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UNIT BACKGROUND

Unit Title: Systems of Equations and Inequalities  
Subject/Topic: Algebra 1  
Key Words: Graphing, Substitution, Elimination  
Unit Designers: Emily and Paul  
Time Frame: 19 days  
School: Achievement First  

BRIEF SUMMARY

In this unit, students will understand that systems of equations and inequalities can be used to model the relationship between two real-world functions. Students will learn to solve these systems algebraically using two distinct strategies, and learn to recognize when one strategy might be more efficient than the other. Students will also represent the solution set to a system of linear inequalities in two variables in the coordinate plane. Systems of linear equations and inequalities will be used to model real-world situations, leading to algebraic solutions and in some cases estimates or predictions about future occurrences.

ENDURING UNDERSTANDINGS: What enduring understandings are desired?

1. Systems of linear equations can be used to model many types of real-world problems.

2. Systems of linear equations can be solved by graphing, substitution, or eliminating a variable.

3. The solution to a system of equations can be determined by graphing each equation and finding the intersection point of the graph, if one exists. The graphing method is best when you would like a visual display of the equations, or when you are looking to give an estimate.

4. The solution to a system of equations can be determined by solving one equation for one variable and then substituting the expression for that variable into the other equation. The substitution method is efficient when one equation is already solved for one of the variables, or when it is easy to solve for one of the variables.

5. The solution to a system of equations can be determined by adding or subtracting equations in a system to eliminate a variable. The elimination method is efficient when the coefficients of one variable are the same or opposites, or when it is not convenient to use graphing or substitution.

6. A linear inequality describes a region of the coordinate plane with a boundary line. Two or more inequalities form a system of inequalities. The system’s solutions lie where the graphs of the inequalities overlap.

7. Many real-world mathematical problems can be represented algebraically and graphically. A function that models a real-world situation can then be used to find algebraic solutions or make estimates and/or predictions about future occurrences.
**ESSENTIAL QUESTIONS:** What questions will guide this unit and focus learning and teaching?

Part 1: Systems of Equations
1. How can you solve a system of equations?
2. How do you determine which method is most appropriate and/or most efficient for solving a particular system of equations?
3. How can systems of equations model real-world situations?
4. How can systems of equations predict future behavior of real-world situations?

Part 2: Systems of Inequalities
1. How can you represent the solution set of a linear inequality and systems of linear inequalities?
2. How can systems of inequalities model real-world situations?
3. How can systems of inequalities predict future behavior of real-world situations?
4. How do the solution sets of linear equations and inequalities in two variables differ? How are these differences expressed graphically?

**FRAMING QUESTIONS:** What questions will be presented at the start of the unit and returned to as the unit progresses?

**Systems of Linear Equations:**
Your mother and you get into a heated debate about which cell phone to purchase for you for your Christmas present. Your mother sees a T-Mobile x90 for only $10 up front and then monthly payments of $45 (as long as you stay under 2000 minutes). She sees this as the smartest and cheapest option for you. However, you have your eyes set on a Sprint Blackberry5000 that is $140 up front and the $35 per month (as long as you stay under 2000) minutes. You insist that in the long run, your Blackberry5000 will be cheaper. She wants to know what “long run” means. You need to explain this to her using your Algebra skills.

**Systems of Linear Inequalities:**
You received a $100 gift certificate to a clothing store. The store sells T-shirts for $15 and dress shirts for $22. You want to spend no more than the amount of the gift certificate. You want to leave at most $10 of the gift certificate unspent. You need at least one dress shirt. What are all of the possible combinations of T-shirts and dress shirts you could buy?

