Standard #: MAFS.912.N-Q.1.1

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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. ★

Subject Area: Mathematics

Grade: 912

Domain-Subdomain: Number & Quantity: Quantities

Cluster: Level 2: Basic Application of Skills & Concepts

Cluster: Reason quantitatively and use units to solve problems. (Algebra 1 - Supporting Cluster) (Algebra 2 - Supporting Cluster) -
Clusters should not be sorted from Major to Supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.

Date Adopted or Revised: 02/14

Content Complexity Rating: Level 2: Basic Application of Skills & Concepts - More Information

Date of Last Rating: 02/14

Status: State Board Approved

Assessed: Yes

Related Courses

Course Number	Course Title
1200310:	Algebra 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200320:	Algebra 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200370:	Algebra 1-A (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200400:	Intensive Mathematics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000350:	Anatomy and Physiology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000360:	Anatomy and Physiology Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2001350:	Astronomy Solar/Galactic (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2020910:	Astronomy Solar/Galactic Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000310:	Biology 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000320:	Biology 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000330:	Biology 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2000430:	Biology Technology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000370:	Botany (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003340:	Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003350:	Chemistry 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003360:	Chemistry 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2001310:	Earth/Space Science (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2001320:	Earth/Space Science Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000380:	Ecology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002480:	Forensic Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 and beyond (current))
2002490:	Forensic Sciences 2 (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 and beyond (current))
2000440:	Genetics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002400:	Integrated Science 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002410:	Integrated Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002430:	Integrated Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002440:	Integrated Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002450:	Integrated Science 3 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000390:	Limnology (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2002500:	Marine Science 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002510:	Marine Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002520:	Marine Science 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002530:	Marine Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003400:	Nuclear Radiation (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2020710:	Nuclear Radiation Honors (formerly 202071A) (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003310:	Physical Science (Specifically in versions: 2015 and beyond (current))
2003320:	Physical Science Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003380:	Physics 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003390:	Physics 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))

2003410:	Physics 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003600:	Principles of Technology 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003610:	Principles of Technology 2 (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2002540:	Solar Energy Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002330:	Space Technology and Engineering (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2000410:	Zoology (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000800:	Florida's Preinternational Baccalaureate Biology 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200410:	Mathematics for College Success (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200700:	Mathematics for College Readiness (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002340:	Experimental Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002350:	Experimental Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002360:	Experimental Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002370:	Experimental Science 4 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912060:	Access Informal Geometry (Specifically in versions: 2014 - 2015 (course terminated))
7912070:	Access Liberal Arts Mathematics (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7912080:	Access Algebra 1A (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7912090:	Access Algebra 1B (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7920011:	Access Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
7920015:	Access Biology 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
7920020:	Access Earth/Space Science (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
7920025:	Access Integrated Science 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2000315:	Biology 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000500:	Bioscience 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000510:	Bioscience 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2000520:	Bioscience 3 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002405:	Integrated Science 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2002445:	Integrated Science 3 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003345:	Chemistry 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2003385:	Physics 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
1200315:	Algebra 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200375:	Algebra 1-A for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912100:	Fundamental Algebraic Skills (Specifically in versions: 2013 - 2015, 2015 - 2017 (course terminated))
1207300:	Liberal Arts Mathematics 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912065:	Access Geometry (Specifically in versions: 2015 and beyond (current))
7912075:	Access Algebra 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))

Related Access Points

Access Point

Access Points Number	Access Points Title
MAFS.912.N-Q.1.AP.1a:	Interpret units in the context of the problem.
MAFS.912.N-Q.1.AP.1b:	When solving a multi-step problem, use units to evaluate the appropriateness of the solution.
MAFS.912.N-Q.1.AP.1c:	Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context.
MAFS.912.N-Q.1.AP.1d:	Choose and interpret both the scale and the origin in graphs and data displays.

Related Resources

Lesson Plan

Name	Description
Acceleration:	In this lesson students will learn to: 1. Identify changes in motion that produce acceleration. 2. Describe examples of objects moving with constant acceleration. 3. Calculate the acceleration of an object, analytically, and graphically. 4. Interpret velocity-time graph, and explain the meaning of the slope. 5. Classify acceleration as positive, negative, and zero. 6. Describe instantaneous acceleration.
BIOSCOPES Summer Institute 2013 - Forces:	This lesson is designed to be part of a sequence of lessons. It follows resource 52937 "BIOSCOPES Summer Institute 2013 - Motion" and precedes resource 52910 "BIOSCOPES Summer Institute 2013 - Mechanical Energy." This lesson uses a predict, observe, and explain approach along with inquiry based activities to enhance student understanding of Newton's three laws of motion.
BIOSCOPES Summer Institute 2013 - Mechanical Energy:	This lesson is designed to be part of a sequence of lessons. It follows resource 52648 "BIOSCOPES Summer Institute 2013 - Forces" and precedes resource 52957 "BIOSCOPES Summer Institute 2013 - Thermal Energy." This lesson uses a predict, observe, and explain approach along with inquiry based activities to enhance student understanding of the conservation of energy.

