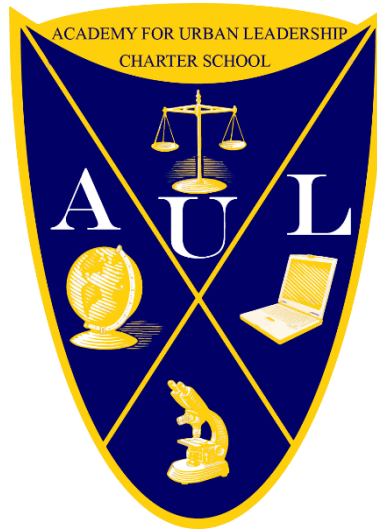


Honors Algebra 1 Curriculum 2023-2024



Approved by the Academy for Urban Leadership Board of
Trustees

April 2023

Founded in 2010 in Perth Amboy, New Jersey, the Academy for Urban Leadership Charter School is one of Middlesex County's comprehensive Public Charter Schools that serves students in seventh through twelfth grades. The school operates under the terms of a charter granted by the New Jersey Department of Education. AUL offers an advanced academic track and AP courses.

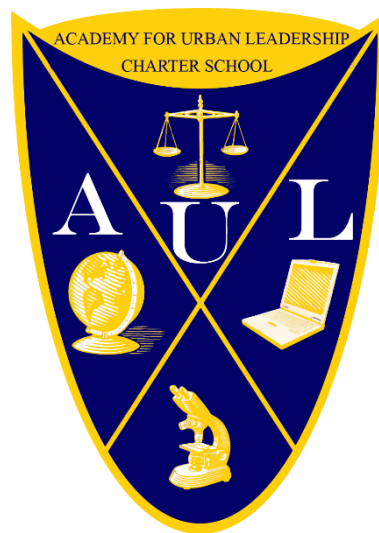
AUL has designed its curriculum to focus on Four Academies which include Applied Science, Law/Public & Safety, Business & Technology and Human Development. Students are given an opportunity to explore interests and take courses related to their chosen field, proving students with an opportunity to utilize knowledge in their everyday life.

MISSION STATEMENT OF ACADEMY FOR URBAN LEADERSHIP CHARTER SCHOOL:

To employ an educational design and experience that merges the highest standards of academic excellence while fostering convictions and commitment to social and economic justice.

Goals:

- Provide each student the resources necessary to excel to his/her maximum ability
- Prepare students for success in post-secondary education
- Prepare students with the skills for the workforce
- Prepare students to be leaders in this community
- Prepare students for their civic responsibilities and instill values of good citizenship



UNIT OVERVIEW

CONTENT AREA: Mathematics	UNIT: Algebra 1 honors
TARGET COURSE/GRADE LEVEL: Algebra 1 honors	SUGGESTION TIMEFRAME: 8 - 18 days
TOPIC: Modeling with Linear Equations and Inequalities	CHAPTERS COVERED:

UNIT SUMMARY/ UNIT RATIONALE:

Unit 1 presents the foundational skills related to solving linear equations and the connected skills. Solving literal equations requires students to see the structure of equations and perform operations on variable terms as they would perform operations on constants. The unit continues to emphasize the writing and graphing of linear inequalities. Graphs are used to display and check solutions. The last section will introduce compound inequalities

Unit Rationale

Solving linear equations is the foundation of the Algebra I curriculum. By learning to solve linear equations and inequalities, students will be able to extend their learning to solving systems of equations and solving quadratic equations.

INTERDISCIPLINARY CONNECTIONS / PROBLEM-BASED LEARNING:

WIDA : CAN DO Descriptors - Key Uses Edition (2016)

WIDA : Grades 9-12

Key Use of Recount

Reading Level 1 - Entering

Process recounts by:

Matching key content-related terms and ideas to images, graphs, icons, or diagrams

WIDA : ELP Standards (2007)

WIDA : Grades 9-12

ELP Standard 3: The Language of Mathematics

SPEAKING

Example Topics: Problem solving

Level 1 - Entering: Exchange key words involved in problem solving from models and visual support in L1 or L2 with a partner

NJ: 2014 SLS: Science

NJ: Grades 6-8

MS-ETS1 Engineering Design

Performance Expectations

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

NJSLS-S: Disciplinary Core Ideas

NJSLS-S: 9-12

ESS3: Earth and Human Activity

ESS3.C: Human Impacts on Earth Systems

The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (HS-ESS3-3)

P21: 21st Century Student Outcomes

P21: K-12

Learning & Innovation Skills

Make Judgements and Decisions

Interpret information and draw conclusions based on the best analysis

Solve Problems

Solve different kinds of non-familiar problems in both conventional and innovative ways

Identify and ask significant questions that clarify various points of view and lead to better solutions

Communication and Collaboration Communicate Clearly

Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact

Life & Career Skills

Work Independently

Monitor, define, prioritize and complete tasks without direct oversight

AASL: AASL Standards Framework for Learners (2018)

AASL: K-12

III. COLLABORATE

B. CREATE

Learners participate in personal, social, and intellectual networks by:

2. Establishing connections with other learners to build on their own prior knowledge and create new knowledge

ESSENTIAL QUESTIONS:

1. What is the difference between a variable and a constant?

2. How are the addition and subtraction properties of equality used to solve equations?

3. What steps need to be taken to isolate the variable? Why?

4. What is the difference between solving an equation that has all real numbers as solutions and solving an equation that has no solution?

5. What does rate of change mean and how do you find it?

6. What kind of slope represents a negative rate of change? A positive rate of change?

7. What is the first step when graphing a line given the slope and y-intercept?

8. What is true about the slopes of perpendicular lines? Parallel lines?

LEARNING TARGETS

NEW JERSEY STUDENT LEARNING STANDARDS

N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multistep problems; Choose and interpret units consistently in formulas; Choose and interpret the scale and the origin in graphs and data displays.

A.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance step problems; Choose and interpret units consistently in formulas; Choose and interpret the scale and the origin in graphs and data displays.

N.RN.B.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

R. 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.
 N.RN.B.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
 N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

21st century skills

Core Ideas: With a growth mindset, failure is an important part of success

Performance Expectation/s:

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

9.4.12.CT.3: Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that Content Area: Mathematics (NJSL-S-M) Grades K - 12 Grade:9 Dev. Date: 2021 addresses a local or global issue (e.g., environmental justice).

9.4.12.CT.4: Participate in online strategy and planning sessions for coursebased, school-based, or other projects and determine the strategies that contribute to effective outcome

Career Readiness, Life Literacies, & Key Skills Practices

Act as a responsible and contributing community member and employee.

Attend to financial well-being. Consider the environmental, social and economic impacts of decisions.

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Model integrity, ethical leadership and effective management.

Plan education and career paths aligned to personal goals.

Use technology to enhance productivity, increase collaboration and communicate effectively. Work productively in teams while using cultural/global competencies

Social and Emotional Learning:

Sub-Competencies

Recognizing the importance of self-confidence in handling daily tasks and challenges.

Demonstrate an awareness of the expectations for social interactions in a variety of ways.

Demonstrate an understanding of the need for mutual respect when viewpoints differ.

Recognize the skills needed to establish and achieve personal and educational goals.

Utilize positive communication and social skills to interact effectively with others.

Develop, implement, and model effective problem solving and critical thinking skills.

Content: What information do students need to know?

To write verbal expressions for algebraic expressions. \

To write algebraic expressions for verbal expressions.

To evaluate numerical expressions by using the order of operations. Evaluate algebraic expressions by using the order of operations.

Use the Distributive Property to evaluate expressions.

Process: What will students be able to do with the information?

Enduring Understanding

Expressions are used to describe patterns and real-life situations. Operations can be used to represent verbal and algebraic models. Symbols can be manipulated by using the order of operations to model and demonstrate real-life relationships.

Modifications:

Special Education	ESL	At-risk	Gifted and Talented
<p>Modifications and accommodations for students with IEPs are designed and documented in daily lesson plans</p> <p>Emphasize note taking strategies Use guided notes when necessary</p> <p>Revisit and study notebook</p> <p>Create vocabulary notecards</p> <p>Use tools/manipulatives/models</p> <p>Reword application problems</p> <p>Use handouts/graphic organizers Review peer work and provide feedback</p> <p>Complete error analysis process. Use Google Apps for Education Use supplemental programs such as:</p> <ul style="list-style-type: none">o Delta Matho Desmoso Discovery Educationo EdPuzzleo Edulastico Geogebrao iXLo Khan Academyo Math-Gameso Math Planeto PurpleMatho Quiao Quizizzo Soft Schools <p>Create a study guide for intervention</p>	<p>Modifications and accommodations for ELL students are designed and documented in daily lesson plans</p> <p>Extended time, scribe, speech to text, challenge questions, and specific other accommodations/modifications per a student's IEP or 504 plan, student resources in multiple languages.</p>	<p>Interventions and strategies to support students at-risk for are designed and documented in daily lesson plans</p> <p>Visual diagrams, clarify directions, vocabulary usage, small group work, one on one instruction, differentiated lessons, enrichment activities, manipulatives, modeling, and specific other accommodations/modifications per a</p>	<p>Enrichment and acceleration opportunities for G&T students are designed and documented in daily lesson plans</p> <p>Reverse a question by providing the answer instead of the question. For example, instead of asking for the sum of 452 and 798, give the sum of 1,250 and ask students to provide two, or three, 3-digit addends to equal the sum. Analyze similarities and differences. For example, how are additive patterns and multiplicative patterns alike? How are they different?</p> <p>Allow students to choose the numbers. For example, provide a word problem without numbers. Then allow students to select the numbers and solve the problem.</p> <p>Create number sentences. This could be as simple as rolling a few dice and asking students to create a target number with the numbers rolled or by giving students numbers and words to create a sentence. For example, when given the numbers 7 and 8 and the word more, students may write “the square of 8 is more than the square of 7” or “7 times 8 is two more than 9 x 6”.</p>

