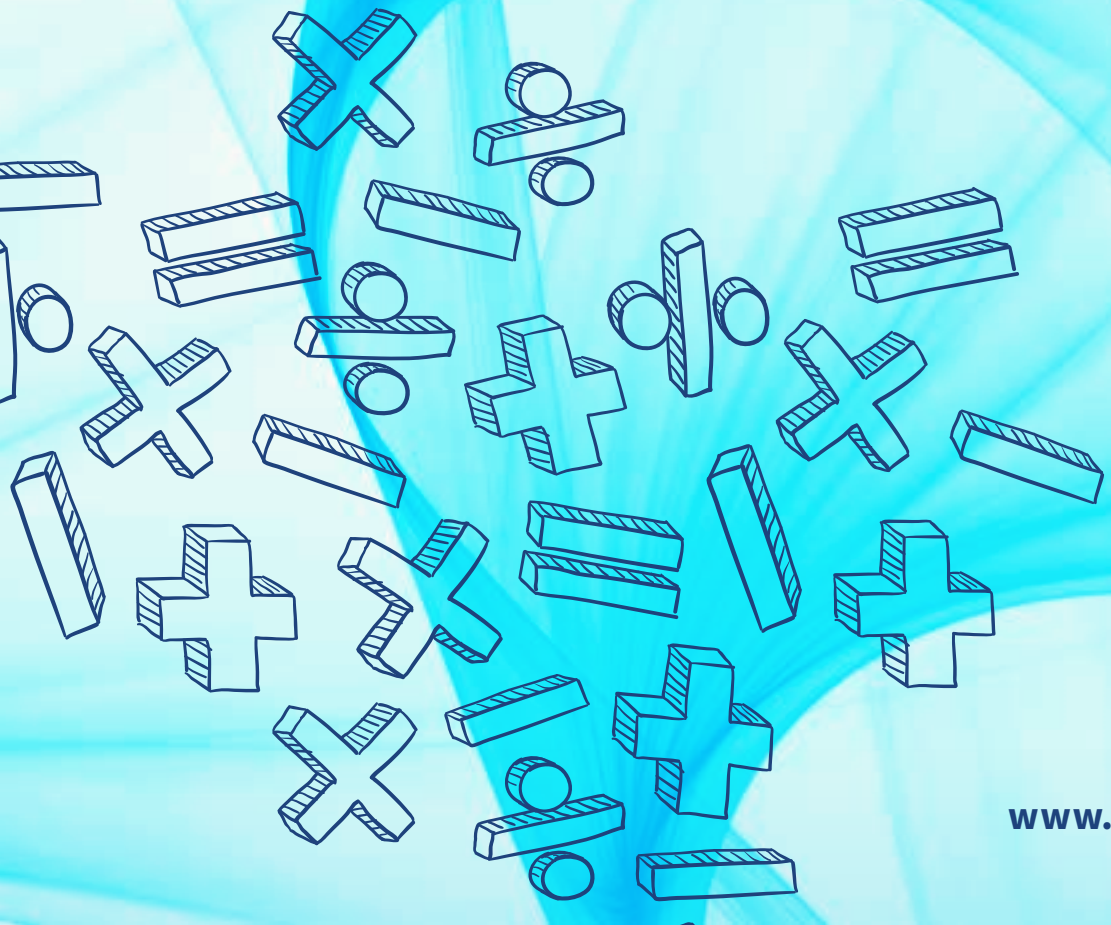
STEMscopes™ MATH

ALGEBRA I

TEACHER LESSON SAMPLE

SYSTEMS OF EQUATIONS



www.stemscopes.com/math

Discover the wonder of mathematics in our everyday world with STEMscopes Math. Built from the ground up by practicing educators using the flexible 5E lesson model, STEMscopes Math provides you with everything you need to create a meaningful learning experience.

LEARNING WITHIN A REAL-WORLD, RELEVANT CONTEXT

Student learning is rooted in real-world scenarios. Real-world connection provides teachers a way to foster an understanding and appreciation for numbers by focusing on the relationship between mathematical concepts and students' experiences and interests. When real-world connection is incorporated into lessons, students can see how math fits into their daily lives.

STEMscopes Math uses the Hook, Explore Activities, and Problem-Based Tasks to engage students in real-world situations where math skill is needed. Life Connections, Career Connections, Math Today! News, and Math Story incorporate math into the everyday experiences and careers that students may encounter outside of the classroom.

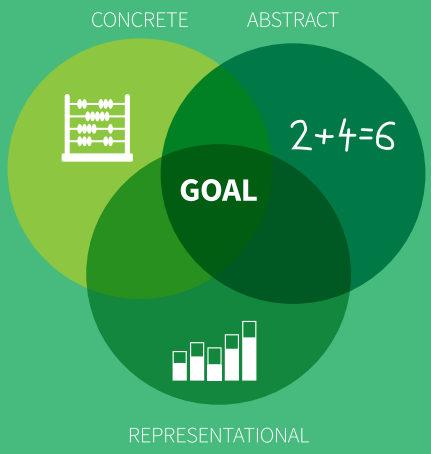
DESIGNED FOR NEW AND VETERAN TEACHERS

Every STEMscopes Math lesson is built to the standards, from the ground up. Chunking information into bite-size pieces, we make our units (called "scopes") digestible and engaging. Whether you're a new or veteran teacher, STEMscopes Math provides everything you need to create a meaningful learning experience.

CONCRETE-REPRESENTATIONAL-ABSTRACT (CRA) APPROACH

The CRA model is a powerful strategy for teaching new math concepts. It is a three-part constructivist process that transitions students from hands-on learning to the math we use as adults. As students progress through the Explore Activities (Lessons), they will transition from hands-on experiences with concrete objects to representational, pictorial models and ultimately arrive at symbolic representations, using only numbers, notations, and mathematical symbols.

Since state assessments often require students to solve problems at all three levels, the CRA model helps students succeed in high-stakes testing. Research-based studies show that students who use concrete materials to learn math develop more precise and comprehensive mental representations, show more motivation and on-task behavior, understand mathematical ideas, and better apply these ideas to life situations.



PROMOTING EQUITY

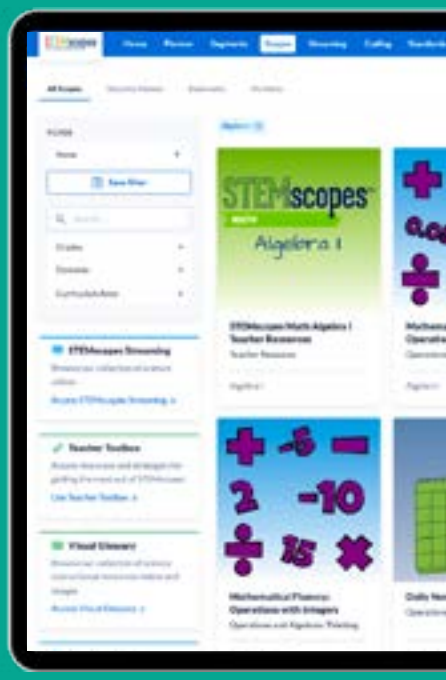
Implementing STEMscopes Math in the classroom provides every student access to high-quality, challenging learning opportunities. The activities within the program are scaffolded and differentiated so that all students find the content accessible, relatable, and challenging. The emphasis on collaborative learning and intentional discourse within the STEMscopes program promotes a sense of community in the classroom where students can learn from each other.

DIGITAL, PRINT, AND KITS

We are committed to delivering flexible, differentiated, student-centered instructional content through our digital platform, and we're all about making life easier for teachers.

DIGITAL CURRICULUM

Our **digital platform** allows you to assign work directly to student accounts, push content to Google Classroom, print materials on demand, and use our lessons in a whole-group or blended learning setting. Find coherent, 5E-based lessons that align with standards and seamlessly flow from one activity to the next.



Print and hands-on kits bring digital learning and real-world instruction together. These supplemental resources establish a concrete connection between school and home, helping teachers make education more equitable.

STUDENT PRINT

HANDS-ON KITS

STANDARDS

Aligning our math program to standards is at the core of what we do. STEMscopes Math fully supports your state standards, no matter where you are.

HOME

This is where you will find your lesson planning materials so you can facilitate fun, purposeful experiences for your students. Build your content knowledge, review the scope's standards, and access parent materials in the Home section.

ENGAGE

The Engage section lays the foundation for learning. You begin by pre-assessing students and filling knowledge gaps. The Hook lays out a storyline narrative to establish a purpose for learning and capture students' attention with real-world connections.

EXPLORE*

This is where students dig into the content. The Explore section includes scaffolded hands-on activities that build toward mastery of the standards. Each Explore prompt encourages rich mathematical discourse and student reasoning, and concludes with an Exit Ticket.

EXPLAIN*

Paired with Explore, the Explain section offers a variety of resources that connect the experiences of the Explore activities to the academic content students need to know. These resources include illustrated vocabulary cards, independent practice, and journal prompts that support the Explore activities and solidify student learning.

ELABORATE*

Workstations are a go! The Elaborate section makes differentiation a cinch with ready-made activities—digital and paper-based games, spiraled review, career connections, literacy connections, and more—perfect for rotations! Students continue learning while you make time for small group interventions and independent projects to support your struggling and advanced learners.

**Instructional elements in STEMscopes Mathematics are intended to work together. The elements in the Explain and Elaborate sections can be used to support student learning and provide opportunities for practice while students explore the concept.*

EVALUATE

Get the data you need from the assessment tools provided in the Evaluate section. From multiple choice-based assessments to an open-ended reasoning prompt, there's an evaluation for every student's learning style. You can also create your own assessments using the assessment builder tool.

INTERVENTION

Useful during Elaborate or as an after-school support, Intervention is a small hands-on activity designed to target students' conceptual misunderstanding while building their math skills. This is also a great re-teach and test prep tool!

ACCELERATION

Are your students ready to go above and beyond with what they've learned? In the Acceleration section, students complete a design challenge and relate learning to current events around the world. The activities prompt them to think more deeply about the content and its applications.

DIGITAL CURRICULUM SAMPLE

To review the lesson resources in the digital Algebra I Scope, *Systems of Equations*, access our digital curriculum sample at **www.stemscopes.com/math/national/curriculum-sample** and choose the Algebra I level on the left *Grades* menu bar.

Algebra I
SAMPLE LESSON

SCOPE (UNIT) **Systems of Equations**
EXPLORE (LESSON) **Solve Systems Using Graphs and Tables**

The following pages introduce resources to help you get the most out of your STEMscopes Math Algebra I lesson. You will also notice we've provided supportive unit resources that would allow you to plan lessons throughout the year using STEMscopes Math.

This sample lesson ***does not include*** all the elements and features of our digital and print math curriculum.