BIOSCOPES Summer Institute 2013 - States of Matter:	This lesson is designed to be part of a sequence of lessons. It follows CPALMS Resource #52957 "BIOSCOPES Summer Institute 2013 - Thermal Energy" and precedes CPALMS Resource #52961 "BIOSCOPES Summer Institute 2013 - Solutions." The lesson employs a predict, observe, explain approach along with inquiry-based activities to enhance student understanding of states of matter and phase changes in terms of the kinetic molecular theory.
BIOSCOPES Summer Institute 2013 - Thermal Energy:	This lesson is designed to be part of a sequence of lessons. It follows resource 52910 "BIOSCOPES Summer Institute 2013 - Mechanical Energy" and precedes resource 52705"BIOSCOPES Summer Institute 2013 - States of Matter." This lesson uses a predict, observe, and explain approach along with inquiry based activities to enhance student understanding of thermal energy and specific heat.
Bottled Up Energy:	This experimental design project deals with real life understanding of being assigned a group task, creating a budget, and providing evidence about the completion of the assigned task. The task in this case is that students are being asked to create a model of a car out of supplied materials and to test these designs. After each trial the students will analyze the data collected and make any improvements that are necessary. The teams will test all modifications and after analyzing the results of their trials, they will create a presentation to the class on how their design performed.
Compacting Cardboard:	Students with investigate the amount of space that could be saved by flattening cardboard boxes. The analysis includes linear graphs and regression analysis along with discussions of slope and a direct variation phenomenon.
Corn Conundrum:	The Corn Conundrum MEA provides students with an agricultural problem in which they must work as a team to develop a procedure to select the best variety of corn to grow under drier conditions predicted by models of global climate change. Students must determine the most important factors that make planting crops sustainable in restricted climate conditions for the client. The main focus of this MEA is manipulating factors relating to plant biology, including transpiration and photosynthesis.
Dollars for Density:	This is a guided inquiry activity in which students use simple lab procedures and discussions to develop and apply the concept of density. Students collect and graph data which they use to explore the relationship between mass and volume. Then students use their graph, rather than a memorized formula, to identify the unknown substance.
Earthquake Structures and the Richter Scale:	In this engineering design challenge, students will build an earthquake-proof structure out of spaghetti and marshmallows and then test them with an earthquake shake table. Students will research earthquake damage and how designs have changed with our new technologies and our understanding of earthquakes. After testing and research, students will prepare and present a final presentation on their findings. They will also explore the use of the Richter scale as a measurement of earthquake intensity. This is a culminating activity for a unit on Earth's forces.
Efficient Storage:	The topic of this MEA is work and power. Students will be assigned the task of hiring workers to complete a given task. In order to make a decision as to which workers to hire, the students initially must calculate the required work. The power each worker can exert, the days each worker is available to work each week, the number of sick days each worker has taken over the past 12 months, and the salary each worker commands will then be provided. Full- and/or part-time positions are available. Through data analysis, the students will need to evaluate which factors are most significant in the hiring process. For instance, some groups may select the most efficient workers; other groups may select the group of workers that will cost the company the least amount of money; still other groups may choose the workers that can complete the job in the shortest amount of time. Each group will also be required to provide the rationale that justifies the selection of which workers to hire.
Farming in the Gilded Age: A Simulation:	This video is about a simulation created by a teacher to show the hardships of "gambling" in the world of farming, especially in a past, less civilized time. The students were given 2000 and had to put 500 aside for various expenses. They were then given a list of 11 objects (crops and livestock) that they could chose from to purchase with the remaining 1500. The catch is, they only have a certain amount of space to use, and must plan which items will be more efficient in a set area. To simulate the purchasing of the crops and livestock, the teacher cut out squares with each item on it. He then had each group come up to spend their money on what they found fit for their particular group. After each group chose their ratios of crops and livestock, there was then a simulated growing season that had problems with certain crops and benefits of others. They then repeat the process for the following year with a different scenario for the growing season. At the end of the simulation, the teacher acted as if he was the banker that loaned the 2000 in the beginning. This is where it comes full circle to show why farming was so difficult in the past, and how it declined due to poor weather and the lack of the ability to pay off loans given to start farming in the first place.
Flower Power:	In this MEA students compare data from different commercial floral preservatives. Students are asked to choose which is the best preservative for a certain floral arrangement.
Forced To Learn:	Using inquiry techniques, students, working in groups, are asked to design and conduct an experiment to test Newton's Second Law of Motion. Upon being provided with textbooks, rulers, measuring tapes, mini-storage containers, golf balls, marbles, rubber balls, steel balls, and pennies they work cooperatively to implement and revise their hypotheses. With limited guidance from the teacher, students are able to visualize the direct relationships between force and mass; force and acceleration; and the inverse relationship between mass and acceleration.
How Fast Do Objects Fall?:	Students will investigate falling objects with very low air friction.
Mole Relay:	To be successful in chemistry, students need a solid foundation in solving multi-step (sequential) problems. This activity uses inexpensive materials to strengthening students understanding of stoichiometry problems during an engaging group competition. A student-centered approach develops the reasoning skills needed for scientific thinking. Each student assumes a different role as they complete work in a complex stoichiometry problem. Students may receive immediate feedback from their teammates so that success is felt by all learners.
Motion: Speed and Velocity:	In this lesson students should be able to : • Identify appropriate SI units for measuring speed. • Compare and contrast average speed and instantaneous speed. • Interpret position-time graphs. • Calculate the speed of an object using slopes.
	The focus of this MEA is oil spills and their effect on the environment. In this activity, students from a fictitious class