			<p>Use “soft” words. This strategy encourages critical thinking about numbers and requires the use of “soft” words instead of absolutes. For example, instead of asking for two numbers with a product of 96, ask for two numbers that have a product around 96. Change the question. For this strategy, change up a question you are already using. For example:</p> <p>Question 1: What is the volume, in cubic meters, of a rectangular prism with a width of 3 meters and a height that is five times more than the width?</p> <p>Question 2: The volume of a rectangular prism is 15 cubic meters. What could be the dimensions of the prism?</p>
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INSTRUCTION

CONTENT VOCABULARY:

- coefficient
- multiplicative inverse
- identity property
- null set
- two step equations
- constant of proportionality
- constant of variation
- constant rate of change

- direct variation
- linear relationships
- point slope form
- rise/run • slope
- slope intercept form
- standard form
- systems of equations
- x intercept
- y intercept
- ordered pairs

ASSESSMENTS (BENCHMARK, FORMATIVE, SUMMATIVE, ALTERNATIVE):

Formative Assessments:

- Entry and Exit Slips
- Quizzes
- Self Assessments

Benchmarks:

- Chapter Tests
- Projects

Summative Assessments:

- Assessments
- Midterms
- Standardized Tests

INSTRUCTIONAL RESOURCES (ELA – INCLUDE VARIOUS LEVELS OF TEXT):

Activity Description:

- Variables and Expressions
- One-step equations
- Solving equations by adding or subtracting
- Solving equations by multiplying or dividing
- Solve equations by graphing
- Solving two-step equations
- Solving multi-step equations
- Solving equations with variables on both sides
- Solving for a variable
- Identifying Linear functions
- Using intercepts
- Rate of change and slope
- The slope formula

Slope intercept form

- Line of best fit
- Slope of parallel and perpendicular lines
- Example tasks below

Task 1: Last year, the area of Jamie's garden was 32 square feet. This year, she added a new rectangular-shape section to her garden. The length of the new section of the garden is 12 feet. The total area of her garden now, last year's garden plus the new section is 116 square feet.

- Write an equation that can be used to determine the width (w) in feet of the garden.
- What is the width, in feet, of the new section of the garden?

Answer: • $32 + 12W = 116$

- 7 Feet

Task 2:

a. $24 = \frac{2}{3}x + 12$ $24 = \frac{2}{3}x + 12$

b. $0.5(y + 12) = -2.5y - 8$ $0.5(y + 12) = -2.5y - 8$

c. $\frac{x-3}{5} = \frac{3x-3}{7}$ $\frac{x-3}{5} = \frac{3x}{7}$

Answer:

a. |18

b. -7

c. -2.625

Task 3

Becky is competing in an 8-mi road race. She runs at a constant speed of 6mi/h. Write an equation in slope-intercept form to represent the distance Becky has left to run.

Answer $y = -6x + 8$

Interdisciplinary Connections: Career Readiness, life Literacies and Key Skills Content: Money Management

Arabica coffee cost \$28 per pound and Robusta coffee cost \$8.75 per pound. How many pounds of Arabica coffee must you mix with 3 pounds of Robusta coffee to make a blend that costs \$15.50 per pound?

Answer:

Write an equation to represent the situation nt ;NJSLS#: 9.4.12.PB.2

$28a + 26.25 = 15.5(a + 3)$ $a = 1.62$

You must mix 1.62 pounds of Arabica coffee with 3 pounds of Robusta coffee to make a blend that cost \$15.50

Spot Light on:

LGBT and Disabilities Law: N.J.S.A 18A:34-4.35

- Sally Ride: First American woman in space.

Activity Description:

- Graphing and writing inequalities.
- Solving inequalities by adding or subtracting.
- Solving inequalities by multiplying or dividing.
- Solving two-step and mutli-step inequalities
- Solving inequalities with variables of both sides.
- Solving compound inequalities.
- Solving absolute-value inequalities.
- Example tasks below

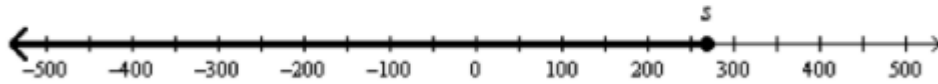
Task 1: 1 .

Sam earned \$450 during winter vacation. He needs to save \$180 for a camping trip over spring break. He can spend the remainder of the money on music. Write an inequality to show how much he can spend on music. Then, graph the inequality

Answer:

ANS:

$$180 + s \leq 450; s \leq 270$$



Task 2:

Solve the compound inequality and graph the solutions.

$$-a + 8 < -2 \text{ OR } -3a > -9$$

Answer:

ANS:

$$a < 3 \text{ OR } a > 10$$



Task 3: Solve the compound inequality.

$$6 \leq x - 2 < 14$$

Answers:

ANS:

$$8 \leq x < 16$$

Task 4: Solve the inequality

$$-3(x - 1) > -3x - 2$$

Answer:

All Real Numbers

Interdisciplinary Connections: Social Studies Domain; Geography, People, and the Environment
Content: Planning a trip on a budget - \$200

- Students choose a place they would realistically like to visit.
- Students research the location to complete a spread sheet including o travel expenses (plane, train, rental car, gas) o lodging expenses o food expenses (breakfast, lunch, dinner, snack) o include at least 1 activity
- Complete the inequality: travel + lodging + food + activity(s) > or = \$200

- Based on research and the inequality, students assign an amount of money for each event category

Students will write a word equations under each event category showing how the money will be dispersed (miles / miles per gallon = # of gallons x cost per gallon less than or equal to _____ dollars.

- Add numeric values to word inequalities in order to solve to make sure you come in under budget.
- Discussion questions
 - What were some problems you came across when doing this activity?
 - How did you solve them?
 - What was helpful throughout this activity.
 - What would have been more helpful? ●

Extension questions

○ What would you do differently if you had \$400?

or What would your ideal budget be?

○ How was this activity helpful? Can you think of other times you might need to create a budget?

NJSLS#: 6.2.9-12.B

Highlight on Climate Change: Data Analysis and Probability Standards:

S-ID.A.1-4, S-ID.C.7 Personal and Social Perspectives:

NS.9-12.6

Activity:

Increasing students' general knowledge of climate change on local, national, and global scales, and how such changes in climate will affect humans. Students will use the following information to practice their math and analytical skills and relate to average temperature change over time

UNIT OVERVIEW

CONTENT AREA: Mathematics	UNIT: Algebra 1 honors
TARGET COURSE/GRADE LEVEL: Algebra 1 honors	SUGGESTION TIMEFRAME: 8-18 days
TOPIC: Inequalities and Systems of Equations	CHAPTERS COVERED:

UNIT SUMMARY/ UNIT RATIONALE:

Unit 2 focuses on the solving systems of equations by graphing, substitution, and elimination. Students will be able to solve systems that have no solution or infinitely many solutions. Students will use their knowledge of solving systems of equations to solve systems of inequalities by graphing.

Unit Rationale

By learning systems of equations students will be able to interpret mathematical results in real-life contexts.

Solving a system of equations is a technique that students will use extensively in future mathematics courses.

In the future, students will observe and find solutions of system of non-linear equations using a graphing calculator.

INTERDISCIPLINARY CONNECTIONS / PROBLEM-BASED LEARNING:

NJ: 2014 SLS: Science

NJ: Grade 5

5-PS3 Energy

Performance Expectations

5-PS3-1. Use models to describe that that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

P21: 21st Century Student Outcomes

P21: K-12

Core Subjects & 21st Century Themes

Global Awareness

Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts

Financial, Economic, Business and Entrepreneurial Literacy

Knowing how to make appropriate personal economic choices

Learning & Innovation Skills

Work Creatively with Others

Develop, implement and communicate new ideas to others effectively

Critical Thinking and Problem Solving Reason Effectively

Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation.

Use Systems Thinking

Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Solve Problems

Solve different kinds of non-familiar problems in both conventional and innovative ways

Collaborate with Others

Demonstrate ability to work effectively and respectfully with diverse teams

Info, Media & Tech Skills

Information Literacy Access and Evaluate Information

Evaluate information critically and competently

ICT Literacy Apply Technology Effectively

Use technology as a tool to research, organize, evaluate and communicate information

Life & Career Skills

Be Flexible

Incorporate feedback effectively

ESSENTIAL QUESTIONS:

1. What does the solution of the system represent? 2. What does the intersection of two lines represent?

3. How do you know if an ordered pair is not a solution of a linear inequality?

4. How do you determine which inequality symbol to use?

LEARNING TARGETS

NEW JERSEY STUDENT LEARNING STANDARDS

A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A.REI.C.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

A.REI.D.12 Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding halfplane

21st century skills

CoCore Ideas:

Core Ideas: Digital communities influence many aspects of society, especially the workforce. The increased connectivity between people in different cultures and different career fields have changed the nature, content, and responsibilities of many careers.

Performance Expectation/s: 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and idea

Career Readiness, Life Literacies, & Key Skills Practices

Act as a responsible and contributing community member and employee

Attend to financial well-being. Consider the environmental, social and economic impacts of decisions.