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**DESIRED RESULTS**

<table>
<thead>
<tr>
<th>ID</th>
<th>Algebra 1 Standard</th>
<th>Purpose</th>
<th>Daily Aims</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:A18</td>
<td>Students will solve systems of two linear equations in two variables both algebraically and graphically and apply these techniques to solve practical problems. When appropriate, graphing calculators will be used as a tool to confirm an algebraic solution.</td>
<td>Determine if two linear equations that represent a real-world situation intersect within a specified domain.</td>
<td>SWBAT solve systems of equations in slope intercept form by graphing.</td>
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<td></td>
<td>SWBAT solve systems of equations NOT in slope intercept form by graphing.</td>
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<td></td>
<td>SWBAT analyze special systems that have no solutions or an infinite number of solutions.</td>
</tr>
<tr>
<td>7:A18</td>
<td>Use substitution to</td>
<td></td>
<td>SWBAT solve systems of equations using substitution.</td>
</tr>
<tr>
<td>ID</td>
<td>Algebra 1 Standard</td>
<td>Skill</td>
<td>Why students need these skills?</td>
</tr>
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<tr>
<td>2:A5</td>
<td>Students will solve multi-step linear equations in one variable, solve formulas for a given variable, and apply these skills to solve practical problems.</td>
<td>Solving Equations</td>
<td>Solving equations will be extended to systems of equations.</td>
</tr>
<tr>
<td>4:A9</td>
<td>Students will solve linear inequalities, graph the solution set and then apply these skills to solve practical problems.</td>
<td>Solving Inequalities</td>
<td>Students will graph and solve systems of linear inequalities.</td>
</tr>
<tr>
<td>5:A12</td>
<td>Students will create and use tabular, symbolic, graphical, verbal and physical representations to analyze a given set of data for the existence of a pattern, determine the domain and range of relations, and identify the relations that are functions.</td>
<td>Writing Functions</td>
<td>Students write functions to solve real-world systems of equations.</td>
</tr>
<tr>
<td>6:A17</td>
<td>Students will write, graph and compare linear equations in slope-intercept form, point-slop form and standard form.</td>
<td>Graphing Linear Equations</td>
<td>Students will solve systems of equations by graphing.</td>
</tr>
</tbody>
</table>
Formative Performance Tasks – Seminars, Projects, Presentations, etc.

Performance Task #1: Mixed Nuts

You want to sell 1-lb. jars of mixed peanuts and cashews for $5. You pay $3 per pound for peanuts and $6 per pound for cashews. You plan to combine 4 parts peanuts and 1 part cashews to make your mix. You have spent $70 on materials to get started. How many jars must you sell to break even?

Performance Task #2: Which car should Mr. Bostock buy?

Mr. Bostock is thinking of buying a new car. He has narrowed his choices to the Honda Civic Sedan and the Honda Civic hybrid. The Honda Civic Sedan only costs $16,500, but the Honda Civic hybrid costs $23,800. Of course Mr. Bostock needs to consider the long term costs of the car, especially the cost of gasoline. The Honda Civic Sedan only averages 29 mpg, while the hybrid version averages 43 mpg. Assume that gas costs $3.00 per gallon.

Mr. Bostock needs some mathematical advice to help him decide which car he should buy.

a. Write an equation to represent the long term cost of the Honda Civic Sedan as a function of the number of miles driven.

b. Write an equation to represent the long term cost of this Honda Civic Hybrid as a function of the number of miles driven.

c. Graph these two equations. Estimate the mileage when the Civic Hybrid becomes cheaper than the Civic sedan.

d. At which exact point does the Civic Hybrid become cheaper than the Civic Sedan?

e. About how many years would Mr. Bostock need to own the Civic Hybrid for it to be a better deal than the Civic Sedan? (Hint: you need to make an assumption. Make sure to justify your assumption).

f. Explain how an increase in the price of gasoline would affect the graph and your conclusion in part e.

Performance Task #3: Fourth of July Parade

A town is organizing a Fourth of July parade. There will be two sizes of floats in the parade. Floats will be either 30 feet or 15 feet long. A space of 10 feet will be left after each float.

a. The parade must be at least 150 ft long, but less than 200 feet long. What combinations of large and small floats are possible?

b. Large floats cost $600 to operate. Small floats cost $300 to operate. The town has a budget of $2,500 to operate the floats. How does this change your answer to part(a)? What combination of large and small floats are possible?

Summative Performance Tasks – Tests, Essays, etc.