Preserving Our Marine Ecosystems:	are studying about the effects of an oil spill on marine ecosystems and have performed an experiment in which they were asked to try to rid a teaspoon of corn oil from a baking pan filled with two liters of water as thoroughly as possible in a limited timeframe and with limited resources. By examining, analyzing, and evaluating experimental data related to resource usage, disposal, and labor costs, students must face the tradeoffs that are involved in trying to preserve an ecosystem when time, money, and resources are limited.
Ramp It Up:	Using inquiry techniques, students, working in groups, are asked to design and conduct experiments to test the Law of Conservation of Energy and the Law of Conservation of Momentum. Upon being provided with textbooks, rulers, measuring tapes, stopwatches, mini-storage containers, golf balls, marbles, rubber balls, steel balls, and pennies, they work cooperatively to implement and revise their hypotheses. With limited guidance from the teacher, students are able to visualize the relationships between mass, velocity, height, gravitational potential energy, kinetic energy, and total energy as well as the relationships between mass, velocity, and momentum.
Riding the Roller Coaster of Success:	Students compete with one another to design and build a roller coaster from insulation tubing and tape that will allow a marble to travel from start to finish with the lowest average velocity. In so doing, students learn about differences between distance and displacement, speed and velocity, and potential and kinetic energy. They also examine the Law of Conservation of Energy and concepts related to force and motion.
Sugar Scrub:	In the Sugar Scrub MEA students will analyze 5 sugar scrub formulas. In the first part, students are asked to evaluate each formula based on color, scent, and exfoliation. In the second part, students apply their methodology to a cost analysis of the scrubs.
The Video Game:	This activity can be used with students in statistics, algebra 2, or a precalculus course who have a good understanding of the statistical methods that are used in describing a given data set.
Which Brand of Chocolate Chip Cookie Would You Buy?:	In this activity, students will utilize measurement data provided in a chart to calculate areas, volumes, and densities of cookies. They will then analyze their data and determine how these values can be used to market a fictitious brand of chocolate chip cookie. Finally, they will integrate cost and taste into their analyses and generate a marketing campaign for a cookie brand of their choosing based upon a set sample data which has been provided to them.

Formative Assessment

Name	Description
Aquarium Visitors:	Students are given a set of data and are asked to choose the scale for the axes, graph the data, and explain why they chose the scales they used.
Fishy Formulas:	Students are asked to choose and justify the unit to be used in a formula and are asked to choose and explain the unit used in the answer.
Notebooks to Trees:	Students are asked to find the approximate number of trees that are saved by using recycled paper.