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them. Model integrity, ethical leadership and effective management.

Plan education and career paths aligned to personal goals.

Use technology to enhance productivity, increase collaboration and communicate effectively. Work productively in teams while using cultural/global competence.

Social and Emotional Learning: Sub-Competencies

Recognizing the importance of self-confidence in handling daily tasks and challenges.

Demonstrate an awareness of the expectations for social interactions in a variety of ways.

Demonstrate an understanding of the need for mutual respect when viewpoints differ.

Recognize the skills needed to establish and achieve personal and educational goals.

Utilize positive communication and social skills to interact effectively with others.

Develop, implement, and model effective problem solving and critical thinking skills.

Content: What information do students need to know?

- Solve systems of linear equations graphically and algebraically.
- Strategically convert between various forms for a linear equation, depending on the situation.
- Find the slope of a line.
- Write and graph direct variation equations.
- Solve problems involving direct variation. Write equations in slope-intercept form.
- Write equations of lines in point-slope form. Write an equation of the line that passes through a given point, parallel to a given line.
- Write an equation of the line that passes through a given point, perpendicular to a given line

Process: What will students be able to do with the information?

Enduring Understanding

- Slope shows the relationship between changing dependent variables over changing independent variables.
- Slope-intercept, point-slope, and standard form are interdependently related and can model real world situations.
- The relationship between two lines can be determined by comparing their slopes and y-intercepts.
- Systems of equations can be solved graphically, by substitution, or by elimination.
- Systems of inequalities can be solved by graphing. Systems of equations and inequalities model real world situations to form possible solution sets to a given problem

Modifications:

Special Education	ESL	At-risk	Gifted and Talented
<p>Modifications and accommodations for students with IEPs are designed and documented in daily lesson plans</p> <p>Emphasize note taking strategies Use guided notes when necessary</p> <p>Revisit and study notebook</p> <p>Create vocabulary notecards</p> <p>Use tools/manipulatives/models</p> <p>Reword application problems</p> <p>Use handouts/graphic organizers Review peer work and provide feedback</p> <p>Complete error analysis process. Use Google Apps for Education Use supplemental programs such as:</p> <ul style="list-style-type: none">o Delta Matho Desmoso Discovery Educationo EdPuzzleo Edulastico Geogebrao iXLo Khan Academyo Math-Gameso Math Planeto PurpleMatho Quiao Quizizzo Soft Schools <p>Create a study guide for intervention</p>	<p>Modifications and accommodations for ELL students are designed and documented in daily lesson plans</p> <p>Extended time, scribe, speech to text, challenge questions, and specific other accommodations/modifications per a student's IEP or 504 plan, student resources in multiple languages.</p>	<p>Interventions and strategies to support students at-risk for are designed and documented in daily lesson plans</p> <p>Visual diagrams, clarify directions, vocabulary usage, small group work, one on one instruction, differentiated lessons, enrichment activities, manipulatives, modeling, and specific other accommodations/modifications per a</p>	<p>Enrichment and acceleration opportunities for G&T students are designed and documented in daily lesson plans</p> <p>Reverse a question by providing the answer instead of the question. For example, instead of asking for the sum of 452 and 798, give the sum of 1,250 and ask students to provide two, or three, 3-digit addends to equal the sum. Analyze similarities and differences. For example, how are additive patterns and multiplicative patterns alike? How are they different?</p> <p>Allow students to choose the numbers. For example, provide a word problem without numbers. Then allow students to select the numbers and solve the problem.</p> <p>Create number sentences. This could be as simple as rolling a few dice and asking students to create a target number with the numbers rolled or by giving students numbers and words to create a sentence. For example, when given the numbers 7 and 8 and the word more, students may write “the square of 8 is more than the square of 7” or “7 times 8 is two more than 9 x 6”.</p>

			<p>Use “soft” words. This strategy encourages critical thinking about numbers and requires the use of “soft” words instead of absolutes. For example, instead of asking for two numbers with a product of 96, ask for two numbers that have a product around 96. Change the question. For this strategy, change up a question you are already using. For example:</p> <p>Question 1: What is the volume, in cubic meters, of a rectangular prism with a width of 3 meters and a height that is five times more than the width?</p> <p>Question 2: The volume of a rectangular prism is 15 cubic meters. What could be the dimensions of the prism?</p>
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INSTRUCTION

CONTENT VOCABULARY:

ASSESSMENTS (BENCHMARK, FORMATIVE, SUMMATIVE, ALTERNATIVE):
Formative Assessments:
 • **Entry and Exit Slips**

- Quizzes
- Self Assessment

Benchmarks:

- Chapter Tests
- Projects

Summative Assessments:

- District Assessments
- Midterms
- Standardized Test

INSTRUCTIONAL RESOURCES (ELA – INCLUDE VARIOUS LEVELS OF TEXT):

Solving systems by Graphing.

- ❖ Solving Systems by Substitution.
- ❖ Solving Systems by Elimination.
- ❖ Solving Special Systems.
- ❖ Solving Linear Inequalities.

Task 1:

Solve each using two different methods. Explain which method you found to be more efficient.

$$3x - 9y = 3 \quad 7x - 3y = 20$$

$$y = 1/2x - 6 \quad 6x - 3y = -24$$

$$5x + 3y = 16 \quad 2x + 6y = 19$$

Answer: (-5,-2) (3,1/3) (11,-1/2)

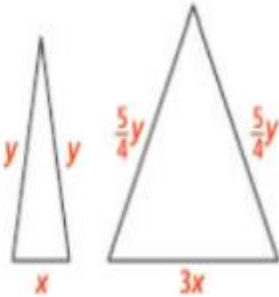
Task 2: Solve. Show all your work and explain your steps.

The triangle on the left has a perimeter of 14. The triangle on the right has a perimeter of 21. What are x and y ?

Task 2

Solve. Show all your work and explain your steps.

The triangle on the left has a perimeter of 14. The triangle on the right has a perimeter of 21. What are x and y ?



Answer: (2,6)

Task 3:

Three hundred fifty-eight tickets to the school basketball game on Friday were sold. Student tickets were \$1.50, and nonstudent tickets were \$3.25. The school made \$752.25. How many student and nonstudent tickets were sold?

Answer: 235 student tickets and 123 nonstudent tickets were sold.

Interdisciplinary Connections: Physical Education: 2.2 Physical Wellness; Physical Fitness;

NJSLS#: 2.2.12.PF.2

In a basketball game, Marlene made 16 baskets. Each of the baskets was worth either 2 or 3 points and she scored a total of 39 points. Let x represent the number of twopoint shots and y represent the number of 3-point shots. Write a system of equations in terms of x and y to model the situation.

Answer:

$$x + y = 16$$

$2x + 3y = 39$ Highlight on:

Text Resource: "Information Technology and the U.S. Workforce: Where Are We and Where Do We Go from Here?" Recent years have yielded significant advances in computing and communication technologies, with profound impacts on society. Technology is transforming the way we work, play, and interact with others. From these technological capabilities, new industries, organizational forms, and business models are emerging.

UNIT OVERVIEW

CONTENT AREA: Mathematics	UNIT: Algebra 1 honors
TARGET COURSE/GRADE LEVEL: Algebra 1 honors	SUGGESTION TIMEFRAME: 10-12 days
TOPIC: Linear and Exponential Modeling: Functions and Bivariate Statistics –	CHAPTERS COVERED:

UNIT SUMMARY/ UNIT RATIONALE:

Unit 3 extends an introductory understanding of functions and presents the notation of functions. This unit focuses on function notation, various representations of functions, discrete and continuous functions, and evaluating functions. Students will interpret qualitative graphs, and construct qualitative graphs from given scenarios.

Unit Rationale

By learning and applying the consistent use of notation and language of functions, the students will be able to use correct mathematical vocabulary. This will allow them to make the connection to rate of change and slope of linear equations. In the future students will be able to identify different types of functions such as linear functions, exponential and quadratic functions.

INTERDISCIPLINARY CONNECTIONS / PROBLEM-BASED LEARNING:

NJ: 2014 SLS: Science

NJ: Grades 6-8

MS-PS3 Energy

Performance Expectations

MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

P21: 21st Century Student Outcomes

P21: K-12

Core Subjects & 21st Century Themes

Global Awareness

Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts

Health Literacy

Obtaining, interpreting and understanding basic health information and services and using such information and services in ways that are health enhancing

Learning & Innovation Skills

Work Creatively with Others

Develop, implement and communicate new ideas to others effectively
 Make Judgements and Decisions
 Interpret information and draw conclusions based on the best analysis
 Reflect critically on learning experiences and processes
 Communication and Collaboration Communicate Clearly
 Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
 Info, Media & Tech Skills
 Information Literacy Access and Evaluate Information
 Access information efficiently (time) and effectively (sources)
 Use and Manage Information
 Use information accurately and creatively for the issue or problem at hand
 Life & Career Skills
 Work Independently
 Monitor, define, prioritize and complete tasks without direct oversight
 Be Self-directed Learners
 Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise
 AASL: AASL Standards Framework for Learners (2018)
 AASL: K-12
 I. INQUIRE
 A. THINK
 Learners display curiosity and initiative by:
 2. Recalling prior and background knowledge as context for new meaning

ESSENTIAL QUESTIONS:

1. What does the domain represent? Range represents?
2. What does a scatter plot look like if there is no correlation between the data sets? Positive correlation? Negative correlation?
3. How is identifying an arithmetic sequence similar to identifying a function rule?