RESOURCE LIST

The following resources, as well as additional resources not listed, can be found in the digital curriculum *Algebra I Scope, Systems of Equations.*

HOME
- Student Expectations
- Key Concepts
- Scope Overview
- Parent Letter

TEACHER TOOLBOX
- Scope List
- Scope and Sequence
- Lesson Planning Guide for 1-3 Explores
- Lesson Planning Guide for 3-5 Explores

EXPLORE
- Explore 1: Solve Systems Using Graphs and Tables*

ELABORATE
- "Coordinate Match" Fluency Builder*

EXPLAIN
- Vocabulary Cards*

ACCELERATION
- Choice Board
- Would You Rather

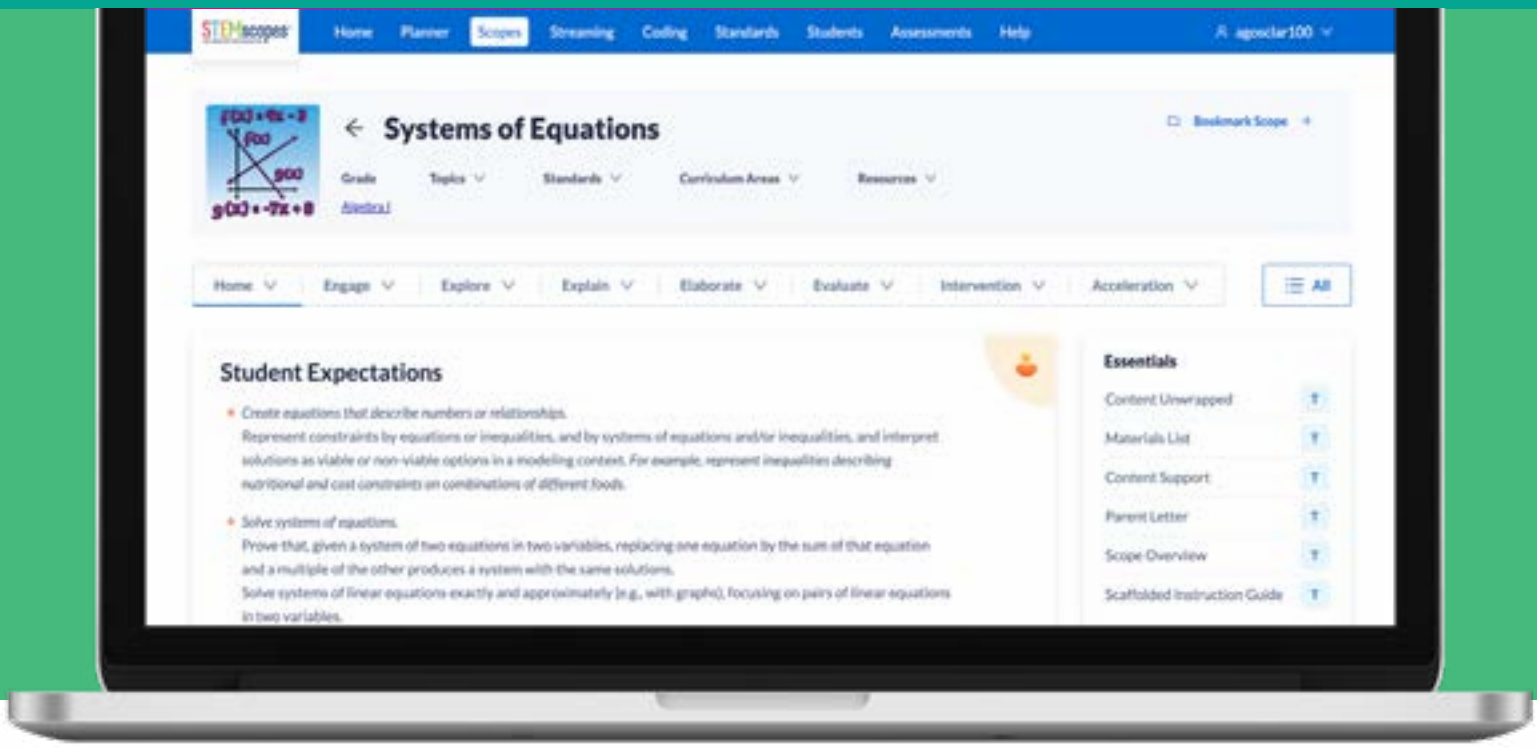
DAILY NUMERACY
- Week 1 Activities

MATHEMATICAL FLUENCY
- "Operations with Fractions: Subtracting: Mixed Numbers and Improper Fractions" Activity*

**These activities are samples and do not represent all the activities and resources within our digital and print curriculum.*

Algebra I SAMPLE LESSON

SCOPE (UNIT) **Systems of Equations**



STUDENT EXPECTATIONS

Create equations that describe numbers or relationships.

- Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.
- Solve systems of equations. 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. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- Represent and solve equations and inequalities graphically. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). 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 the 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.

KEY CONCEPTS

- I can determine the solution to a linear system by graphing the given equation, ordered pairs, or verbal description.
- I can identify the solution to a linear system given a graph.
- I can solve linear systems algebraically using methods such as substitution and elimination.
- I can write a system of linear equations given any representation.
- I can identify reasonable and unreasonable solutions given the context of the situation.
- I can justify the method selected to solve a linear system.
- I can solve linear systems using a variety of methods with one solution, no solution, or infinite solutions.

*This scope focuses on linear systems.

Scope Overview: Systems of Equations

Standards

Create equations that describe numbers or relationships.

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

Solve systems of equations.

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

Represent and solve equations and inequalities graphically.

- Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- 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 the 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.

*This scope focuses on linear functions.

If the APK reveals that students are not ready, move to the Foundation Builder!

Engage

- Accessing Prior Knowledge: Analyze Pairs of Simultaneous Linear Equations
- Foundation Builder: Analyze Pairs of Simultaneous Linear Equations
- Hook: Dog Chase

Home

- Scope Overview
- Content Support
- Standards Unwrapped
- Parent Letter

Explore

- Explore 1: Solve Systems Using Graphs and Tables
  - Exit Ticket
  - Show What You Know: Part 1
- Explore 2: Solve Systems Using Substitution
  - Exit Ticket
  - Show What You Know: Part 2
- Explore 3: Introduction to Elimination
  - Exit Ticket
  - Show What You Know: Part 3
- Explore 4: Solve Systems Using Elimination
  - Exit Ticket
  - Show What You Know: Part 4
- Explore 5: Select Methods to Solve Systems
  - Exit Ticket
  - Show What You Know: Part 5

Elaborate

- Fluency Builder
  - Coordinate Match
- Spiraled Review
- Data Science
- Interactive Practice
  - Make Way for Penguins
- PhET
  - Graphing Lines: Linear Equations and Pairs of Equations

Explain

- Picture Vocabulary
- Interactive Vocabulary
- Show What You Know
- Anchor Charts
- Interactive Notebook

Once all of the Explores have been taught, go back to the Hook for students to apply knowledge learned.

Instructional elements in STEMscopes Mathematics are intended to work together. The elements in the Explain and Elaborate sections can be used to support student learning and provide opportunities to practice while the students are exploring the concept.

Evaluate

- Mathematical Modeling Task
- Standards-Based Assessment
- Skills Quiz

Intervention

- Skill Review and Practice
- Interactive Skill Review
- Supplemental Aids

Acceleration

- Choice Board
- Would You Rather

Algebra I - Systems of Equations

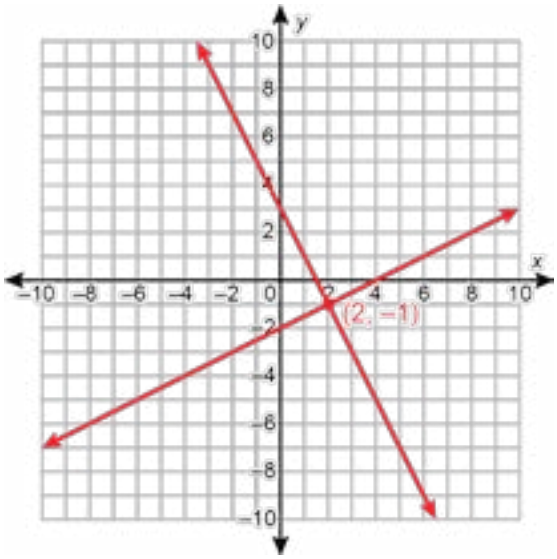
Dear Parents,

In math class, your student is about to explore systems of equations. To master this skill, they will build on their knowledge of identifying and verifying *x*- and *y*-coordinates that satisfy a system of linear equations, as well as explaining the meaning of the solution within the context of the problem. As your student extends their mathematical knowledge, they will learn the following concepts:

- Graphing
  - Students will graph equations on a coordinate plane to see where they intersect. The point(s) of intersection between the equations are the solution(s) to the system of equations. If the lines are parallel, they will never intersect and will not have a solution. If the equations demonstrate a single line once they are graphed, the system has infinitely many solutions.

Example: Graph the following system of equations on the coordinate plane below, and list the solution(s) on the line.

$$y = -2x + 3$$
$$y = \tfrac{1}{2}x - 2$$



The answer is (2, −1). Graph both of the equations using the slope and *y*-intercept. Start at the *y*-intercept, and then count up or down from that point to represent the rise and run. Once the equations are graphed, the solution is the point at which the two equations intersect, (2, −1).

- Substitution
  - This method is more advantageous than graphing or other methods when at least one equation is solved for a variable or can be solved for a variable in one step.

Example: What is the value of x in the solution to the system of equations?

$$3x = 2y + 14$$
$$y = -6x + 18$$

A. $\frac{10}{3}$
B. -2
C. $\frac{12}{5}$
D. $\frac{32}{15}$

The correct answer is A. The second equation can be substituted into the first and then simplified.

$$3x = 2y + 14$$
$$3x = 2(-6x + 18) + 14$$
$$3x = -12x + 36 + 14$$
$$3x = -12x + 50$$
$$15x = 50$$
$$x = \frac{10}{3}$$

- Elimination
  - This method is more advantageous than graphing or other methods when the equations are in the same or similar form and they have variables that make a zero pair when combined using addition.

Example: What is the solution to the system of equations?

$$2x + 3y = 6$$
$$-3y + x = 9$$

A. $\left(-1, \frac{8}{3}\right)$
B. $(-3, -4)$
C. $\left(5, -\frac{4}{3}\right)$
D. $\left(8, -\frac{1}{3}\right)$

The correct answer is C. The equations can be rewritten with like terms stacked vertically.

$$\begin{array}{rr} 2x + 3y = 6 \\ +x - 3y = 9 \\ \hline 3x = 15 \\ x = 5 \end{array}$$

The solution, $x = 5$, can be substituted into either equation to calculate the *y* value.

$$\begin{aligned} 2x + 3y &= 6 \\ 2(5) + 3y &= 6 \\ 10 + 3y &= 6 \\ 3y &= -4 \\ y &= -\tfrac{4}{3} \end{aligned}$$

The solution to the system is $(5, -\frac{4}{3})$.