Problem-Solving Task

Name	Description
Felicia's Drive:	This task provides students the opportunity to make use of units to find the gas needed (MAFS.912.N-Q.1.1). It also requires them to make some sensible approximations (e.g., 2.92 gallons is not a good answer to part (a)) and to recognize that Felicia's situation requires her to round up. Various answers to (a) are possible, depending on how much students think is a safe amount for Felicia to have left in the tank when she arrives at the gas station. The key point is for them to explain their choices. This task provides an opportunity for students to practice MAFS.K12.MP.2.1: Reason abstractly and quantitatively, and MAFS.K12.MP.3.1: Construct viable arguments and critique the reasoning of others.
Fuel Efficiency:	The problem requires students to not only convert miles to kilometers and gallons to liters but they also have to deal with the added complication of finding the reciprocal at some point.
Harvesting the Fields:	This is a challenging task, suitable for extended work, and reaching into a deep understanding of units. Students are given a scenario and asked to determine the number of people required to complete the amount of work in the time described. The task requires students to exhibit MAFS.K12.MP.1.1, Make sense of problems and persevere in solving them. An algebraic solution is possible but complicated; a numerical solution is both simpler and more sophisticated, requiring skilled use of units and quantitative reasoning. Thus the task aligns with either MAFS.912.A-CED.1.1 or MAFS.912.N-Q.1.1, depending on the approach.
How Much Is a Penny Worth?:	This task asks students to calculate the cost of materials to make a penny, utilizing rates of grams of copper.
Ice Cream Van:	The purpose of this task is to engage students, probably working in groups, in a substantial and open-ended modeling problem. Students will have to brainstorm or research several relevant quantities, and incorporate these values into their solutions.
Runner's World:	Students are asked to use units to determine if the given statement is valid.
Selling Fuel Oil at a Loss:	The task is a modeling problem which ties in to financial decisions faced routinely by businesses, namely the balance between maintaining inventory and raising short-term capital for investment or re-investment in developing the business.
Traffic Jam:	This resource poses the question, "how many vehicles might be involved in a traffic jam 12 miles long?" This task, while involving relatively simple arithmetic, promps students to practice modeling (MP4), work with units and conversion (N-Q.1), and develop a new unit (N-Q.2). Students will also consider the appropriate level of accuracy to use in their conclusions (N-Q.3).
	The principal purpose of the task is to explore a real-world application problem with algebra, working with units and

Weed Killer:	maintaining reasonable levels of accuracy throughout. Students are asked to determine which product will be the most economical to meet the requirements given in the problem.

Lesson Study Resource Kit

Name	Description
Motion and Forces:	This Lesson Study Resource Kit was adapted from a 2013 BioScopes physical science summer institute. It features a STEM-integrated unit plan that consists of resources and activities aligned to a unit of instruction on that employs Vernier LabQuest probeware in an investigation of Newton's Laws that complies with the Florida Standards for mathematics and the NGSSS for science for grades 9-12.

Worksheet

Name	Description
Practice with Dimensional Analysis:	This is a worksheet that can be used for students individually or as a cooperative learning resource for practice with dimensional analysis. Answers are in red as a separate copy of the worksheet.

Assessment

Name	Description
Sample 1 - High School Algebra 1 State Interim Assessment:	This is the State Interim Assessment for high school.
Sample 4 - High School Algebra 1 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.

Unit/Lesson Sequence

Name	Description
Sample Algebra 1 Curriculum Plan Using CMAP:	This sample Algebra 1 CMAP is a fully customizable resource and curriculum-planning tool that provides a framework for the Algebra 1 Course. The units and standards are customizable and the CMAP allows instructors to add lessons, worksheets, and other resources as needed. This CMAP also includes rows that automatically filter and display Math Formative Assessments System tasks, E-Learning Original Student Tutorials and Perspectives Videos that are aligned to the standards, available on CPALMS. Learn more about the sample Algebra 1 CMAP, its features and customizability by watching the following video: Using this CMAP To view an introduction on the CMAP tool, please click here. To view the CMAP, click on the "Open Resource Page" button above; be sure you are logged in to your iCPALMS account. To use this CMAP, click on the "Clone" button once the CMAP opens in the "Open Resource Page." Once the CMAP is cloned, you will be able to see it as a class inside your iCPALMS My Planner (CMAPs) app. To access your My Planner App and the cloned CMAP, click on the iCPALMS tab in the top menu. All CMAP tutorials can be found within the iCPALMS Planner App or at the following URL: http://www.cpalms.org/support/tutorials_and_informational_videos.aspx

Perspectives Video: Professional/Enthusiast

Name	Description
The Science and Math Behind Sour Fizzy Candy:	Master candymaker Wes Raley describes the process and science behind making sour fizzy candy.
Unit Conversions:	Get fired up as you learn more about ceramic glaze recipes and mathematical units.