LEARNING TARGETS

NEW JERSEY STUDENT LEARNING STANDARDS

Strand:
 F.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
 F.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
 F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
 F.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of personhours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. ★ modeling F.IF.B.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. standard) F.IF.C.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.
 F.BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
 F.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F.LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function

21st century skills

Disciplinary Concept: Global and Cultural Awareness Core Ideas: Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences. Performance Expectation/s:

9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political, economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.

Career Readiness, Life Literacies, & Key Skills Practices

Act as a responsible and contributing community member and employee.

Attend to financial well-being.

Consider the environmental, social and economic impacts of decisions.

Demonstrate creativity and innovation. 2.12.ETW.3).

Utilize critical thinking to make sense of problems and persevere in solving them.

Model integrity, ethical leadership and effective management.

Plan education and career paths aligned to personal goals.

Use technology to enhance productivity, increase collaboration and communicate effectively.

Work productively in teams while using cultural/global competence

Social and Emotional Learning: Sub-Competencies

Recognize one's feelings and thoughts

- Recognize the impact of one's feelings and thoughts on one's own behavior
- Recognize One's personal traits, strengths, and limitations
- Recognize the importance of selfconfidence in handling daily tasks and challenges
- Recognize and identify the thoughts, feelings, and perspectives of others
- Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds
- Demonstrate an understanding of the need for mutual respect when viewpoints differ
- Demonstrate an awareness of the expectations for socialinteractions in a variety of settings
- Understand and practice strategies for managing one's own emotions, thoughts, and behaviors
- Recognize the skills needed to establish and achieve personal and educational goals
- Identify and apply ways to persevere or overcome barriers through alternative
- methods to achieve one's goals
- Establish and maintain healthy relationships
- Utilize positive communication and social skills to interact effectively with others
- Identify ways to resist inappropriate social pressure
- Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways
- Identify who, when, where, or how to seek help for oneself or others when needed
- Develop, implement, and model effective problem-solving and critical thinking skills
- Identify the consequences associated with one's actions in order to make constructive choices
- Evaluate personal, ethical, safety, and civic impact of decisions

Content: What information do students need to know?

- Solve systems of linear equations graphically and algebraically.
- Strategically convert between various forms for a linear equation, depending on the situation.
- Find the slope of a line.
- Write and graph direct variation equations.
- Solve problems involving direct variation. Write equations in slope-intercept form.
- Write equations of lines in point-slope form. Write an equation of the line that

Process: What will students be able to do with the information?

Enduring Understanding

- Slope shows the relationship between changing dependent variables over changing independent variables.
- Slope-intercept, point-slope, and standard form are interdependently related and can model real world situations.
- The relationship between two lines can be determined by comparing their slopes and y-intercepts.
- Systems of equations can be solved graphically, by substitution, or by elimination.

<p>passes through a given point, parallel to a given line.</p> <ul style="list-style-type: none"> Write an equation of the line that passes through a given point, perpendicular to a given line 	<ul style="list-style-type: none"> Systems of inequalities can be solved by graphing. Systems of equations and inequalities model real world situations to form possible solution sets to a given problem
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Modifications:

Special Education	ESL	At-risk	Gifted and Talented
<p>Modifications and accommodations for students with IEPs are designed and documented in daily lesson plans</p> <p>Emphasize note taking strategies Use guided notes when necessary</p> <p>Revisit and study notebook</p> <p>Create vocabulary notecards</p> <p>Use tools/manipulatives/models</p> <p>Reword application problems</p> <p>Use handouts/graphic organizers Review peer work and provide feedback</p> <p>Complete error analysis process. Use Google Apps for Education Use supplemental programs such as:</p> <ul style="list-style-type: none"> Delta Math Desmos Discovery Education EdPuzzle Edulastic Geogebra iXL Khan Academy Math-Games Math Planet PurpleMath Quia Quizizz Soft Schools <p>Create a study guide for intervention</p>	<p>Modifications and accommodations for ELL students are designed and documented in daily lesson plans</p> <p>Extended time, scribe, speech to text, challenge questions, and specific other accommodations/modifications per a student's IEP or 504 plan, student resources in multiple languages.</p>	<p>Interventions and strategies to support students at-risk for are designed and documented in daily lesson plans</p> <p>Visual diagrams, clarify directions, vocabulary usage, small group work, one on one instruction, differentiated lessons, enrichment activities, manipulatives, modeling, and specific other accommodations/modifications per a</p>	<p>Enrichment and acceleration opportunities for G&T students are designed and documented in daily lesson plans</p> <p>Reverse a question by providing the answer instead of the question. For example, instead of asking for the sum of 452 and 798, give the sum of 1,250 and ask students to provide two, or three, 3-digit addends to equal the sum.</p> <p>Analyze similarities and differences. For example, how are additive patterns and multiplicative patterns alike? How are they different?</p> <p>Allow students to choose the numbers. For example, provide a word problem without numbers. Then allow students to select the numbers and solve the problem.</p> <p>Create number sentences. This could be as simple as rolling a few dice and asking students to create a target number with the numbers rolled or by</p>

			<p>giving students numbers and words to create a sentence. For example, when given the numbers 7 and 8 and the word more, students may write “the square of 8 is more than the square of 7” or “7 times 8 is two more than 9 x 6”. Use “soft” words. This strategy encourages critical thinking about numbers and requires the use of “soft” words instead of absolutes. For example, instead of asking for two numbers with a product of 96, ask for two numbers that have a product around 96. Change the question. For this strategy, change up a question you are already using. For example: Question 1: What is the volume, in cubic meters, of a rectangular prism with a width of 3 meters and a height that is five times more than the width? Question 2: The volume of a rectangular prism is 15 cubic meters. What could be the dimensions of the prism?</p>
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INSTRUCTION

CONTENT VOCABULARY:

ASSESSMENTS (BENCHMARK, FORMATIVE, SUMMATIVE, ALTERNATIVE):

Formative Assessments:

- Entry and Exit Slips
- Quizzes
- Self Assessment

Benchmarks:

- Chapter Tests
- Projects

Summative Assessments:

- District Assessments
- Midterms
- Standardized Test

INSTRUCTIONAL RESOURCES (ELA – INCLUDE VARIOUS LEVELS OF TEXT):

Activity Description: Interdisciplinary Connections: Content: ;NJSLS#: Activities: Application to Arts and Crafts Analyze Real-World Functions



An artist spends an afternoon making bracelets using beads she already has. She uses 15 beads for each bracelet. The remaining number R of beads in her supply can be modeled by the function shown, where b represents the number of bracelets she makes. Find and interpret $R(0)$ and $R(3)$.

Find and interpret $R(0)$. $R(0) = 90 - 15(0) = 90$

$$R(b) = 90 - 15b$$

$R(0)$ represents the remaining number of beads when $b = 0$. So, before she makes any bracelets, she has 90 beads left.

Find and interpret $R(3)$. $R(3) = 90 - 15(3) = 45$

A. Why wouldn't you find $R(3.5)$?

$R(3)$ represents the remaining number of beads when $b = 3$. So, after making 3 bracelets, she has 45 beads left.

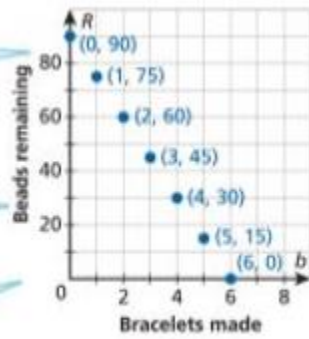
Graph $R(b)$.

The domain is restricted to the input values that make sense in the context of this real-world function. Use the function rule to identify all points on the graph of the function. Then graph the function by plotting the points.

B. Why is the graph of the function R limited to the first quadrant? Explain your reasoning.

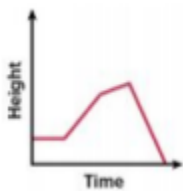
C. What is the domain of the function?

D. What is the range of the function?



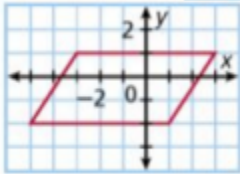
Problem Solving

1) Write a possible situation for the given graph.



Answer: Possible Situation: The level of water in a bucket stays constant. A steady rain raises the level. The rain slows down. Someone dumps the bucket.

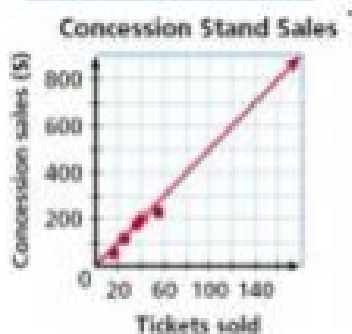
2) Give the domain and range of the relation. Tell whether the relation is a function. Explain.



Answer: D: $-5 \leq x \leq 3$ R: $-2 \leq y \leq 1$

The relation is not a function. Nearly all domain values have more than one range value.

3) The scatter plot shows a relationship between the total amount of money collected at the concession stand and the total number of tickets sold at a movie theater. Based on this relationship, predict how much money will be collected at the concession stand when 150 tickets have been sold. Draw a trend line and use it to make a prediction



Answer:

o Draw a line that has about the same number of points above and below it. Your line may or may not go through data points.

o Find the point on the line whose x-value is 150. The corresponding y-value is 750.

o Based on the data, \$750 is a reasonable prediction of how much money will be collected when 150 tickets have been sold.