- Writing a system of two linear equations that describes the constraints on the variables for a given problem

  Example: In a basketball game, Marlene made 16 field goals. Each of the field goals were worth either 2 points or 3 points, and Marlene scored a total of 39 points from field goals. Let *x* represent the number of 2-point field goals and *y* represent the number of 3-point field goals. Write a system of equations in terms of *x* and *y* to model the situation. Use the system to determine how many 3-point field goals Marlene made in the game.

  $x + y = 16$

  $2x + 3y = 39$

  $x = 9$ and $y = 7$

  Marlene made seven 3-point field goals.

While working with your student at home, you may find the following vocabulary terms helpful in your communication about systems of equations. These are terms your student will be encouraged to use throughout our explorations and during our math chats, which are short, whole-group discussions at the conclusion of each activity.

- **Terms to Know**
  - **variable:** a letter or symbol that takes the place of a number that can change; a letter that can stand for an unknown number or a set of numbers
  - **linear equation:** an equation in which no variable has a power greater than 1; the general form is $y = mx + b$, where m = slope and b = y-intercept

- **coordinate plane:** two perpendicular number lines, called the *x*-axis and the *y*-axis, that intersect at the point (0, 0) and create four quadrants; also called a graph, coordinate grid, or Cartesian plane
- **constraint:** a condition that the solution must satisfy
- **system of equations:** two or more equations with two or more variables
- **solution:** any number that makes an equation true

We will do many explorations in class to help your student learn these concepts from firsthand experiences. Encourage your student to share these experiences with you and to teach you what they have learned. Ask your student to identify examples of what they are learning in everyday life, or use the examples on the attached page as a starting point.

Thank you for your support as your student begins this new learning adventure.

Sincerely,

Math outside the Classroom!

Systems of equations are used all around our everyday lives. Chat about where you use systems of equations in your everyday life. Below are a few examples:

- ★ Ask your student if they have ever heard of supply and demand. Business owners use this to see when the amount of product produced is equal to the amount of quantity demanded. A system of linear equations is used to see where these two intersect so that business owners know how to price their products in order to make the most profit.

- ★ Systems of equations can be used to compare two companies to see which one offers a better deal. For example, one grocery delivery service offers a monthly pass for $50 a month, and then charges $5 each time you place a grocery order. Another grocery delivery service does not require a monthly pass, but charges $10 each time you place an order. How many orders would it take for both services to equal the same monthly fee? If you needed to place 12 orders a month, which grocery delivery service should you choose?

Algebra I Scope List

Scope Name	Explores	Suggested Pacing
Properties of Function	2 Explores	1 Week
Solve Equations	2 Explores	1 Week
Solve Inequalities	2 Explores	1 Week
Absolute Value Equations and Inequalities	2 Explores	1 Week
Arithmetic and Geometric Sequences	6 Explores	3 Weeks
Linear Functions	5 Explores	2 Weeks
Linear Inequalities	4 Explores	2 Weeks
Systems of Equations	3 Explores	2 Weeks
Systems of Inequalities	3 Explores	2 Weeks
Functions Derived from Linear Relationships	3 Explores	2 Weeks
Rational Exponents	3 Explores	2 Weeks
Exponential Functions	Explores	Weeks
Transform Exponential Functions	Explores	Weeks
Polynomial Operations	3 Explores	2 Weeks
Graphs of Quadratic Functions	5 Explores	2 Weeks
Factors of Polynomials	2 Explores	1 Week
Transform Quadratic Functions	1 Explore	1 Week
Solve Quadratics	3 Explores	2 Weeks
The Quadratic Formula	4 Explores	2 Weeks
Statistics	5 Explores	2 Weeks
Model Data	4 Explores	2 Weeks
Daily Numeracy/Embedded Throughout	Ongoing	

STEMscopes Math Suggested Scope and Sequence

The STEMscopes Math program is flexible, and there are variations in implementation within the guidelines provided here. This Scope and Sequence is meant to serve as a tool for you to lean on as you find how STEMscopes Math best meets the needs of the students in your classroom.

ALGEBRA I

Week	Scope
1	• Establish classroom procedures • **Pre-Assessment Benchmark**
2	• Properties of Functions
3	• Solve Equations
4	• Solve Inequalities
5	• Solve Inequalities
6	• Absolute Value Equations and Inequalities
7	• Absolute Value Equations and Inequalities
8	• Arithmetic and Geometric Sequences
9	• Linear Functions
10	• Linear Functions
11	• Linear Inequalities
12	• Systems of Equations
13	• Systems of Equations
14	• Systems of Inequalities
15	• Functions Derived from Linear Relationships
16	• Rational Exponents
17	• **Mid-Assessment Benchmark**
18	• Polynomial Operations
19	• Graphs of Quadratic Functions
20	• Graphs of Quadratic Functions
21	• Factors of Polynomials
22	• Factors of Polynomials
23	• Transform Quadratic Functions
24	• Solve Quadratics

Week	Scope
25	• The Quadratic Formula
26	• Exponential Functions
27	• Transform Exponential Functions
28	• Transform Exponential Functions
29	• Statistics
30	• Statistics
31	• Model Data
32	• **Post-Assessment Benchmark**
33	• **Review Week**
34	• **STANDARDIZED TEST (Approximate)**
35	Review
36	Review

Week	Daily Numeracy
All	Additional or repeated standards are addressed in Daily Numeracy. These activities should be rotated through daily. To see the full list of what standards are addressed in these activities, please see the Daily Numeracy: Standards by Activity section in the Daily Numeracy Teacher Toolbox.

Whole-Group Plan

1–3 Explores

*Based on a 90-minute class period	Day 1	Day 2	Day 3	Day 4	Day 5
Whole Group	Mathematical Fluency/Daily Numeracy Accessing Prior Knowledge Foundation Builder[1] Hook Begin Explores if time allows. Anchor Chart	Mathematical Fluency/Daily Numeracy Explores[2] Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)	Mathematical Fluency/Daily Numeracy Explores (continued) Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)	Mathematical Fluency/Daily Numeracy Hook (Post-Explore) Teacher Choice[3] All students: • Picture Vocabulary • Interactive Vocabulary • Interactive Notebook Mastery level: • Would You Rather • Choice Board Meets level: • Data Science • Mathematical Modeling Task Approaching level: • Interactive Practice • Skills Quiz	Mathematical Fluency/Daily Numeracy Skill Review and Practice (for students who need it) Fluency Builder (Choose one.) (for students who don't need intervention)
Assessment and Closure	Accessing Prior Knowledge to determine readiness Formative assessment based on APK and student performance on Explore Allow students to share what they felt successful with and what they struggled with today.	Administer the Exit Ticket to assess student learning after the Explore. Allow students to work on Show What You Know – Part I as independent practice after first Explores.	Administer the Exit Ticket to assess student learning after the final Explores. Allow students to work on Show What You Know – Part 2 as independent practice after Explore 2.	Assess how students perform based on individual assignments chosen.	Standards-Based Assessment

The essential elements are highlighted. If time is limited, teach these elements to fully cover the standards.

[1]Use as intervention if APK shows foundational gaps.

[2]Set your pace according to the number of Explores included in this scope. Use Exit Tickets as well as Show What You Knows for each Explore completed.

[3]Teachers can choose from the following elements. We have suggested activities for students, including recommended tasks for students at each skill level.

Small-Group Plan

1–3 Explores

*Based on a 90-minute class period	Day 1	Day 2	Day 3	Day 4	Day 5
Whole Group ***20 Minutes**	Daily Numeracy Accessing Prior Knowledge[1] Hook Introduce stations.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart Add Picture Vocabulary words to word wall based on terms introduced in the lessons.	Daily Numeracy Hook (Post-Explore) Review any Explore or Show What You Know problems that gave students trouble. Anchor Chart	Daily Numeracy Spiraled Review Standards-Based Assessment
Small-Group Instruction *Small Group/ Stations 70 Minutes	Pull small groups of students to do the following: 1. The Foundation Builder (if they need previous grade level content) 2. Explores 1–2[2]	Pull students to work with you to finish Explores 1–2.	Pull students to work with you on Explores 2–3.	Pull students to do the Skill Review and Practice based on needs.	None
Stations ***Options are flexible.**	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder 4. Interactive Vocabulary 5. Spiraled Review 6. Show What You Know	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder 4. Choice Board 5. Spiraled Review 6. Show What You Know	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder 4. Data Science 5. Spiraled Review 6. Show What You Know	Have students work in groups on the Mathematical Modeling Task.	Have the following materials available for students who finish early: 1. Mathematical Fluency 2. Would You Rather 3. Skills Quiz 4. Choice Board 5. Spiraled Review
Assessment and Closure	Accessing Prior Knowledge to determine readiness Formative assessment based on APK and student performance to determine who needs to be pulled to small group Allow students to share what they felt successful with and what they struggled with today.	Administer the Exit Tickets to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.	Administer the Exit Tickets to assess student learning.	Student success with intervention can be assessed by using the Checkup. Other students can be assessed by their performance on the Mathematical Modeling Task.	Standards-Based Assessment

The essential elements are highlighted. If time is limited, teach these elements to fully cover the standards.
[1]Use as intervention if APK shows foundational gaps.
[2]Set your pace according to the number of Explores included in this scope. Use Exit Tickets as well as Show What You Knows for each Explore completed.

STEMscopes MATH

Whole-Group Plan

3–6 Explores

Week 1 *Based on 90-minute class period	Day 1	Day 2	Day 3	Day 4	Day 5
Whole Group	Mathematical Fluency/Daily Numeracy Accessing Prior Knowledge Foundation Builder[1] Hook (Pre-Explore)	Mathematical Fluency/Daily Numeracy Explores[2] Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)	Mathematical Fluency/Daily Numeracy Explores (continued) Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)	Mathematical Fluency/Daily Numeracy Explores (continued) Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)	Mathematical Fluency/Daily Numeracy Explores (continued) Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)
Assessment and Closure	Accessing prior knowledge to determine readiness Formative assessment based on APK and student performance on Explore Allow students to share what they felt successful with and what they struggled with today.	Administer the Exit Ticket to assess student learning after the Explore. Allow students to work on Show What You Know as independent practice after Explores.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Know as independent practice after Explores.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Know as independent practice after Explores.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Know as independent practice after Explores.

The essential elements are highlighted. If time is limited, teach these elements to fully cover the standards.
[1]Use as intervention if APK shows foundational gaps.
[2]Set your pace according to the number of Explores included in this scope. Use Exit Tickets as well as Show What You Knows for each Explore completed.

