The cost per pound for 1 cent of copper would be $1.536639 or $1.54.

Working with Units – Error in Measurements Quiz

Score: _____

Calculate the error of measurement(s) indicated below. Be sure to show all of your work.

1. A measurement is taken to be 20 ± 0.05 m. What is the absolute, relative, and percent error?
2. A photograph is measured at 8.5 inches in length, the actual length is 8.1 inches. What is the absolute, relative, and percent error?
3. A test tube is tipped and is mistakenly measured to contain 35 fluid ounces, when actually it contains 37 fluid ounces. What is the relative error?
4. A measurement is taken to be 13.6 in. and the absolute error is 0.05 in. What is the percent error?

Answer Key

1. Absolute Error = 0.05m; Relative Error = 0.0025; Percent Error = 0.25%
2. Absolute Error = 0.4 inches; Relative Error = 0.049382716; Percent Error = 4.938271605%
3. Relative Error = 0.0571428
4. Percent Error = 0.3676470588%

Working with Units – Graphs and Data Displays

Score: _____

Read each problem carefully. Answer the question and provide mathematical evidence to support your answer. Be sure to show all of your work.

1. A liquid weed-killer comes in four different bottles, all with the same active ingredient. The accompanying table gives information about the concentration of active ingredient in the bottles, the size of the bottles, and the price of the bottles. Each bottle's contents is made up of active ingredient and water. You need to apply a 1% solution of the weed killer to your lawn. (All of the bottles contain the same active ingredient and can be diluted down to a 1% solution.)

   (a) Rank order the four bottles in order of best to worst buy.
   (b) How did you decide what made a bottle a better buy than another?

	Concentration	Amount in Bottle	Price of Bottle
A	1.04%	64 fl oz	$12.99
B	18.00%	32 fl oz	$22.99
C	41.00%	32 fl oz	$39.99
D	1.04%	24 fl oz	$5.99

2. Jason recorded the amount of time he spent studying for his final examination in chemistry.

   (a) Describe how you would determine which scale and unit to use when creating a scatter graph to represent his set of data.
   (b) Plot the graph.

Day of Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Study time	45 min	2 hours	1½ hours	4 hours	1 hour	30 min	3 hours

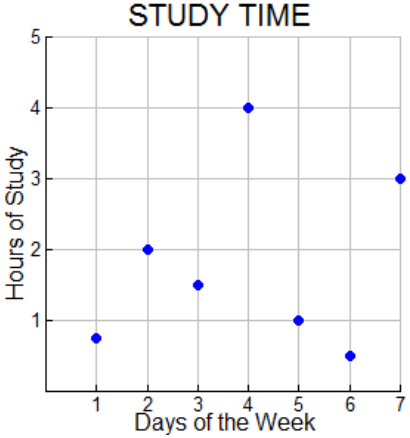
Answer Key

1a. The rank order from best-to-worst buy is C, B, A, and D.

1b. Receiving more active ingredient per dollar is a better buy that receiving less active ingredient per dollar.

a.	Amount active in Bottle	Price of bottle	Cost per ounce
A	1.04%×64≈0.64 fl oz	$12.99≈$13	130.64≈$20 per fl oz
B	18.00%×32≈6 fl oz	$22.99≈$23	236≈$4 per fl oz
C	41.00%×32≈13 fl oz	$39.99≈$40	4013≈$3 per fl oz
D	1.04%×24≈0.24 fl oz	$5.99≈$6	60.24≈$24 per fl oz

2a. The data is not expressed in consistent units. Since most of the entries are in hours, and the minute entries convert easily to hours, hours should be chosen as the unit.

Day of Week	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Study time	¾ hour	2 hours	1½ hours	4 hours	1 hour	½ hour	3 hours

2b. Other scales are also acceptable.