4) Find the indicated term of the arithmetic sequence The 25th term: $a_1 = -5$; $d = -2$

Answer:

$$\begin{aligned} a_n &= a_1 + (n-1)d && \text{Write a rule to find the } n\text{th term} \\ a_{25} &= -5 + (25-1)(-2) && \text{Substitute } -5 \text{ for } a_1, 25 \text{ for } n, \text{ and } -2 \text{ for } d. \\ &= -5 + (24)(-2) && \text{Simplify the expression in parentheses} \\ &= -53 \end{aligned}$$

The 25th term is -53 .

Application to Science

A certain type of lily plant is growing in a pond in such a way that the number of plants is growing exponentially. The number of plants N in the pond at time t is modeled by the function $N(t) = ab^t$, where a and b are constants and t is measured in months. The table shows two values of the function.

t	$N(t)$
0	150
1	450

Write an equation to model this function.

Answer:

$$N(t) = 150(3)^t$$

Highlight on: Climate Change

Understand the difference between climate and weather One common refrain you might hear is, “It snowed 20 inches today, so explain how global warming is real?” That’s when it’s time to tackle the difference between weather (the current conditions) and climate (the average of those conditions over time in a particular region). Make an anchor chart. Then try a sorting activity to help kids understand the difference between the two.

Activity:

Student Experiences Model with Linear Functions

Jim has a long drive home from a conference.

He notes that his odometer reads 1500 miles at the beginning of his journey.

Jim reaches home after 4 hours of driving.

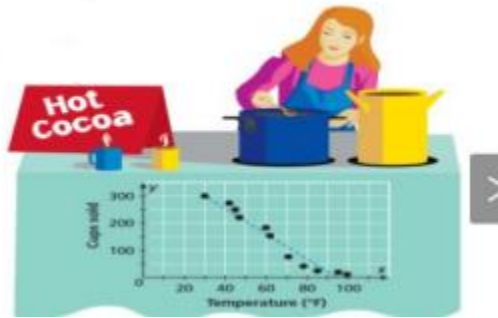
How can you model the mileage on his odometer as a function of driving time?

Graph the function, and identify any minimum or maximum values.

Activity-

Business Fit a Linear Function to Data

When there is a strong correlation between two variables, you can use a line of fit to construct a linear model for the data. To estimate a line of fit, position a straightedge through the middle of the plotted data points so that the data points are evenly dispersed above and below the line. Use the straightedge to draw a line. Then select two points on the line to write the equation. The scatter plot for the data of hot cocoa sales from Task 2 is shown. Draw a line of fit, and write an equation for the line of fit



Draw the line of fit.

Use a straightedge to draw a line of fit, such as the blue dashed line that is shown. T

he data points should appear to be clustered around the line. Write an equation for the line of fit. Select two points (not necessarily data points) on the line: (30, 300) and (60, 160).

Find the slope of the line.

A. How do you know what points to select?

B. What do the slope and y-intercept represent in this line of fit?

Activity Description: Interdisciplinary Connections: Content: ;NJSLS#:

Application to Finance and Investments Model

Exponential Growth Exponential growth functions can be used to model situations represented by an initial amount a and a growth rate r . In these situations, the base b is replaced by the growth factor A new investment account is opened with \$4000 at the interest rate shown. If no additional money is invested, what will be the value of the investment after 5 years?



Write the exponential growth function that models this situation A. How was the value of a determined? B. How was the value of r determined?

Application to Science

A scientist has 360 grams of a radioactive material that has a half-life of 2 years. Half-life is the length of time needed for half of the radioactive material to decay.

How many grams of the radioactive material will remain in 7 years?

Write a function of the form $A(t) = abt^r$ for this situation, where A is the amount of radioactive material remaining, in grams, and t is the time, in years.

Use the points $(t, A(t)) = (0, 360)$ and $(t, A(t)) = (2, 180)$

- i. The Fibonacci sequence is
1, 1, 2, 3, 5, 8, 13, 21, ...
- a. Write a recursive function to describe the terms of the Fibonacci sequence. Begin with the conditions $f(0) = f(1) = 1$ and $f(2) = f(1) + f(0)$.
-
- b. Suppose the first two terms of the Fibonacci sequence were $f(0) = 2$ and $f(1) = 2$, instead of $f(0) = 1$ and $f(1) = 1$. Write the first 5 terms of the sequence.
-
- c. Explain how you can modify your answer from part a to describe the terms of the sequence found in part b.

Highlight on: Graduation Rates • Creating algebraic inequalities to describe limits on funding, class size, school size, etc., how can a school or district maximize graduation rates?

UNIT OVERVIEW

CONTENT AREA: Mathematics	UNIT: Algebra 1 honors
TARGET COURSE/GRADE LEVEL: Algebra 1 honors	SUGGESTION TIMEFRAME: 10-12 days
TOPIC: Quadratic Modeling	CHAPTERS COVERED:

UNIT SUMMARY/ UNIT RATIONALE:

Unit 7 presents preliminary radical and irrational number sense including different representations of radical expressions and properties of rational and irrational numbers. Students will be able to solve quadratic equations using various techniques including graphing, square roots, completing the square, and the Quadratic Formula. Students will be able to determine the best method for solving given quadratic equations presented in various forms.

Unit Rationale

By learning various techniques to solve quadratic equations, students will be able to apply the appropriate method to solve quadratic equations throughout the Algebra I curriculum. These techniques will also be used in future courses. Students will be able to use a graphing calculator to check their solutions.

INTERDISCIPLINARY CONNECTIONS / PROBLEM-BASED LEARNING:

WIDA : ELP Standards (2007)

WIDA : Grades 9-12

ELP Standard 1: Social and Instructional Language

SPEAKING

Example Topics: Recommendations/Suggestions

Level 5 - Bridging: Critique, evaluate and make recommendations or suggestions for a variety of everyday information sources

NJ: 2014 SLS: Science

NJ: Grades 9-12

HS-PS2 Motion and Stability: Forces and Interactions

Performance Expectations

HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. Show details

NJSLS-S: Science and Engineering Practices

NJSLS-S: 9-12

Practice 4. Analyzing and interpreting data

Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Apply techniques of algebra and functions to represent and solve scientific and engineering problems.

ESSENTIAL QUESTIONS:

1. What are polynomial expressions, and how do you simplify them?
2. How do you add and subtract polynomials?
3. How can you multiply polynomials by monomials?
4. How do you interpret algebraic expressions in terms of their context?
5. How can you use completing the square to solve a quadratic equation?
6. How can you use factoring to solve quadratic equations in standard form for which $a = 1$?
7. How can you use factoring to solve quadratic equations in standard form for which $a \neq 1$?
8. How can you use special products to aid in solving quadratic equations by factoring
5. How can you identify and use intercepts in linear relationships?
6. How do you graph an exponential function of the form $f(x) = ab^x$?
7. How can you use the graph of a quadratic function to solve its related quadratic equation?
8. How can you use the Zero Product Property to solve quadratic equations in factored form?
9. How can you use factoring to solve quadratic equations in standard form for which $a = 1$?
10. How can you use factoring to solve quadratic equations in standard form for which $a \neq 1$?
11. How can you use completing the square to solve a quadratic equation?

How can the vertex form of a quadratic function help you sketch the graph of the function?

- How is the standard form of a quadratic function different from the vertex form?
- How can graphs and tables help you solve quadratic equations?
- How is solving linear-quadratic systems of equations similar to and different from solving systems of linear equations?
- What key features are shared among the square root function and translations of the square function?
- What are the key features of the cube root function?
- Do horizontal and vertical translations work in the same way for all types of functions?

- What are the key features of the graph of the absolute value function?
- How are step functions related to piecewise-defined functions.
- How do the constraints affect the graphs of piecewise-defined functions?

LEARNING TARGETS

NEW JERSEY STUDENT LEARNING STANDARDS

A.APR.A.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

A.SSE.B.3 Choose and produce an equivalent form of a quadratic expression to reveal the zeros of the function it defines.

b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Rewrite a quadratic expression in vertex form to reveal and explain properties of the quantity represented by the expression.

Standards (Taught and Assessed):

A.APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

F.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ (modeling standard)

b. Graph square root, cube root, and piecewise-defined functions, including step-functions and absolute value functions.

c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

A.REI.D.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find these solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. ★

21st century skills

Core Ideas: Cultivating online reputations for employers and academia requires separating private and professional digital identities.

Performance Expectation/s: 9.4.12.DC.6: Select information to post online that positively impacts personal image and future college and career opportunities.

Career Readiness, Life Literacies, & Key Skills Practices

Act as a responsible and contributing community member and employee.

Attend to financial well-being.

Consider the environmental, social and economic impacts of decisions.

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Model integrity, ethical leadership and effective management.

Plan education and career paths aligned to personal goals.

Use technology to enhance productivity, increase collaboration and communicate effectively.

Work productively in teams while using cultural/global competence.

Social and Emotional Learning:

Sub-Competencies

Recognizing the importance of self-confidence in handling daily tasks and challenges.

Demonstrate an awareness of the

expectations for social interactions in a variety of ways.

Demonstrate an understanding of the need for mutual respect when viewpoints differ.

Recognize the skills needed to establish and achieve personal and educational goals.

Utilize positive communication and social skills to interact effectively with others.

Develop, implement, and model effective problem solving and critical thinking skills.

Content: What information do students need to know?

- Factor polynomials.
- Rewrite polynomials to reveal the contextual interpretation
- Divide polynomials.
- Solve quadratic equations by graphing and determining the number of solutions
- Solve quadratic equations by completing the square.
- Use the quadratic formula to solve quadratic equations.
- Use the discriminant of a quadratic equation to determine if it has two rational roots, two irrational roots, one root, or no real roots.