Whole-Group Plan

3–6 Explores

Week 2 *Based on 90-minute class period	Day 6	Day 7	Day 8	Day 9	Day 10
Whole Group	Mathematical Fluency/Daily Numeracy Explores (continued) Anchor Chart Exit Tickets Show What You Know (Assist and reteach as needed.)	Mathematical Fluency/Daily Numeracy Hook (Post-Explore) Picture Vocabulary Interactive Vocabulary Would You Rather Choice Board	Mathematical Fluency/Daily Numeracy Interactive Practice Mathematical Modeling Task	Mathematical Fluency/Daily Numeracy Teacher Choice[3] Meets Level: • Would You Rather • Choice Board Approaching Level: • Interactive Practice • Skills Quiz	Mathematical Fluency/Daily Numeracy Skill Review and Practice (for students who need it) Fluency Builder (choose one.) (for students who do not need intervention)
Assessment and Closure	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Know as independent practice after Explores.	Allow students to share what they felt successful with and what they struggled with today.	Assess how students perform on the Mathematical Modeling Task.	Assess how students perform based on individual assessment chosen.	Standards-Based Assessment

The essential elements are highlighted. If time is limited, teach these elements to fully cover the standards.
[3]Choose from the following elements. We have suggested activities for students, including recommended tasks for students at each skill level.

Small-Group Plan

3–6 Explores

Week 1 *Based on 90-minute class period	Day 1	Day 2	Day 3	Day 4	Day 5
Whole Group *20 Minutes	Daily Numeracy Accessing Prior Knowledge[1] Hook (Pre-Explore) Introduce stations.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart Add Picture Vocabulary words to word wall based on terms introduced in the lessons.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart Review any Explore or Show What You Know problems that gave students trouble.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart Review any Explore or Show What You Know problems that gave students trouble.
Small-Group Instruction *Small Group/ Stations 70 Minutes	Pull small groups of students to the Foundation Builder (if they need previous grade-level content). Begin Explores.[2]	Pull students to work with you on Explore 1.	Pull students to work with you on Explore 2.	Pull students to work with you on Explore 3.	None
Stations	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder (from previous scope)	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder (from previous scope)	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder (from previous scope)	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder (from previous scope)	1. Mathematical Fluency 2. Interactive Practice 3. Fluency Builder (from previous scope)
Assessment and Closure	Accessing prior knowledge to determine readiness Formative assessment based on APK and student performance to determine who needs to be pulled to small group Allow students to share what they felt successful with and what they struggled with today.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.

The essential elements are highlighted. If time is limited, teach these elements to fully cover the standards.

[1]Use as intervention if APK shows foundational gaps.

[2]Set your pace according to the number of Explores included in this scope. Use Exit Tickets as well as Show What You Knows for each Explore completed.

Small-Group Plan

3–6 Explores

Week 2 *Based on 90-minute class period	Day 6	Day 7	Day 8	Day 9	Day 10
Whole Group *20 Minutes	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart Review any Explore or Show What You Know problems that gave students trouble.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Anchor Chart Review any Explore or Show What You Know problems that gave students trouble.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Add Picture Vocabulary words to word wall based on terms introduced in the lessons.	Daily Numeracy Allow students to share what they learned yesterday, and discuss what students worked on. Review any Explore or Show What You Know problems that gave students trouble.	Daily Numeracy Spiraled Review Standards-Based Assessment
Small-Group Instruction *Small Group/ Stations 70 Minutes	Pull students to work with you on Explore 4.	Pull students to work with you on Explore 5.	Hook (Post-Explore)	Skill Review and Practice	None
Stations	1. Choice Board 2. Spiraled Review 3. Show What You Know	1. Interactive Vocabulary 2. Spiraled Review 3. Show What You Know	1. Interactive Notebook 2. Spiraled Review 3. Show What You Know	Have students work in groups on the Mathematical Modeling Task.	Have the following materials available for students who finish early: 1. Would You Rather 2. Choice Board 3. Spiraled Review
Assessment and Closure	Administer the Exit Ticket to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.	Administer the Exit Tickets to assess student learning after the Explores. Allow students to work on Show What You Knows as independent practice after Explores.	Administer the Exit Tickets to assess student learning. Skills Quiz	Student success with intervention can be assessed by using the Checkup. Other students can be assessed by their performance on the Mathematical Modeling Task.	Standards-Based Assessment

The essential elements are highlighted. If time is limited, teach these elements to fully cover the standards.
[1]Use as intervention if APK shows foundational gaps.
[2]Set your pace according to the number of Explores included in this scope. Use Exit Tickets as well as Show What You Knows for each Explore completed.

Systems of Equations

Explore 1 - Solve Systems Using Graphs and Tables

Description

Students will use graphs and tables to solve systems of equations. Students will approximate solutions using tables.

Standards of Mathematical Practice

- **MP.3 Construct viable arguments and critique the reasoning of others:** Students will analyze problems and use stated mathematical assumptions, definitions, and established results in construction arguments. Students will justify conclusions with mathematical ideas. Students will compare two arguments and determine correct or flawed logic.
- **MP.6 Attend to precision:** Students will calculate efficiently and accurately. Students will communicate precisely with others and try to use clear mathematical language when discussing their reasoning.
- **MP.7 Look for and make use of structure:** Students will apply general mathematical rules to specific situations. Students will look for the overall structure and patterns in mathematics.

Setup Video

Materials

Printed
1 Student Journal (per student)
1 Set of Gas Station Options Cards (per group)
1 Exit Ticket (per student)

Reusable
1 Resealable bag (per group)

Preparation

- Separate the class into groups of 3 or 4 students.
- Print a Student Journal and Exit Ticket for each student.
- Print a set of Gas Station Options Cards, on card stock for durability, for each group of students. Cut the cards apart, and place them inside a resealable bag labeled “Part II.”

Procedure and Facilitation Points

Part I

1. Read the following scenario to the class: *While driving down the road, you hear the dreaded “ding ding” of your car. You look down, and you are running on empty! You pull into the closest gas station, Gas Galore, where you notice they are running a special: “Get a car wash for $5 and get your gas for $2.00 per gallon.” If you don’t get a car wash, your gas will cost $2.50 per gallon. If you need 24 gallons of gas to fill up your gas tank, which option would be a better deal for you?*
2. Give a Student Journal to each student.
3. Explain to students that they will work with their groups to write an equation for each option, complete the table, and graph both options on the grid provided on their Student Journals. Remind students to pay close attention to which option is y_1 and which option is

y_2. Students will analyze the data and answer the questions that follow.

4. As students collaborate, monitor their work and use the following guiding questions to assess student understanding:
   a. **DOK-1** How did you determine the equation for each option? The car wash is a one-time fee, so it would not have a variable attached. The price per gallon has a variable because the number of gallons will change the cost of that item.
   b. **DOK-2** Explain your process for completing the table and graphing each option. Answers will vary. Some students may graph using the slope and *y*-intercept and then complete the table by reading coordinates from the graph. Others may substitute values into the equations to complete the table and then plot those ordered pairs on the graph.
5. Allow students enough time to complete Part I and answer the questions that follow.
6. After completing Part I, invite the class to a Math Chat to share their observations and learning thus far.

Math Chat	
Questions	**Sample Student Responses**
DOK-1 What is the intersection of these two lines, and what does that ordered pair mean in terms of the scenario?	The intersection is (10, 25). The intersection represents the point at which the cost for the same amount of gas would be the same for both options. For 10 gallons of gas, it will cost $25 for both options.
DOK-1 Where does that intersection fall on the table?	It is not listed on the table, but it is between points that are listed (in between $x = 8$ and $x = 12$).
DOK-1 Analyze the table. What patterns do you notice with the *y* values of each option before and after the intersection?	When x is less than or equal to 8, y_1 values are larger than y_2. When x is greater than or equal to 12, y_2 values are larger than y_1. The intersection must fall in between $x = 8$ and $x = 12$.
DOK-2 How could you use the *y* values from the table to help determine the intersection?	If I know the intersection is between $x = 8$ and $x = 12$, I can choose values for x to substitute into each equation to see if the outputs are equal.
Explain the following to the class: *When you are working with two or more linear equations simultaneously, mathematicians call this a system of equations. The point of intersection is called the solution because it satisfies both equations simultaneously.*	

Part II

1. Read the following scenario to the class: *Just down the street there is an intersection with a gas station on each corner. Now you really have options! Analyze the data to determine which gas station options would be better deals than Gas Galore if you only need 12 gallons of gas. Also, determine at what cost and for what amount of gas both gas stations will be the same.*
2. Give a set of Gas Station Options Cards to each group of students.
3. Each group should still have their Student Journals and should turn to Part II.
4. Explain to students that they will work with their groups to analyze the other gas station options, write an equation, create a sketch, and fill in the table. They will compare each option to Gas Galore to determine which gas station would be the best choice for purchasing 12 gallons of gas. Students will also identify the intersection of each pair of equations and determine what that means in the scenario.
5. Point out to the class that since we decided getting the car wash would be the better option, we will use that equation as the comparison for Gas Galore's station (y_1 from Part I).
6. As students collaborate, monitor their work and use the following guiding questions to assess student understanding:

a. **DOK-2** Why are two equations referred to as a system of equations? When you are working with more than one equation simultaneously, mathematicians call this a system of equations.
b. **DOK-2** Why is the intersection referred to as the solution to the system? The intersection is the coordinate that satisfies both equations. If the intersection makes each equation true, then it is also the solution.
c. **DOK-2** How can you determine the intersection from the Fuel N' More table? I can see that both gas stations have the coordinate (2, 9) in the table. This means that (2, 9) is the intersection. This coordinate makes both equations true.
d. **DOK-2** When you have a system of equations, how can you check if your solution is correct? You could look for the point of intersection on the graph and find a point in common on the table of each equation. You could also substitute the point into both equations and check that it makes both equations true.
e. **DOK-2** Does a system of equations have to have an intersection? Explain. No, the graphs of the equations could be parallel and they would never intersect. The graphs of the equations could also be on top of each other, meaning that they are the same line. This would also not have a point of intersection.

7. Allow students enough time to complete Part II and answer the questions that follow.
8. After the Explore, invite the class to a Math Chat to share their observations and learning.

Math Chat	
Questions	**Sample Student Responses**
DOK-1 How did you determine which options were better than Gas Galore?	I looked at the graph or table to determine which options were cheaper at 12 gallons of gas.
DOK-1 What did you notice about the graphs of Fuel N' More and Gas and Go?	Both of these graphs contained one point of intersection.
Explain the following to the class: *If the graph of a system of equations contains one intersection, there is one solution to this system.*	
DOK-2 What did you notice about the graphs, equations, and table for Gas 'Er Up and Gas Galore?	These two lines were parallel, meaning they had no point of intersection. The equations had the same slope. The *y* values for Gas Galore were always lower than the *y* values for Gas 'Er Up.
Explain the following to the class: *If the graph of a system of equations contains parallel lines, there are no solutions to this system.*	
DOK-2 What did you notice about the graphs, equations, and table for Fillin' Station and Gas Galore?	These two lines were on top of each other, meaning they were the same. The equations were exactly the same, with the same slope and *y*-intercept. Both *y* columns of the table were exactly the same.
Explain the following to the class: *If the graph of a system of equations contains lines that are on top of each other or are the same, there are infinite solutions to this system.*	
DOK-2 How can we use the table to approximate the solution?	Identify where the *y* value pattern switches, then use in-between numbers to substitute into the equations and check for the outputs to be the same.