Mid-Unit Assessment (attached)

7:A18 - Students will solve systems of two linear equations in two variables both algebraically and graphically and apply these techniques to solve practical problems. When appropriate, graphing calculators will be used as a tool to confirm an algebraic solution.

Unit Assessment (attached)

7:A18 - Students will solve systems of two linear equations in two variables both algebraically and graphically and apply these techniques to solve practical problems. When appropriate, graphing calculators will be used as a tool to confirm an algebraic solution.

7:A19 - Students will graph linear inequalities as well as write
and use linear inequalities when modeling real-world situations.

7:A20 - Students will solve systems of linear inequalities through graphing as well as model real-world situations using systems of linear inequalities.

Interim Assessment: The following questions are related to systems.

3. Which ordered pair is a solution of the system of equations shown in the graph below?
   A. (−3, 1)
   B. (−3, 5)
   C. (2, 0)
   D. (0, −4)

10. What is the solution of the system of equations \( c + 3d = 8 \) and \( c = 4d - 6 \)?
   A. \( c = -14, d = -2 \)
   B. \( c = -2, d = 2 \)
   C. \( c = 2, d = 2 \)
   D. \( c = 14, d = -2 \)

12. Which quadrant will be completely shaded in the graph of the inequality \( y \leq 2x \)?
   A. Quadrant I
   B. Quadrant II
   C. Quadrant III
   D. Quadrant IV

13. Which ordered pair is in the solution set of the system of linear inequalities graphed below?

14. Which ordered pair is in the solution set of the following system of linear inequalities?
   \( y < 2x + 2 \)
   \( y \geq -x - 1 \)
   A. (0, 3)
   B. (2, 0)
   C. (−1, 0)
   D. (−1, −4)

16. Julia went to the movies and bought one jumbo popcorn and two chocolate chip cookies for $5.00. Marvin went to the
same movie and bought one jumbo popcorn and four chocolate chip cookies for $6.00. How much does one chocolate chip cookie cost?
A. $0.50  
B. $0.75  
C. $1.00  
D. $2.00

18. What is the value of the y-coordinate of the solution to the system of equations  \(2x + y = 8\) and \(x - 3y = -3\)?
A. \(-2\)  
B. \(2\)  
C. \(3\)  
D. \(-3\)

20. Ralph spent $132 to buy movie tickets for 20 students and 4 adult chaperones. Adult tickets cost $3 more than student tickets. If \(A\) is the price of an adult ticket and \(S\) is the price of a student ticket, which system of equations could be used to find the price of each adult and student ticket?
A. \(\begin{cases} S = A + 3 \\ 4A + 20S = 132 \end{cases}\)
B. \(\begin{cases} A = S + 3 \\ 4A + 20S = 132 \end{cases}\)
C. \(\begin{cases} 20A + 4S = 132 \\ A = S + 3 \end{cases}\)
D. \(\begin{cases} 2S = 4A + 132 \\ 4A + S = 132 \end{cases}\)

21. What inequality does the graph represent?
A. \(y > \frac{1}{3}x + 4\)  
B. \(y \geq \frac{3}{4}x - 4\)  
C. \(y < \frac{3}{4}x - 1\)  
D. \(y < \frac{1}{3}x + 4\)

23. Tina has $220 in her account. Cliff has $100 in his account. Starting in July, Tina adds $25 to her account on the first of each month, while Cliff adds $35 to his. How many dollars will they have in their accounts when the amounts are the same? Show your work in the space below.

25. Graph the solution set for the inequality \(4x - 3y > 9\) on the set of axes below. Determine if the point \((1, -3)\) is in the solution set. Justify your answer.

Graph the following systems of inequalities on the set of axes shown below and shade the solution set.
\[y > -x + 2\]
\[y \leq \frac{2}{3}x + 5\]

26. Suppose you have a job in an ice cream shop that pays $6 per hour. You also have a babysitting job that pays $4 per hour. You want to earn at least $60 per week but would like to work no more than 12 hours per week.

a. Write a system of linear inequalities that describes this situation.
b. Give three possible solutions to the system.