Process: What will students be able to do with the information?

Enduring Understanding

- The family of quadratic functions model situations where the rate of change is not constant.
- Quadratic functions are identified by intercepts, maxima, and minima. Quadratic equations can be solved by a variety of methods including graphing, square roots, factoring, the quadratic formula, and completing the square.
- The discriminant of a quadratic equation can be used to determine the number of solutions an equation has.
- Systems of quadratic equations can be solved graphically and algebraically.

Modifications:

Special Education	ESL	At-risk	Gifted and Talented
<p>Modifications and accommodations for students with IEPs are designed and documented in daily lesson plans Emphasize note taking strategies Use guided notes when necessary Revisit and study notebook Create vocabulary notecards Use tools/manipulatives/models Reword application problems</p>	<p>Modifications and accommodations for ELL students are designed and documented in daily lesson plans Extended time, scribe, speech to text, challenge questions, and specific other accommodations/modifications per a student's IEP or 504 plan, student resources in multiple languages.</p>	<p>Interventions and strategies to support students at-risk for are designed and documented in daily lesson plans Visual diagrams, clarify directions, vocabulary usage, small group work, one on one instruction, differentiated lessons, enrichment activities, manipulatives, modeling, and</p>	<p>Enrichment and acceleration opportunities for G&T students are designed and documented in daily lesson plans Reverse a question by providing the answer instead of the question. For example, instead of asking for the sum of 452 and 798, give the sum of 1,250 and ask students to provide two, or three, 3-digit addends to equal the sum.</p>

<p>Use handouts/graphic organizers Review peer work and provide feedback Complete error analysis process. Use Google Apps for Education Use supplemental programs such as:</p> <ul style="list-style-type: none"> o Delta Math o Desmos o Discovery Education o EdPuzzle o Edulastic o Geogebra o iXL o Khan Academy o Math-Games o Math Planet o PurpleMath o Quia o Quizizz o Soft Schools <p>Create a study guide for intervention</p>		<p>specific other accommodations/modifications per a</p>	<p>Analyze similarities and differences. For example, how are additive patterns and multiplicative patterns alike? How are they different?</p> <p>Allow students to choose the numbers. For example, provide a word problem without numbers. Then allow students to select the numbers and solve the problem.</p> <p>Create number sentences. This could be as simple as rolling a few dice and asking students to create a target number with the numbers rolled or by giving students numbers and words to create a sentence. For example, when given the numbers 7 and 8 and the word more, students may write “the square of 8 is more than the square of 7” or “7 times 8 is two more than 9 x 6”.</p> <p>Use “soft” words. This strategy encourages critical thinking about numbers and requires the use of “soft” words instead of absolutes. For example, instead of asking for two numbers with a product of 96, ask for two numbers that have a product around 96. Change the question. For this strategy, change up a question you are already using. For example:</p> <p>Question 1: What is the volume, in cubic meters, of a rectangular prism with a width of 3 meters</p>
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			<p>and a height that is five times more than the width?</p> <p>Question 2: The volume of a rectangular prism is 15 cubic meters. What could be the dimensions of the prism?</p>
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INSTRUCTION

CONTENT VOCABULARY:

ASSESSMENTS (BENCHMARK, FORMATIVE, SUMMATIVE, ALTERNATIVE):

Formative Assessments:

- Entry and Exit Slips
- Quizzes
- Self Assessment

Benchmarks:

- Chapter Tests
- Projects

Summative Assessments:

- District Assessments
- Midterms
- Standardized Test

INSTRUCTIONAL RESOURCES (ELA – INCLUDE VARIOUS LEVELS OF TEXT):

Activity Description(s):

See example tasks below:

- Understanding Polynomial Expressions
- Adding Polynomial Expressions
- Subtracting Polynomial Expressions
- Multiplying Polynomial Expressions by Monomials
- Modeling with Expressions
- Solving Equations by Factoring
- Solving Equations by Completing the Square
- Solving Equations by Factoring $ax^2 + bx + c$
- Using Special Factors to Solve Equations

Task 1 (A.SSE.A.2)

Find a value for a, a value for K, and a value for n so that $(3x+2)(2x-5)=ax^2+kx+n$.

Answer:

No matter what the value of x, the distributive property of multiplication over addition tells us that :

$$(3x+2)(2x-5) = (3x+2)(2x) + (3x+2)(-5)$$

$$= 6x^2 + 4x - 15x - 10 = 6x^2 - 11x - 10$$
 So, if $a=6$, $k=-11$, and $n=-10$,

then the expression on the left has the same value as the expression on the right for all values of x; that is, the two expressions are equivalent.

Source: <http://tasks.illustrativemathematics.org/contentstandards/HSA/SSE/A/2/tasks/87>

Task 2 (A.APR.A.1)

A skyrocket is launched from a 6-foot-high platform with an initial speed of 200 feet per second. The polynomial $-16t^2 + 200t + 6$ gives the height in feet that the skyrocket will rise in t seconds. What is the height of the rocket 5 seconds after it is launched?

Answer: The rocket will rise to a height of 606 feet after 5 seconds.

Source: HMH <https://my.hrw.com/dashboard/home>.

Task 3 (A.SSE.B.3)

a.

Graph these equations on your graphing calculator at the same time. What happens? Why?

$$y_1 = (x-3)(x+1)$$

$$y_2 = x^2 - 2x - 3$$

$$y_3 = (x-1)^2 - 4$$

$$y_4 = x^2 - 2x + 1$$

b.

Below are the first three equations from the previous problem.

$$y_1 = (x-3)(x+1)$$

$$y_2 = x^2 - 2x - 3$$

$$y_3 = (x-1)^2 - 4$$

These three equations all describe the same function. What are the coordinates of the following points on the graph of the function? From which equation is each point most easily determined? Explain.

i.

vertex: _____

ii.

y-intercept: _____

iii.

x-intercept(s): _____

Answer:

a. When you graph these four equations, only two different parabolas are shown. This is because the first three equations are equivalent, and so all produce the same graph. The fourth function produces a different graph.

b.

i.

The vertex is $(1, -4)$ which is most visible in y_3 since the vertex occurs at the point where the squared portion is zero.

ii.

The y -intercept is $(0, -3)$, which is visible as the constant in y_2 since the other terms are 0 when you plug in $x = 0$.

iii.

The x -intercepts are $(3, 0)$ and $(-1, 0)$, which are most visible in y_1 since you can find the roots of the polynomial using the zerofactor property and thus the intercepts correspond to the zeros of each factor.

Interdisciplinary Connections: Science.

Skills Content: Growing cell cultures and substance's effects.

NJSLS#:

A scientist is growing cell cultures and examining the effects of various substances on them as part of his research. The culture in one petri dish increases according to the expression $t^2 + 4t + 4$ for time t in minutes. Another increases according to $t^2 + 2t + 4$. He needs to feed all the cells equally, so he needs to know the expression for the total number of cells in both dishes because the food is proportional to the total number of cells. Find the expression.

Answer: $2t^2 + 6t + 8$

Source: <https://my.hrw.com/dashboard/home>

Spotlight on:

“The Mathematicians Project: Mathematicians Are Not Just White Dudes”

Take 10-15 minutes a week to research (read Wikipedia, that's all you need) a not-old-dead-white-dude mathematician, and then take 5 minutes in class to tell your students about them. Include a picture.

Activity Description(s):

- ❖ Graphs of Quadratic Functions
- ❖ Exponential growth versus linear/polynomial growth
- ❖ Transforming the graph of a function
- ❖ Factoring Quadratics
- ❖ Zero product property

Task 1: (Illustrative math: Standard F.IF.C7)

c.

Make up an equation for a quadratic function whose graph satisfies the given condition. Use whatever form is most convenient.

i.

Has a vertex at $(-2, -5)$.

ii.

Has a y -intercept at $(0, 6)$

iii.

Has x -intercepts at $(3, 0)$ and $(5, 0)$

iv.

Has x -intercepts at the origin and $(4, 0)$

v.

Goes through the points $(4, 2)$ and $(1, 2)$

Task 1 solution

Task 2: (Illustrative math: Standard F.LE.A.3)

The population of a country is initially 2 million people and is increasing at 4% per year. The country's annual food supply is initially adequate for 4 million people and is increasing at a constant rate adequate for an additional 0.5 million people per year.

a.

Based on these assumptions, in approximately what year will this country first experience shortages of food?

b.

If the country doubled its initial food supply and maintained a constant rate of increase in the supply adequate for an additional 0.5 million people per year, would shortages still occur? In approximately which year?

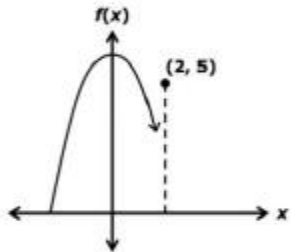
c.

If the country doubled the rate at which its food supply increases, in addition to doubling its initial food supply, would shortages still occur?

Task 3: (Illustrative math: Standard F.BF.B.3)

A computer game uses functions to simulate the paths of an archer's arrows. The x -axis represents the level ground on which the archer stands, and the coordinate pair $(2, 5)$ represents the top of a castle wall over which he is trying to fire an arrow.

In response to user input, the first arrow followed a path defined by the function $f(x) = 6 - x^2$, failing to clear the castle wall.



The next arrow must be launched with the same force and trajectory, so the user must reposition the archer in order for his next arrow to have any chance of clearing the wall.