9. When students are done, have them complete the Exit Ticket to formatively assess their understanding of the concept.

Anchor Chart and Interactive Notebook

- Be sure to complete the Anchor Chart as a class. Once the class has completed the Anchor Chart, have each student complete their Interactive Notebook.

Explore

Name:_____ Date:_____

To Wash or Not to Wash?

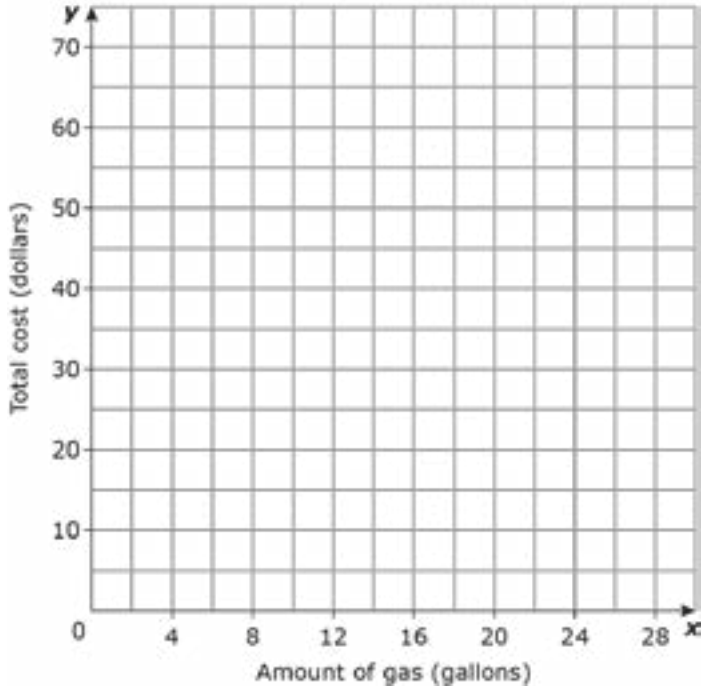
Part I

Use the information about the Gas Galore special to write equations, complete the table, and graph both options on the grid provided. Once completed, analyze the data and answer the questions that follow.

Cost of gas with a car wash: y_1 = _____

Cost of gas without a car wash: y_2 = _____

x	y_1	y_2
0		
4		
8		
12		
16		
20		
24		
28		



1. If you need 24 gallons of gas, would you get the car wash? Explain.

2. Which option would you choose if you needed 10 gallons of gas? Why?

Explore

Part II

For each gas station option, write an equation, sketch the line, and complete the table. Compare each gas station option to the Gas Galore data provided below to determine which gas station would be a better option if you need 12 gallons of gas.

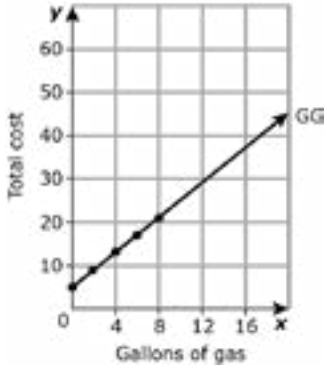
Gas Galore or Fuel N' More

Gas Galore equation

$y = 2x + 5$

Fuel N' More equation:

Sketch



Table

x	GG	FNM
0	5	
2	9	
4	13	
6	17	
8	21	

a. Which gas station is cheaper for 12 gallons of gas?
b. At what cost and amount of gas will both gas stations be the same?

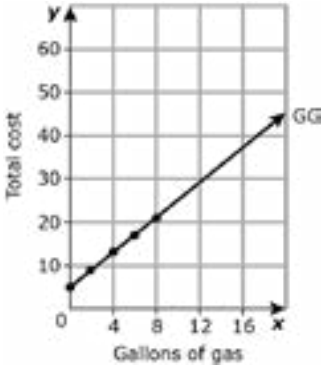
Gas Galore or Fillin' Station

Gas Galore equation

$y = 2x + 5$

Fillin' Station equation:

Sketch



Table

x	GG	FS
0	5	
2	9	
4	13	
6	17	
8	21	

a. Which gas station is cheaper for 12 gallons of gas?
b. At what cost and amount of gas will both gas stations be the same?

Explore

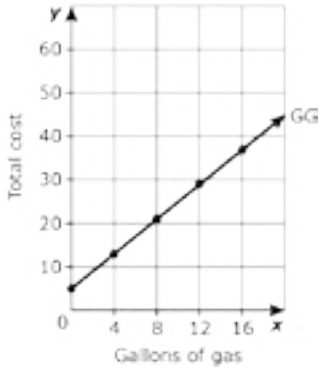
Gas Galore or Gas 'Er Up

Gas Galore equation

$y = 2x + 5$

Gas 'Er Up equation:

Sketch



Table

x	GG	GEU
0	5	
4	13	
8	21	
12	29	
16	37	

a. Which gas station is cheaper for 12 gallons of gas?
b. At what cost and amount of gas will both gas stations be the same?

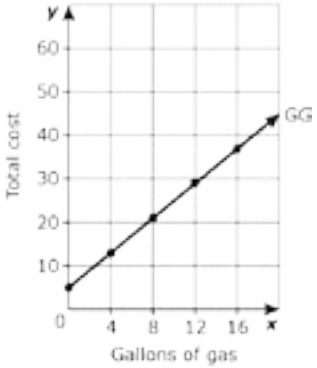
Gas Galore or Gas and Go

Gas Galore equation

$y = 2x + 5$

Gas and Go equation:

Sketch



Table

x	GG	G and G
0	5	
4	13	
8	21	
12	29	
16	37	

a. Which gas station is cheaper for 12 gallons of gas?
b. At what cost and amount of gas will both gas stations be the same?

Explore

Reflect

1. Did every pair of equations have one intersection? Explain.

2. Is it possible for a system of linear equations to have exactly two solutions? Why or why not?

3. How can you identify the intersection of a system of equations from a table?

4. How can you use a table to approximate the solution to a system of equations?

5. Design a pair of linear equations whose graphs never intersect.

y_1 = _____

y_2 = _____

Explore

Gas Station Options Cards

Fuel N' More

At Fuel N' More, you can purchase gas for $3 per gallon when you purchase a loaded hot dog for $3.

Fillin' Station

At the Fillin' Station, you can purchase gas for $2 per gallon when you buy two drinks that cost $2.50 each.

Gas 'Er Up

At Gas 'Er Up, you can purchase gas for $2 per gallon when you buy the following snacks: chips for $2.50, candy for $1.50, and a slushy for $3.

Gas and Go

At Gas and Go, you can purchase gas for $1.50 per gallon when you buy an ice cream dream cone for $4, a sandwich for $3, and a Mega Melt for $3.

Explore

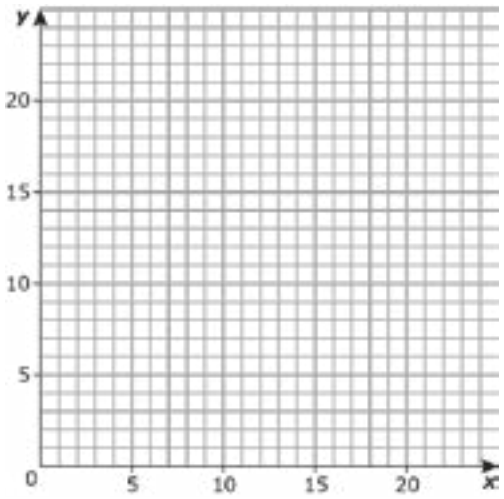
Systems of Equations
Explore 1

Name:_____ Date:_____

Solve Systems Using Graphs and Tables
Exit Ticket

1. Identify the solution to the system shown. Show the solution on the graph and on the table.

$y_1 = 3x + 9$
$y_2 = 4x + 7$



x	y_1	y_2
0		
1		
2		
3		

Different systems of equations are represented in the tables in questions 2–4. Identify the number of solutions for each system, and explain your reasoning.

2.

x	y_1	y_2
0	1	−2
1	2	0
2	3	2
3	4	4

3.

x	y_1	y_2
−1	5	5
0	7	7
1	9	9
2	11	11

4.

x	y_1	y_2
−5	2	4
−4	4	6
−3	6	8
−2	8	10

Systems of Equations

Fluency Builder - Coordinate Match

Description

In this activity, students will play a game of Coordinate Match.

Materials

Printed

1 Coordinate Match Instruction Sheet (per pair)

1 Set of Coordinate Match Cards (per pair)

Reusable

1 Envelope or bag (per pair)

Consumable

1 Sheet of notebook paper

Preparation

- Make double-sided copies of the Coordinate Match Cards.
- Laminate the cards for durability.
- Cut out individual cards, and place them in an envelope or bag for easy distribution and cleanup.
- Put students in pairs.

Procedure and Facilitation Points

1. Show students how to shuffle the cards and place them facedown in a 4 × 6 array.
2. Model playing the game with a student.
    a. Player 1 flips over two cards to try to find a match.
    b. If player 1 matches a card with an ordered pair to a corresponding description of the coordinate location, then the player keeps the matched set. All locations start from the origin.
    c. If player 1 does not find a match, then they place the turned cards facedown again, and it is the next player's turn.
    d. Players continue taking turns until all of the matches have been found.
    e. The player who collects the most cards wins.
3. Distribute materials.
4. Monitor students to make sure they find accurate matches and record their work on notebook paper.

Fluency Builder

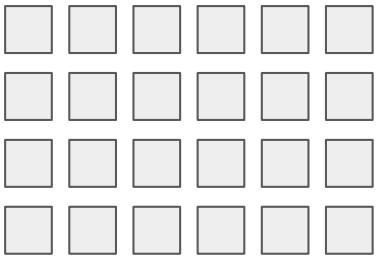
Coordinate Match

Play this game with a partner.

You Will Need
1 Set of Coordinate Match Cards (per pair)

How to Play

1. Shuffle the cards, and place them facedown to form a 4 × 6 array.



2. Player 1 flips over two cards to try to find a match.
3. If player 1 matches a card with an ordered pair to a corresponding description of the coordinate location, then the player keeps the matched set. All locations start from the origin.
4. If player 1 does not find a match, then they place the turned cards facedown again, and it is the next player's turn.
5. Players continue taking turns until all of the matches have been found.
6. The player who collects the most cards wins.