COMMON MISCONCEPTIONS: What common misconceptions do students have?
<table>
<thead>
<tr>
<th>Misconception</th>
<th>Clarification</th>
</tr>
</thead>
<tbody>
<tr>
<td>In solving systems graphically, students may mistake a system with infinite</td>
<td>A. Infinite solutions occur when two equations have the same graph. All points that lie on the line</td>
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<tr>
<td>solutions for a system with no solutions.</td>
<td>are solutions to the system.</td>
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<td>B. If the graphs of the equations are parallel, then the system has no solutions because parallel</td>
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<td>lines will never intersect.</td>
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<td>When solving by substitution, students may substitute into the same equation</td>
<td>If when solving a system of equations using substitution, you get a result of $0 = 0$, this indicates</td>
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<td>they used to isolate the variable.</td>
<td>that you have substituted the expression into the wrong equation. Go back and substitute the</td>
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<td>expression into the second equation.</td>
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<tr>
<td>Students may attempt to solve a system of linear equations using a less</td>
<td><strong>Graphing</strong> – when you want a visual display of the equations or when you want to estimate a</td>
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<tr>
<td>efficient method.</td>
<td>solution.</td>
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<td></td>
<td><strong>Substitution</strong> – When one equation is already solved for one of the variables, or when it is easy</td>
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<td>to solve for one of the variables.</td>
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<td></td>
<td><strong>Elimination</strong> – When the coefficients of one variable are the same or opposites, or when it is</td>
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<td>not convenient to use graphing or substitution.</td>
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<tr>
<td>When students are graphing a system of inequalities, they might shade the</td>
<td>Testing a point to make sure that you have graphed the system of inequalities correctly can help you</td>
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<td>wrong side of the line.</td>
<td>to avoid this mistake. The origin is often a good point to use.</td>
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<tr>
<td>When students are graphing a system of inequalities, they might confuse</td>
<td>Each point on a <em>dashed</em> line is not a solution. A dashed line is used for inequalities with $&gt;$ or</td>
</tr>
<tr>
<td>whether the boundary line should be solid or dashed.</td>
<td>$&lt;$. Each point on a <em>solid</em> line is a solution. A solid line is used for inequalities with $\geq$ or</td>
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<td></td>
<td>$\leq$.</td>
</tr>
<tr>
<td>When students are graphing a system of inequalities, they might not know</td>
<td>If the point falls on a solid line (inequalities with $\geq$ or $\leq$) then that point IS IN the</td>
</tr>
<tr>
<td>what to do if a point falls ON one of the lines in the system.</td>
<td>solution set.</td>
</tr>
<tr>
<td></td>
<td>If the point falls on a dashed line (inequalities with $&gt;$ or $&lt;$) then that point IS NOT in the</td>
</tr>
<tr>
<td></td>
<td>solution set.</td>
</tr>
<tr>
<td>When students are graphing a system of inequalities whose graph forms a set</td>
<td>To find the solution to a system of linear <em>equations</em> we look for the intersection of the lines on</td>
</tr>
<tr>
<td>of parallel lines, they might assume that the system has no solution.</td>
<td>the graph. To find the solution to a system of linear <em>inequalities</em> we look for the intersection of</td>
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<tr>
<td></td>
<td>the two boundaries on the graph.</td>
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<tr>
<td></td>
<td>An system of linear inequalities whose graph forms a set of parallel lines may still have a solution</td>
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<td>set.</td>
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</tbody>
</table>
**SAT:** How are systems of equations and/or inequalities tested on the SAT?

1. A school ordered $600 worth of light bulbs. Some of the light bulbs cost $1 each and the others cost $2 each. If twice as many $1 bulbs as $2 bulbs were ordered, how many light bulbs were ordered altogether?