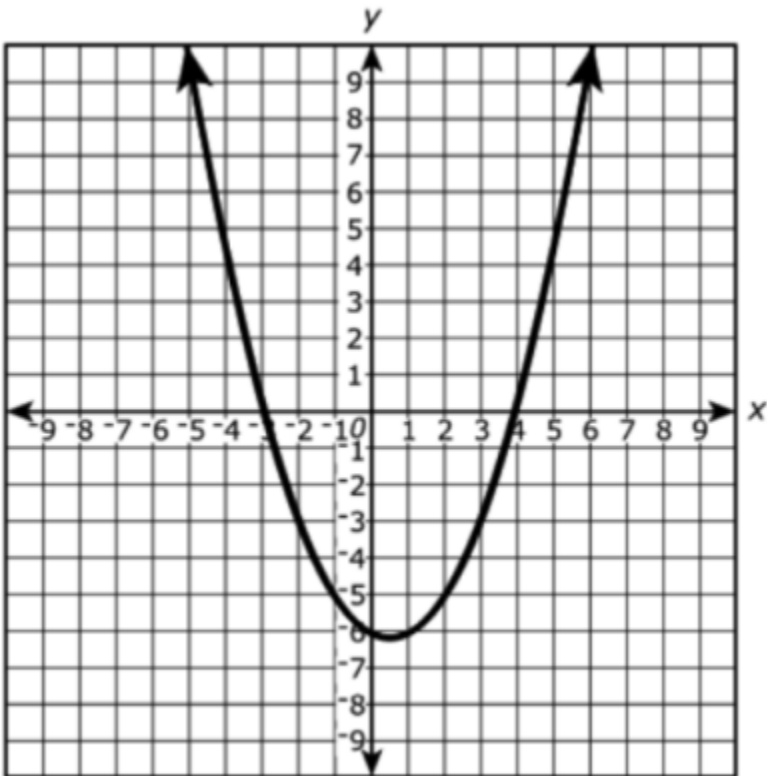
- How much closer to the wall must the archer stand in order for the arrow to clear the wall by the greatest possible distance?
- What function must the user enter in order to accomplish this?
- If the user can only enter functions of the form $f(x + k)$, what are all the values of k that would result in the arrow clearing the castle wall?

Interdisciplinary Connections: (Standard F.BF.B.3)

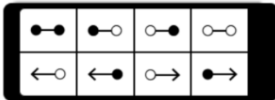
Activity Description:

Task 1: The graph of the function $f(x) =$

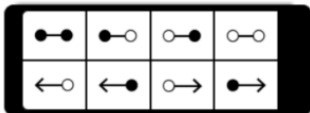
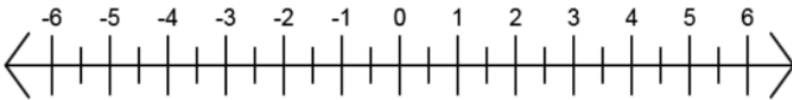
$\frac{1}{2}(x^2 - x - 12)$ is shown on the xy -coordinate plane



Part A: On the number line provided, represent the set of all values of x for which $f(x)$ is increasing. Select a solution set indicator and draw it on the number line at the appropriate location(s).



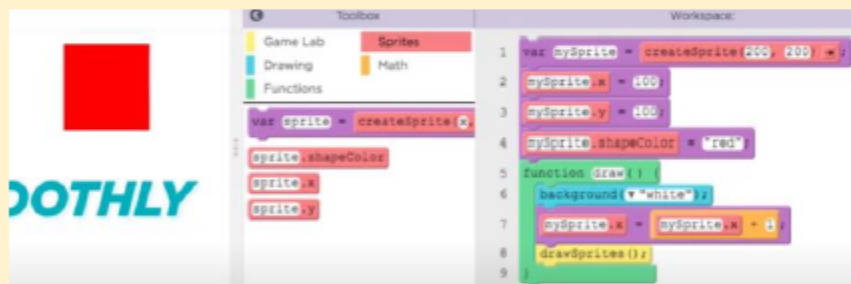
Part B: On the number line provided, represent the set of all values of x for which $f(x)$ is positive. Select a solution set indicator and draw it on the number line at the appropriate location(s).



The purpose of this discussion is to start students thinking about how they might use the various sprite properties they've seen so far to make animations with purposeful motion. If students struggle to come up with ideas, you can narrow down the question to specific properties. For example:

- What would happen to a sprite if you constantly increased its **x** property?
- What would happen to a sprite if you constantly increased its **y** property?

Coding is used by game designers/software engineers to build their animations and websites. In this case we can compare sprites to variables. Line 1 is equivalent to our variables. Line 5 is our "function" and line 7 can be compared to a composition of function/translation of a function.



Content(s): Computer science: code.org
 NJSLS#: CSTA K-12 Computer Science Standards (2017)
 AP - Algorithms & Programming
<https://www.csteachers.org/>

Highlight on:

Lottery:

Study how the Lottery works, why it is nearly impossible to win, and the economic damage it may cause.

UNIT OVERVIEW

<p>CONTENT AREA: Mathematics</p>	<p>UNIT: Algebra 1 honors</p>
<p>TARGET COURSE/GRADE LEVEL: Algebra 1 honors</p>	<p>SUGGESTION TIMEFRAME: 10-12 days</p>
<p>TOPIC: Other Nonlinear Graphs and One Variable</p>	<p>CHAPTERS COVERED:</p>

Statistics	
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UNIT SUMMARY/ UNIT RATIONALE:

Unit 5 focuses on data analysis and displays contains and extended content studied in previous courses. Students should be familiar with the different measures of center: mean, median, and mode, the different measures of variation: range and mean absolute deviation. A new measure of variation, standard deviation, is introduced. Students can compute the standard deviation for a small data set or use technology for larger data sets. Box-and-Whisker plots are analyzed, noting the variation or spread of the data. Other data displays are integrated throughout the unit. The shapes of distributions, symmetric and skewed, are analyzed and compared. Two-way tables are used to organize categories of data from the same source. The unit also covers how to choose a data display for a given set of data.

Unit Rationale

By learning measures of center and variation, students can describe a data set. For future courses students will be able to express answers with a level of precision appropriate for the problem's context. Students will be able to display data and map their relationships using graphs and two-way tables. Students will be able to differentiate between biased and unbiased data sources and representations.

INTERDISCIPLINARY CONNECTIONS / PROBLEM-BASED LEARNING:

NJ: 2016 SLS: English Language Arts

NJ: Grades 9-10

Capacities of the Literate Individual

Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language

They build strong content knowledge.

They comprehend as well as critique.

They value evidence.

Reading: Literature

Craft and Structure

NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

RL.9-10.4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).

P21: 21st Century Student Outcomes

P21: K-12

Core Subjects & 21st Century Themes

Global Awareness

Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts

Learning & Innovation Skills

Creativity and Innovation Think Creatively

Use a wide range of idea creation techniques (such as brainstorming)

Work Creatively with Others

Develop, implement and communicate new ideas to others effectively

Critical Thinking and Problem Solving Reason Effectively

Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation Show details

Make Judgements and Decisions

Effectively analyze and evaluate evidence, arguments, claims and beliefs

Synthesize and make connections between information and arguments

Interpret information and draw conclusions based on the best analysis

Solve Problems

Solve different kinds of non-familiar problems in both conventional and innovative ways Show details

Identify and ask significant questions that clarify various points of view and lead to better solutions Show details

Collaborate with Others

Demonstrate ability to work effectively and respectfully with diverse teams

Info, Media & Tech Skills

Media Literacy Analyze Media

Understand both how and why media messages are constructed, and for what purposes

ICT Literacy Apply Technology Effectively

Use technology as a tool to research, organize, evaluate and communicate information

ESSENTIAL QUESTIONS:

What information about data sets can you get from different data displays?

- How can you use measure of center and spread to compare data sets?
- How does the shape of a data set help you understand the data?
- Why does the way data is spread out matter?
- How can you use two-way frequency tables to analyze data?

LEARNING TARGETS

NEW JERSEY STUDENT LEARNING STANDARDS

S.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

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.

S.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S.ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

21st century skills

Core Ideas: Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.

Performance Expectation/s: 9.4.12.GCA.1: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political, economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).

Career Readiness, Life Literacies, & Key Skills Practices

Act as a responsible and contributing community member and employee.

Attend to financial well-being.

Consider the environmental, social and economic impacts of decisions.

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Model integrity, ethical leadership and effective management.

Plan education and career paths aligned to personal goals.

Use technology to enhance productivity, increase collaboration and communicate effectively.

Work productively in teams while using cultural/global competence.

Content: What information do students need to know?
 Compare the center and spread of data sets using statistical displays appropriate to the shape of the data distributions.
 Interpret differences in shape, center, and spread in the context of data sets.
 Draw a line of best fit through a scatter plot by hand and using technology.
 Assess the fit of a function by calculating residuals.
 Determine the equation of a line of best fit and interpret the meaning of slope and y -intercept in context.
 Calculate and interpret the correlation of a line using r.
 Understand that correlation does not imply causation.
 Use the line of best fit to solve problems within the constraints of the data set.
 Understand how data is organized in a two -way table.
 Construct a two -way table and interpret the table to draw conclusions.
 Write sequences in next -now and recursive form.
 Relate arithmetic sequences to linear functions.
 Express linear relationships in a variety of forms: next -now, recursive, implicit ($y=mx+b$), and explicit ($f(x)=mx+b$).
 Relate geometric sequences to exponential functions.
 Express exponential relationships in a variety of forms: next-now, recursive, implicit ($y=ab^x$), and explicit ($f(x)=ab^x$).