Fluency Builder

Coordinate Match
(Front of Page 1)

Kevin and Maria sold flowers for a school fundraiser. Kevin sold 13 wildflowers, w, and 5 daffodils, d, for a total of \$77. Maria sold 8 wildflowers, w, and 6 daffodils, d, for a total of \$62. What was the cost of each wildflower and daffodil? Write the solution as an ordered pair, (w, d).	(4, 5)
Solve by using any method. $3y - 7x = -15$ $y = \frac{7}{3}x + 12$	No solution
Solve by using any method. $y = 3x + 8$ $-6x + 2y = 16$	Infinitely many solutions

Fluency Builder

Coordinate Match (Back of Page 1)

Systems of Equations

Systems of Equations

Systems of Equations

Systems of Equations

Systems of Equations

Systems of Equations

Fluency Builder

Coordinate Match
(Front of Page 2)

Solve by using substitution or elimination. $y = -4 + x$ $x + y = 6$	(5, 1)
Solve by using substitution or elimination. $3x + 4y = 18$ $x - 2y = -4$	(2, 3)
Solve by using any method. $y = 5$ $x = -6$	(−6, 5)

Systems of Equations

Fluency Builder

Coordinate Match (Back of Page 2)

Systems of Equations

Systems of Equations

Systems of Equations

Systems of Equations

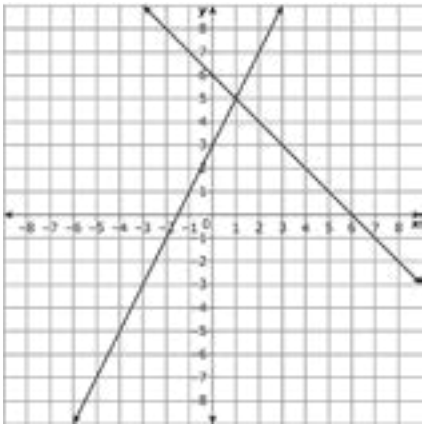
Systems of Equations

Systems of Equations

Fluency Builder

Coordinate Match
(Front of Page 3)

What is the solution to the graphed system of equations?



(1, 5)

The middle school sold 22 tickets to the school play. The total amount collected was $760. Adult tickets, *a*, were $30 each, and student tickets, *s*, were $40 each. How many of each were sold? Write the solution as an ordered pair, (*a*, *s*).

(12, 10)

What is the solution to the system of equations represented in the tables below?

x	0	5	10	15
***a*(*x*)**	−6	−3	0	3

x	−5	−10	−15	−20
***b*(*x*)**	−3	0	3	6

(0, −6)

Systems of Equations

Fluency Builder

Coordinate Match (Back of Page 3)

Systems of Equations

Systems of Equations

Systems of Equations

Systems of Equations

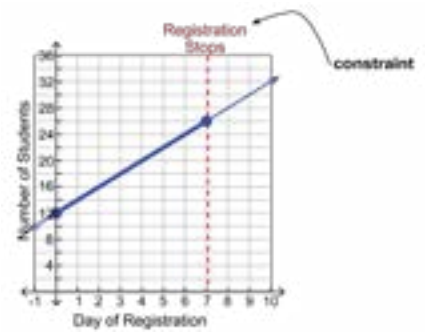
Systems of Equations

Systems of Equations

Systems of Equations

Picture Vocabulary

Constraint



A condition that the solution must satisfy

Less Than

<

Smaller than another (e.g., 432 < 501)

Greater Than

>

More than another (e.g., 49 > 12)

Solution Set

$4x + 12 > -4$

$x > -4$

Solution Set: any number greater than −4

A set of numbers that makes an inequality statement true

Inequality Notation

$x < 6$ $\quad -10 < b$

$a \leq 3$ or $a > 5$

$-2 < y < 7$ $\quad x > 12$

Notation in which the solution is represented by an inequality statement

Less Than or Equal To

Smaller than or the same as another

Greater Than or Equal To

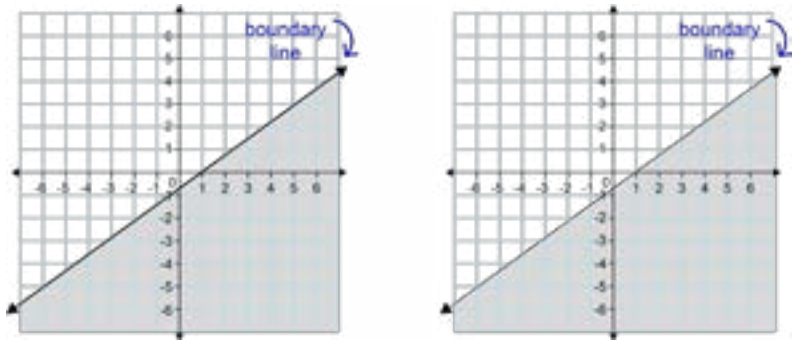
More than or the same as another

Inequality Phrase

≤	<	≥	>
At most, no more than, maximum	Fewer than, below, under	At least, no less than, exceeds	More than, above, exceeds

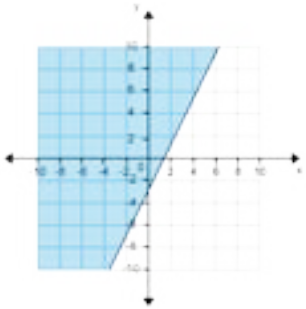
Phrase representing each of the inequalities

Boundary Line



A line that corresponds to the function that divides the coordinate plane into two halves

Half-Plane



A planar region consisting of all points on one side of an infinite straight line, and no points on the other side

Strict Inequality

< less than

> greater than

An inequality that has no equality conditions; the strict inequality is either greater than or less than.

WHAT IS ACCELERATION?

Are your students ready to go above and beyond what they've just learned? In Acceleration, students can engage in a design challenge or relate what they're learning to current events around the world—activities that prompt them to think more deeply about the content and its applications.

Choice Board Activity

DESCRIPTION

Students will explore real-world connections and applications of math content through interactions with engaging activities.

MATERIALS

PRINTED

- 1 Choice Board (per student)
- 1 Set of Activity Handouts (per student)
- 1 Choice Board Self-Assessment (per student)

REUSABLE

- Technology (if applicable)

PREPARATION

- Print a Choice Board and a set of Activity Handouts for each student.
- Print a Choice Board Self-Assessment for each student.
- Plan ahead for technology use. Research may be required for some activities on the Choice Board.

PROCEDURE AND FACILITATION POINTS

1. Distribute a Choice Board to each student.
2. Allow students time to examine the Choice Board and select the activities they would like to explore.
3. Encourage students to attempt at least three activities.
4. Distribute the appropriate Activity Handouts according to students' choices.
5. Upon completion of each Choice Board activity, have students complete a Choice Board Self-Assessment to evaluate their own mathematical thinking and efforts on their project.

Choice Board

Name:_____ Date:_____

Systems of Equations

Choose one or more extension activities from the table below.

Career Connection ## Budget Analyst Research the career field of budget analysis. You must answer the provided questions. Create a presentation to relay your research to the class.	**Arts Connection** ## Stick-Figure Dance Create systems of equations by graphing. Then, create a second set to have a stick-figure dance.
Science Connection ## Boat Trip Explore the connection between math and science by solving the system of equations to find the speed of a boat and the speed of the current.	**Kitchen Connection** ## Trail-Mix Recipe Systems of equations can be used when reading recipes to make foods, like trail mix. Read the scenarios, and answer the questions on the handout.
Mathematician Spotlight ## Carl Friedrich Gauss Search for several news articles or research papers that involve Carl Friedrich Gauss's work. Create an informational poster, a diorama, or a speech to convey this mathematician's work as it relates to systems of equations.	**Financial Connection** ## Making Investments We use math every day in our financial world. Explore how our current math topic connects to our financial world by completing the handout.

Systems of Equations

Choice Board

Name:_____ Date:_____

Career Connection

Research the career field listed on the Choice Board. Your research must answer the following questions:

1. List the career you are researching.
2. Describe the career listed above.
3. What materials does someone with this career work with?
4. Where would a person in this field do most of their work?
5. What training/education is required to enter this field?
6. What does the average day on the job look like for someone with this career?
7. How does this career connect to the math you are currently studying?
8. List several other career fields that someone doing this job interacts with on a daily basis.
9. Is this a career you are interested in? Find out more by interviewing someone with this career in your area and researching on the internet.
10. What 21st century skills listed below could be used with this career? Identify at least one skill that people in this career field use, and explain why the skill is important, according to your research.

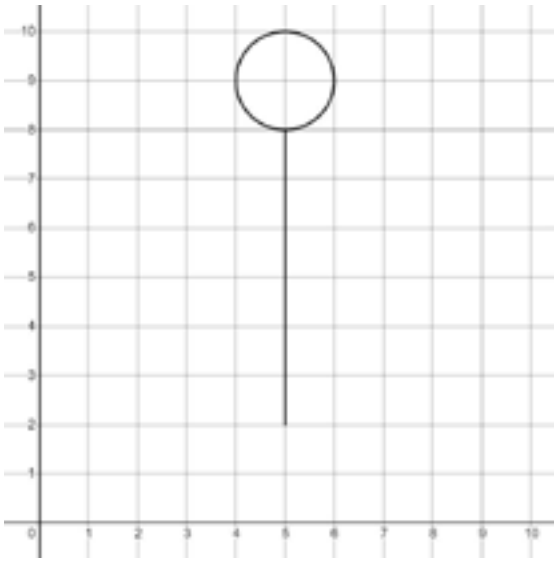
    - Collaboration
    - Creativity and innovation
    - Critical thinking and problem solving
    - Communication
    - Technology literacy
    - Flexibility
    - Leadership

Choice Board

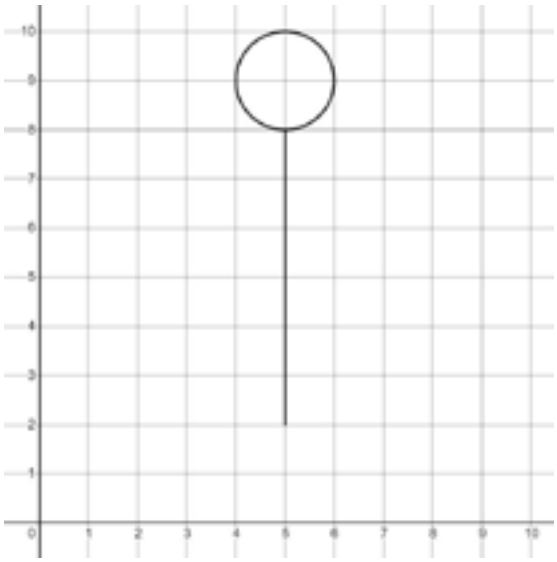
Name:_____ Date:_____

Arts Connection

Digital artists have to input codes for programming in order to create the media we consume. Using systems of equations, create arms and legs for the stick figure. Then, create a second set in a different position to show the stick figure's dance move.



Original arms and legs:



Dancing arms and legs:

Systems of Equations

Choice Board

Name:_____ Date:_____

Science Connection

A boat traveled 160 miles downstream and back. The trip downstream took five hours. The trip going upstream took eight hours. Set up a system of equations to find the speed of the boat in still water (x) and the speed of the current (y).

Here are some helpful hints:

- Distance = rate of speed · time.
- Downstream means going faster with the current.
- Upstream means going slower against the current.