Student Resources

Name	Description
Felicia's Drive:	This task provides students the opportunity to make use of units to find the gas needed (MAFS.912.N-Q.1.1). It also requires them to make some sensible approximations (e.g., 2.92 gallons is not a good answer to part (a)) and to recognize that Felicia's situation requires her to round up. Various answers to (a) are possible, depending on how much students think is a safe amount for Felicia to have left in the tank when she arrives at the gas station. The key point is for them to explain their choices. This task provides an opportunity for students to practice MAFS.K12.MP.2.1: Reason abstractly and quantitatively, and MAFS.K12.MP.3.1: Construct viable arguments and critique the reasoning of others.
Fuel Efficiency:	The problem requires students to not only convert miles to kilometers and gallons to liters but they also have to deal with the added complication of finding the reciprocal at some point.
Harvesting the Fields:	This is a challenging task, suitable for extended work, and reaching into a deep understanding of units. Students are given a scenario and asked to determine the number of people required to complete the amount of work in the time described. The task requires students to exhibit MAFS.K12.MP.1.1, Make sense of problems and persevere in solving them. An algebraic solution is possible but complicated; a numerical solution is both simpler and more sophisticated, requiring skilled use of units and quantitative reasoning. Thus the task aligns with either MAFS.912.A-CED.1.1 or MAFS.912.N-Q.1.1, depending on the approach.
How Much Is a Penny Worth?:	This task asks students to calculate the cost of materials to make a penny, utilizing rates of grams of copper.
Runner's World:	Students are asked to use units to determine if the given statement is valid.
Selling Fuel Oil at a Loss:	The task is a modeling problem which ties in to financial decisions faced routinely by businesses, namely the balance between maintaining inventory and raising short-term capital for investment or re-investment in developing the business.
Traffic Jam:	This resource poses the question, "how many vehicles might be involved in a traffic jam 12 miles long?" This task, while involving relatively simple arithmetic, promps students to practice modeling (MP4), work with units and conversion (N-Q.1), and develop a new unit (N-Q.2). Students will also consider the appropriate level of accuracy to use in their conclusions (N-Q.3).
Unit Conversions:	Get fired up as you learn more about ceramic glaze recipes and mathematical units.
Weed Killer:	The principal purpose of the task is to explore a real-world application problem with algebra, working with units and maintaining reasonable levels of accuracy throughout. Students are asked to determine which product will be the most economical to meet the requirements given in the problem.

Parent Resources

Name	Description
Felicia's Drive:	This task provides students the opportunity to make use of units to find the gas needed (MAFS.912.N-Q.1.1). It also requires them to make some sensible approximations (e.g., 2.92 gallons is not a good answer to part (a)) and to recognize that Felicia's situation requires her to round up. Various answers to (a) are possible, depending on how much students think is a safe amount for Felicia to have left in the tank when she arrives at the gas station. The key point is for them to explain their choices. This task provides an opportunity for students to practice MAFS.K12.MP.2.1: Reason abstractly and quantitatively, and MAFS.K12.MP.3.1: Construct viable arguments and critique the reasoning of others.
Fuel Efficiency:	The problem requires students to not only convert miles to kilometers and gallons to liters but they also have to deal with the added complication of finding the reciprocal at some point.
Harvesting the Fields:	This is a challenging task, suitable for extended work, and reaching into a deep understanding of units. Students are given a scenario and asked to determine the number of people required to complete the amount of work in the time described. The task requires students to exhibit MAFS.K12.MP.1.1, Make sense of problems and persevere in solving them. An algebraic solution is possible but complicated; a numerical solution is both simpler and more sophisticated, requiring skilled use of units and quantitative reasoning. Thus the task aligns with either MAFS.912.A-CED.1.1 or MAFS.912.N-Q.1.1, depending on the approach.
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Traffic Jam:	This resource poses the question, "how many vehicles might be involved in a traffic jam 12 miles long?" This task, while involving relatively simple arithmetic, promps students to practice modeling (MP4), work with units and conversion (N-Q.1), and develop a new unit (N-Q.2). Students will also consider the appropriate level of accuracy to use in their conclusions (N-Q.3).
Unit Conversions:	Get fired up as you learn more about ceramic glaze recipes and mathematical units.
Weed Killer:	The principal purpose of the task is to explore a real-world application problem with algebra, working with units and maintaining reasonable levels of accuracy throughout. Students are asked to determine which product will be the most economical to meet the requirements given in the problem.