Process: What will students be able to do with the information?
Enduring Understanding
 Frequency tables and histograms display numerical data organized into intervals.
 Separating data into subsets is a useful way to summarize and compare data sets.
 Different measures can be used to interpret and compare data sets.
 Three measures of central tendency of a set of data are mean, median, and mode.
 A box-and-whisker plot displays the maximum, minimum, and quartiles of a data set.
 Arithmetic sequences have function rules that can be used to find any term of the sequence.
 If two sets of numerical data are related, a line of best fit on the graph can be used to estimate or predict values

Modifications:

Special Education	ESL	At-risk	Gifted and Talented
<p>Modifications and accommodations for students with IEPs are designed and documented in daily lesson plans Emphasize note taking strategies Use guided notes when necessary Revisit and study notebook Create vocabulary notecards Use tools/manipulatives/models</p>	<p>Modifications and accommodations for ELL students are designed and documented in daily lesson plans Extended time, scribe, speech to text, challenge questions, and specific other accommodations/modifications per a student's IEP or 504 plan, student resources in multiple languages.</p>	<p>Interventions and strategies to support students at-risk for are designed and documented in daily lesson plans Visual diagrams, clarify directions, vocabulary usage, small group work, one on one instruction, differentiated lessons, enrichment activities, manipulatives,</p>	<p>Enrichment and acceleration opportunities for G&T students are designed and documented in daily lesson plans Reverse a question by providing the answer instead of the question. For example, instead of asking for the sum of 452 and 798, give the sum of 1,250 and ask students to provide two, or</p>

<p>Reword application problems Use handouts/graphic organizers Review peer work and provide feedback Complete error analysis process. Use Google Apps for Education Use supplemental programs such as:</p> <ul style="list-style-type: none"> o Delta Math o Desmos o Discovery Education o EdPuzzle o Edulastic o Geogebra o iXL o Khan Academy o Math-Games o Math Planet o PurpleMath o Quia o Quizizz o Soft Schools <p>Create a study guide for intervention</p>		<p>modeling, and specific other accommodations/modifications per a</p>	<p>three, 3-digit addends to equal the sum. Analyze similarities and differences. For example, how are additive patterns and multiplicative patterns alike? How are they different? Allow students to choose the numbers. For example, provide a word problem without numbers. Then allow students to select the numbers and solve the problem. Create number sentences. This could be as simple as rolling a few dice and asking students to create a target number with the numbers rolled or by giving students numbers and words to create a sentence. For example, when given the numbers 7 and 8 and the word more, students may write “the square of 8 is more than the square of 7” or “7 times 8 is two more than 9 x 6”. Use “soft” words. This strategy encourages critical thinking about numbers and requires the use of “soft” words instead of absolutes. For example, instead of asking for two numbers with a product of 96, ask for two numbers that have a product around 96. Change the question. For this strategy, change up a question you are already using. For example: Question 1: What is the volume, in cubic meters, of a</p>
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			<p>rectangular prism with a width of 3 meters and a height that is five times more than the width?</p> <p>Question 2: The volume of a rectangular prism is 15 cubic meters. What could be the dimensions of the prism?</p>
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INSTRUCTION

CONTENT VOCABULARY:

ASSESSMENTS (BENCHMARK, FORMATIVE, SUMMATIVE, ALTERNATIVE):

Formative Assessments:

- Entry and Exit Slips
- Quizzes
- Self Assessment

Benchmarks:

- Chapter Tests
- Projects

Summative Assessments:

- District Assessments
- Midterms
- Standardized Test

INSTRUCTIONAL RESOURCES (ELA – INCLUDE VARIOUS LEVELS OF TEXT):

Activity Description(s):

Activity Description:

Strings of decorative mini lights are supposed to last 1,000 hours, with an acceptable error or plus or minus 50 hours. Data from two quality control tests are given below.

TEST 1

975	1,025	950	950	975
1,050	925	1,050	1,025	1,050
1,000	1,075	975	950	1,025

TEST 2

1,000	1,000	1,025	1,000	975
1,025	975	950	1,000	1,025
1,000	1,000	1,050	975	1,000

Part A

Find the mean, median, and IQR (interquartile range) for each data set.

Part B

Select the type of data display that you think will best allow you to compare the data sets. Explain your reasoning. Create the data displays.

Part C

Interpret and compare the shapes of the data displays. What do the displays tell you about the quality of the mini lights?

KEY:

Part A

Test 1: Mean = 1,000

Median = 1,000

IQR = 100

Test 2: Mean = 1,000

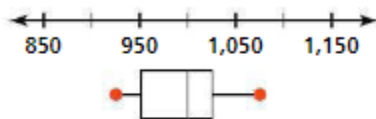
Median = 1,000

IQR = 50

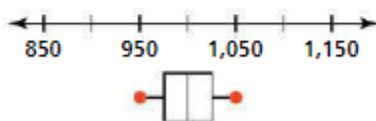
Part B

The mean and median are the same for each data set, so a box plot will show if the middle 50% (IQR) of values are in the acceptable range of plus or minus 50 hours.

Test 1



Test 2



Part C

The data from both tests are symmetrical with a median of 1,000. Fiftypercent of the lights from Test 1 lasted between 950 and 1,150 hours.

Therefore, only 50% of the lights from Test 1 were within the acceptable range of 1,000 hours plus or minus 50 hours. All of the lights from Test 2 were within the acceptable range.

Interdisciplinary Connections: Earth and Space Science

Content: Earth and Human Activity

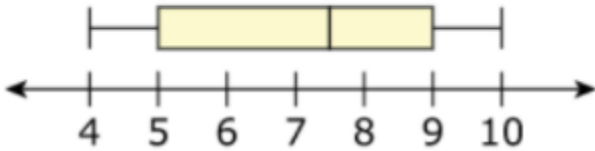
NJSLS#: HS-ESS3-1; ESS2.D

Local meteorologists from 20 cities wanted to calculate the total number of rain they had last year for the month of April. The table shows the amount of rain, in inches for the 20 cities last year.

5.32	6.48	4.25	8.05	7.23
5.37	5.12	6.26	5.31	4.43
6.08	7.16	5.52	5.21	6.53
4.46	5.02	6.33	5.54	6.20

The rainfall totals, in inches for the same 20 cities last year for the month of May are summarized in the box plot shown below

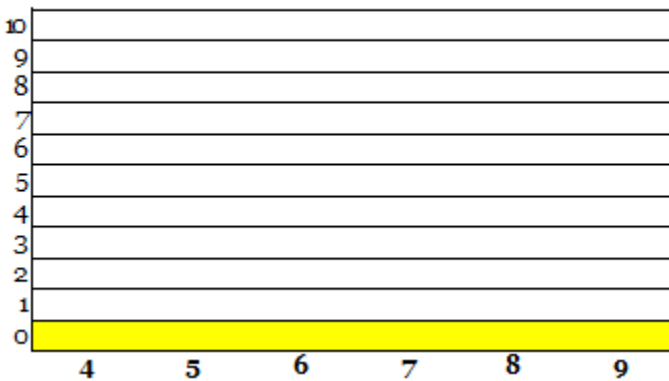
May Rainfall Totals Last Year



Part A

Create a histogram showing the data for the 20 cities in the month of April.

Total Amount of Rainfall in May



Part B

Which statement(s) are true about the given data for the 20 cities in April and May rainfall totals?

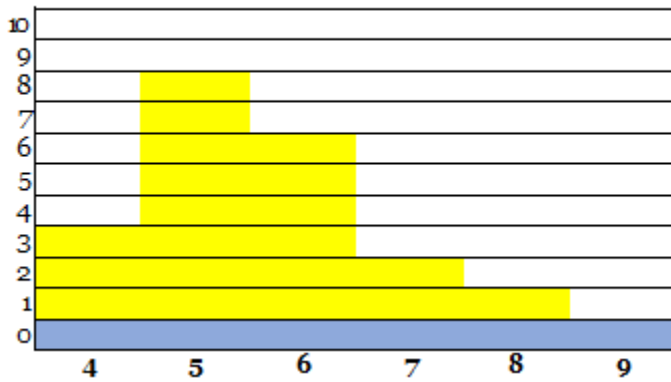
Select all that apply

- A. The median amount of rainfall for April is less than the median amount of rainfall for May.
- B. The median amount of rainfall for April is greater than the median amount of rainfall of May.
- C. The interquartile range of rainfall in April is less than the interquartile range of rainfall in May.
- D. The interquartile range of rainfall in April is equal to the interquartile range of rainfall in May.
- E. The data for April is skewed left.
- F. The data for May includes an outlier.

KEY:

Part A

Total Amount of Rainfall in May



Part B - Select the following choices:

Part B

Which statement(s) are true about the given data for the 20 cities in April and May rainfall totals?

Select all that apply.

A. The median amount of rainfall for April is less than the median amount of rainfall for May.

B. The median amount of rainfall for April is greater than the median amount of rainfall of May.

C. The interquartile range of rainfall in April is less than the interquartile range of rainfall in May.

D. The interquartile range of rainfall in April is equal to the interquartile range of rainfall in May.

E. The data for April is skewed left.

F. The data for May includes an outlier.

Highlight on:

Community Surveys

Teach students how to write surveys, and then survey your school or local community about any social issue

Prepared By
Munira Jamali