1. Write the system of equations that goes along with this scenario.

2. Use either substitution or elimination to solve the system of equations. Show all of your work.

3. What was the speed of the boat in still water?

4. What was the speed of the current?

Choice Board

Name:_____ Date:_____

Kitchen Connection

Taylor has a hiking trip planned for this weekend. Taylor has 3 kilograms of trail mix that is a combination of peanuts and raisins for a snack on the hike. The peanuts cost $4.25 per kilogram, and the raisins cost $3.50 per kilogram. The whole mix costs $12 to make.

1. Write a system of equations to represent this scenario. Solve the system using elimination.

   _____ kilograms of peanuts and _____ kilograms of raisins were used to make this mix.

Taylor decided to change the trail mix by using cashews instead of peanuts. The cashews cost $0.50 more per kilogram than the peanuts. She still wanted to make 3 kilograms of the trail mix and wanted to keep the total cost of the mix at $12.

2. Write a system of equations to represent this scenario. Solve the system using elimination.

   _____ kilograms of cashews and _____ kilograms of raisins were needed to make this mix.

Systems of Equations

Choice Board

Name:_____ Date:_____

Financial Connection

Danielle invests money into two stocks: the stock of a small education company grows by 10%; the large technology company's stock falls by 5%. At the start of the year, the stocks have a combined value of $500. When Danielle checks at the end of the year, the stocks have a combined value of $520.

1. Write a system of equations to represent this scenario. Be sure to define both variables.

2. Solve the system of equations that you created in question 1. How much money was invested into each stock at the start of the year?

3. How much value does each stock have at the end of the year?

4. Check your solution by graphing your system of equations, or solve using a different method. Which approach was the easiest for solving this system? Explain why.

Choice Board

Name:_____ Date:_____

Choice Board Self-Assessment

Rank yourself on the statements below.

1. I successfully completed the task(s).

2. The work led me to learn deeper about the content.

3. This work represents my best effort.

4. Identify at least one struggle you encountered during your extension activity.

5. What part of your project are you most proud of?

6. If given the opportunity to complete a similar task in the future, what would you do the same and what would you do differently?

Teacher Feedback

Would You Rather Activity

DESCRIPTION

Would You Rather is an enriching activity in which students use mathematical reasoning and creativity to justify their answers.

MATERIALS

PRINTED

- 1 Student Handout (per student)
- 1 Rubric (for the teacher)

PREPARATION

- Print one copy of the Student Handout per student
- Plan to put students in pairs if desired

PROCEDURE AND FACILITATION POINTS

1. Distribute a Student Handout to each student.
2. Encourage students to look back at the Student Journals from the Explore activities if they need to review the skills they have learned.
3. Invite students to share their answers and justification with partners.

Systems of Equations

Would You Rather - Pocket Money

Description

Would You Rather is an enriching activity for students to use mathematical reasoning and creativity to justify an answer.

Materials

Printed
1 Student Handout (per student)
1 Rubric (for the teacher)

Preparation

- Print one copy of the Student Handout per student.
- Place students in pairs if desired.

Procedure and Facilitation Points

1. Distribute a Student Handout to each student.
2. Encourage students to look back at their Student Journals from the Explore activities if they need to review the skills they have learned.
3. Invite students to share their answers and justifications with a partner.

Use mathematical reasoning and creativity to justify your answer to the Would You Rather question.

Honyu has $25 in his pocket, consisting of 24 bills or coins. Some are $5 bills, and some are quarters. Cici has $20 in her pocket, consisting of 21 bills or coins. Some are $1 bills, and some are half-dollars ($0.50 each). **Would you rather** carry Honyu's or Cici's money in your pocket over the course of the day? Justify your reasoning with mathematics.

ANSWER

For Honyu, $5B + .25Q = 25$ and $B + Q = 24$, where B is $5 bills and Q is quarters. This means Honyu has 4 $5 bills and 20 quarters.
For Cici, $B + 0.5H = \$20$ and $B + H = 21$, where B is $1 bills and H is half-dollars. This means Cici has 19 $1 bills and 2 half-dollars.

The following statements are sample answers: I would prefer to be Honyu because he has more coins in his pocket, and I like to hear them jingle as I walk. I'm also headed to a gaming arcade where quarters are needed.

I would prefer to be Cici because dollar bills are much lighter in weight than coins, and I don't want to have to carry around so much weight over the course of the day.

Systems of Inequalities

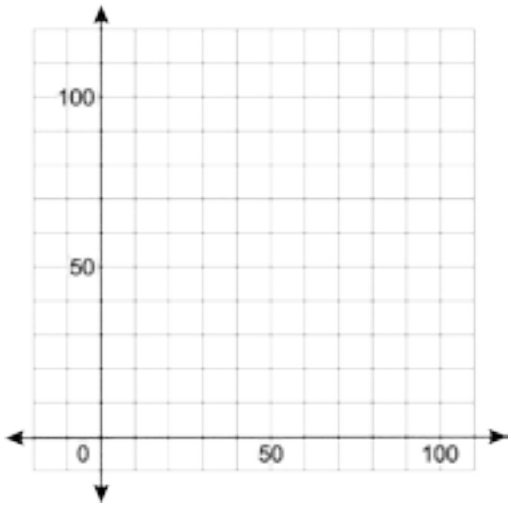
Would You Rather

Name:_____ Date:_____

Car Wash Fundraiser

Use mathematical reasoning and creativity to justify your answer to the Would You Rather question.

Eighth graders have decided to run a carwash fundraiser to buy some new computers for their school. They want to make at least $1,000. For customers who have prepaid, they are charging $15. For customers who come and pay on the day of the fundraiser, they are charging $20. The students expect to be able to wash a maximum of 100 cars based on supplies and their location. If 40 customers have prepaid, and it is still several days before the event, **would you rather** promote getting more prepaid customers or just wait until the day of the fundraiser and hope enough people come? Justify your reasoning with mathematics and the graph provided.



Would You Rather

Rubric

	Understanding	Computation	Reasoning
1	The student does not understand what the problem is asking them to do. They do not address the problem, and the strategies are not appropriate for the problem.	The student does not solve the problem correctly. They do not support their answer with work.	The student does not support their reasoning. They do not use mathematical language.
2	The student understands what some of the problem is asking them to do. They address most parts of the problem. Strategies used to solve the problem are somewhat appropriate.	The student solves some parts of the problem but may make some mistakes. They support some of their answer with work.	The student somewhat supports their reasoning with some mistakes. They use some mathematical language, with a few mistakes.
3	The student fully understands what the problem is asking them to do. They address all parts of the problem and are able to employ strategies to resolve the problem.	The student solves all parts of the problem correctly and is able to support their answer with work.	The student clearly and accurately supports the reasoning behind their answer. They use accurate mathematical language consistently.

WHAT IS DAILY NUMERACY?

The goal of Daily Numeracy is to empower students to reason with numbers in an accurate, efficient, and flexible way. We have included a carefully crafted, purposeful activity sample designed to help students build their thinking and reasoning around relationships and connections. Each grade level has numerous Daily Numeracy activities.

Week 1 Mini-Lesson

DESCRIPTION

Students reason with numbers in an accurate, efficient, and flexible way through purposeful activities designed to help students build their thinking and reasoning around relationships and connections.

MATERIALS

PRINTED

- 1 Weekly Slideshow (per class)
- 1 Set of Number Cards (per class) *for Blank Number Line activity

REUSABLE

- 1 Projector or document camera (per class)
- 1 Marker (per class)* for Solve It!activity
- 1 Blank number line (per class) for Blank Number Line activity

CONSUMABLE

- 1 Piece of chart paper (per class)* for Solve It! activity

PREPARATION

- Prepare to project the slideshow prompt of the day to each class.

Solve It! Activity:

- Gather a piece of chart paper and a marker to document student responses.

Blank Number Line Activity:

- Prepare a blank number line to be reused throughout the year. Examples include painters tape on a board, string that is hung by using magnets, or duct tape on laminated poster board.
- Print and cut the Number Cards according to the slide being used in class.

PROCEDURE AND FACILITATION POINTS

1. Project the slideshow prompt of the day. Students should not have anything with them for this activity.
2. Give students a minute of silent time as they look at the prompt. Ask students relevant guiding questions. Sample questions are shown in the table below by activity.
3. Accept multiple student responses if their reasoning is accurate. *For the Solve It! activity, call on students to give out answers only. Record student answers on chart paper.
4. As students discuss their responses, ask the class if they agree or disagree, and provide sentence stems for responses.
    a. I agree because . . .
    b. I disagree because . . .
    c. Can you explain why you . . . ?

Solve It! Activity:

5. Students solve equations or word problems by using mental math and other number-sense strategies. Guiding Questions:
    a. Explain the strategy used to get your answer.
    b. Is there a different strategy we could use?
    c. How are these strategies similar? How are they different?

Blank Number Line Activity:

6. Students place rational numbers on an open number line, and they discuss the relationships between the placements. Guiding Questions:
    a. Why did you place your number on that spot?
    b. What is the distance between those two numbers?
    c. Is your number closer to _____ or _____?
    d. Do you need to move any other numbers to place your number?
    e. What do you know about those numbers?
    f. What if I placed these two benchmark numbers on the number line? How would the distance or order of the numbers change?

Not Like the Others Activity:

7. Students describe the characteristics of an object in a set of four or more, and they discuss how it is different from the others. Guiding Questions:
    a. What do you notice?
    b. Which one is not like the others?
    c. What characteristic makes it different?
    d. How are these objects similar?
    e. Do you see another object that is not like the others?

Math Mystery Activity:

8. Guiding Questions:
    a. What do you notice?
    b. How does each clue help you determine the mystery number?
    c. Which clue helped you narrow down your options?
    d. How does a number range help you determine the mystery number?

Same and Different Activity:

9. Students describe how two objects are the same but different, and they discuss the reasoning behind their responses. Guiding Questions:
    a. What do you notice?
    b. How are these two _____ the same, but different?
    c. What characteristics helped you decide that they were the same and different?
    d. Can you think of another way in which they are the same and different?

$$-17 - (-9)$$

Daily Numeracy

Day 2
Blank Number Line

-1	2	-3
0	Half of 5	Opposite of -3

-1	1^2
$\lvert -1 \rvert$	0

Daily Numeracy

Day 4 Slide 1
Math Mystery

Clue 1

Clue 2

Clue 3

Clue 4

Clue 1
The number is divisible by 5.

Clue 2

Clue 3

Clue 4

Clue 1
The number is divisible by 5.

Clue 2
The number is greater than 50.

Clue 3

Clue 4

Clue 1
The number is divisible by 5.

Clue 2
The number is greater than 50.

Clue 3
The number is less than 100.

Clue 4

Clue 1
The number is divisible by 5.

Clue 2
The number is greater than 50.

Clue 3
The number is less than 100.

Clue 4
The number is one more than a perfect square.

The number is ...

65

$y = 12.5x$	The cost for 22 students to attend the museum was $275.

WHAT IS MATHEMATICAL FLUENCY?

In order for students to be successful as they progress into upper grades, they need to have a solid understanding of the concepts of addition and subtraction, and they also need to be fluent in the thinking strategies necessary for solving such facts. As you use the STEMscopes Math program, you will come to see how your students are starting to rely on their thinking skills and strategies as opposed to their fingers or skip-counting methods. Each grade level has numerous Mathematical Fluency activities.

Operations with Fractions: Subtracting: Mixed Numbers and Improper Fractions Lesson Instructions

DESCRIPTION

In this triangle puzzle activity, students use their understanding of operations with fractions to calculate expressions and match them with corresponding solutions.

MATERIALS

PRINTED

- 1 Triangle Puzzle Instruction Sheet (per pair)
- 1 Triangle Puzzle (per pair)

CONSUMABLE

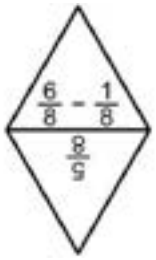
- Tape or glue
- 1 Blank piece of paper (per pair)
- Scrap paper

PREPARATION

Arrange students in pairs. Print a Triangle Puzzle Instruction Sheet and Triangle Puzzle for each pair.

PROCEDURE AND FACILITATION POINTS

1. Have students work together to cut out all of the triangle puzzle pieces and arrange them faceup on the table.
2. Have students work together to solve expressions and find a matched solution.
3. Each expression is matched with a solution on a different puzzle piece. When a match is found, the triangles are arranged so that the matched expression is opposite and upside down from its solution.

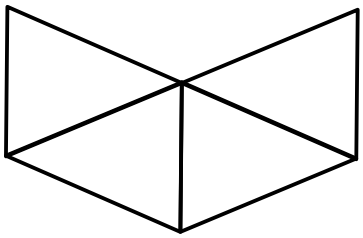


4. Some pieces may share the same solution, but a match is only formed if all 3 sides of each piece correspond to the adjacent sides.
5. When both students agree that all of the pieces have been matched, have students tape or glue the pieces onto the blank paper. Students should glue each piece separately to ensure proper orientation and alignment.
6. Monitor students as they work to ensure that they are following instructions, and assist with computation as needed.
7. Refer to the answer key to check student answers.

Mathematical Fluency

Triangle Puzzle Instruction Sheet

Solve this puzzle with a partner.

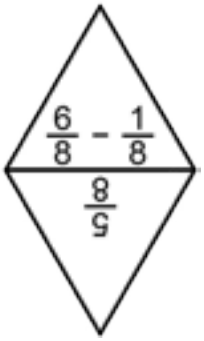


You Will Need

1 Triangle Puzzle (per pair)
1 Piece of blank paper (per pair)

How to Solve

1. Work together to cut out all of the triangle puzzle pieces and arrange them faceup on the table.
2. Work together to solve expressions and find a matched solution.
3. Each expression is matched with a solution on a different puzzle piece. When a match is found, the triangles are arranged so that the matched expression is opposite and upside down from its solution.

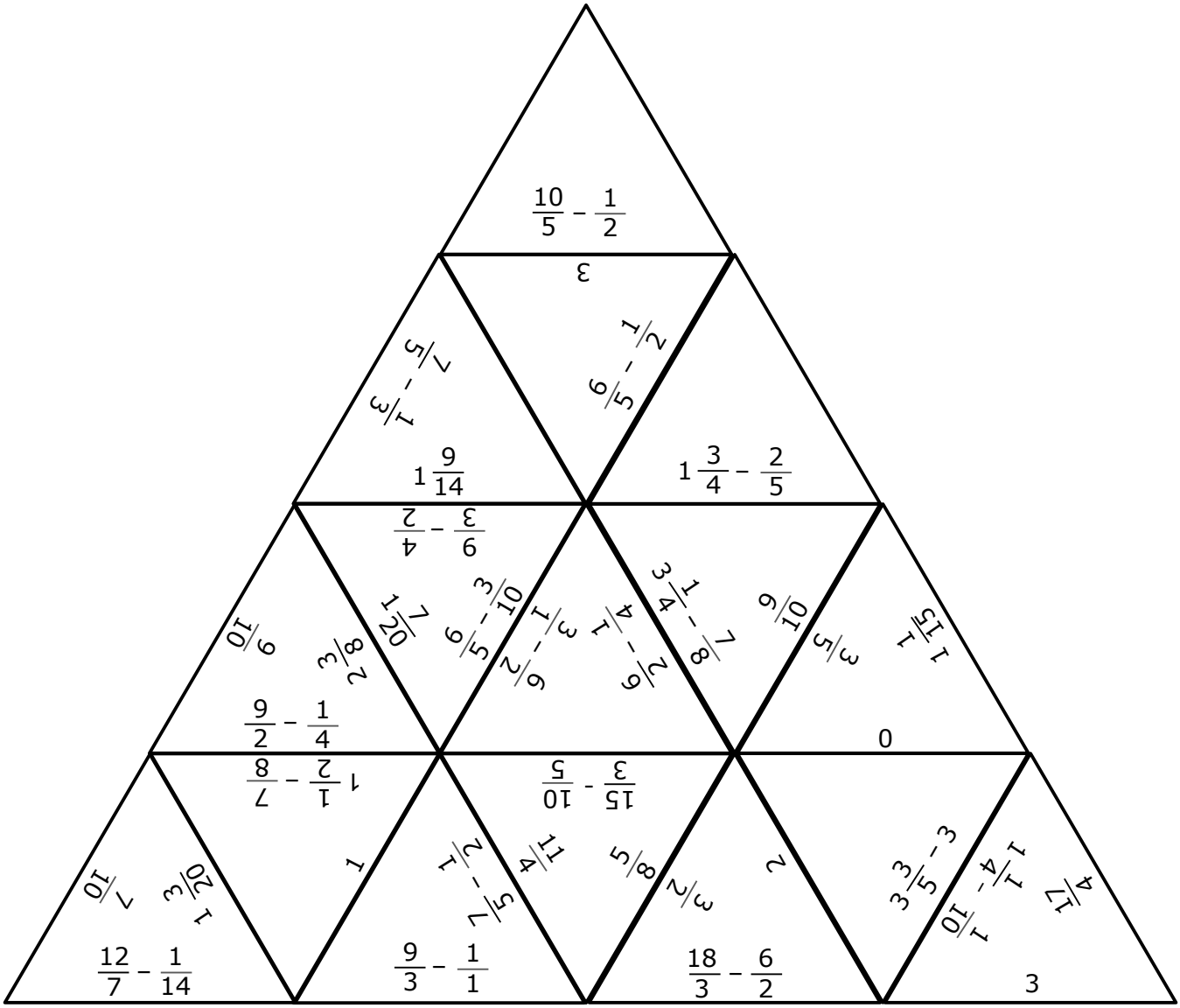


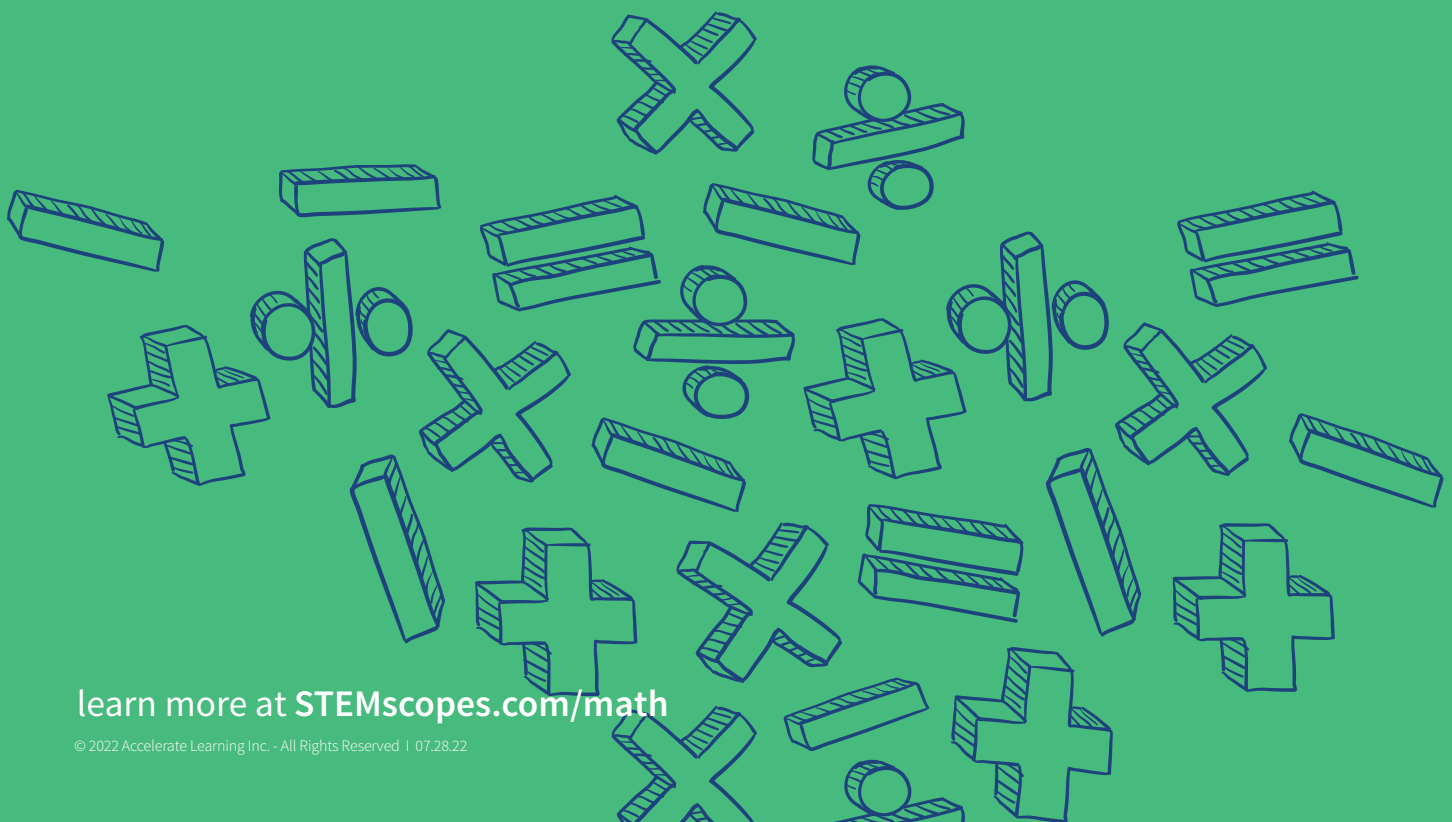
4. Some pieces may share the same solution, but a match is only formed if all 3 sides of each piece correspond to the adjacent sides.
5. When you both agree that all of the pieces have been matched, tape or glue the pieces onto blank paper. Glue each piece separately to ensure proper orientation and alignment.

Mathematical Fluency
Operations with Fractions
Subtracting Mixed Numbers and Improper Fractions

Mathematical Fluency

Triangle Puzzle





learn more at **STEMscopes.com/math**