2. A restaurant has 19 tables that can seat a total of 84 people. Some of the tables seat 4 people and the others seat 5 people. How many tables seat 5 people?
   - A. 4   B. 5   C. 6   D. 7   E. 8

3. A four-digit integer, WXYZ, in which W, X, Y, and Z each represent a different digit, is formed according to the following rules.
   - 1. \( X = W + Y + Z \)
   - 2. \( W = Y + 1 \)
   - 3. \( Z = W - 5 \)

What is the four-digit integer?

4. If \( m = t^3 \) for any positive integer \( t \), and if \( w = m^2 + m \), what is \( w \) in terms of \( t \)?
   - A. \( t^2 + t \)   B. \( t^3 \)   C. \( t^3 + t \)   D. \( t^5 + t^3 \)   E. \( t^6 + t^3 \)

5. The square of \( x \) is equal to 4 times the square of \( y \). If \( x \) is 1 more than twice \( y \), what is the value of \( x \)?
   - A. -4   B. -1/2   C. -1/4   D. \( 1/4 \)   E. \( 1/2 \)

6. The cost of a telephone call using long-distance carrier A is $1.00 for any time up to and including 20 minutes and $0.07 per minute thereafter. The cost using long-distance carrier B is $0.06 per minute for any amount of time. For a call that lasts \( t \) minutes, the cost using carrier A is the same as the cost using carrier B. If \( t \) is a positive integer greater than 0, what is the value of \( t \)?

7. If \( (x + y)^2 = 100 \) and \( (x - y)^2 = 16 \), what is the value of \( xy \)?
   - A. 6   B. 10   C. 21   D. 25   E. 29

8. If \( y = x - 5 \) and \( 20y - 5y = \), what is the value of \( x \)?
   - A. 6   B. 9   C. 12   D. 15   E. 18

9. If \( x^2 - y^2 = 77 \) and \( x + y = 11 \), what is the value of \( x \)?

10. If \( x^2 - y^2 = 10 \) and \( x + y = 5 \), what is the value of \( x - y \)?
<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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</thead>
<tbody>
<tr>
<td>EQ: How can you solve a system of equations?</td>
<td>SWBAT solve systems of equations in slope intercept form by graphing.</td>
<td>SWBAT analyze special systems that have no solutions or an infinite number of solutions.</td>
<td>SWBAT solve systems of equations using substitution.</td>
<td>Performance Task #1 Weekly Quiz</td>
</tr>
<tr>
<td>SWBAT solve systems of equations NOT in slope intercept form by graphing.</td>
<td>SWBAT solve a system of equations by adding or subtracting equations to eliminate a variable.</td>
<td>SWBAT choose the best method for solving a system of linear equations.</td>
<td>SWBAT solve systems of linear equations in context.</td>
<td>SWBAT model real-world situations using systems of linear equations Performance Task #2</td>
</tr>
<tr>
<td>EQ: What conditions help you determine which method to use to solve a system of equations?</td>
<td>EQ: How can you represent the solution set of a linear inequalities and systems of linear inequalities?</td>
<td>SWBAT graph linear inequalities in two variables.</td>
<td>SWBAT solve a system of linear inequalities by graphing.</td>
<td>SWBAT model real-world situations using systems of linear inequalities Weekly Quiz</td>
</tr>
<tr>
<td>Mid-Unit Assessment</td>
<td>SWBAT write an inequality from a graph.</td>
<td>SWBAT apply models of linear inequalities to real-world situations.</td>
<td>SWBAT write a system of linear inequalities from a graph.</td>
<td>SWBAT model real-world situations using systems of linear inequalities Weekly Quiz</td>
</tr>
</tbody>
</table>

EQ: How do the solution sets of linear equations and inequalities in two variables differ? How are these differences expressed graphically?

SWBAT model real-world situations using systems of linear inequalities. | SWBAT model real-world situations using systems of linear equations and inequalities. | Performance Task #3 Unit Review | Unit Assessment |
STAGE 3: End of Class Assessment

What sequence of teaching and learning experiences will equip students to develop and demonstrate the desired understandings?

Day 1--EQ: How can you solve a system of equations?
SWBAT solve systems of equations in slope intercept form by graphing.

1. Solve the following by graphing: \( y = x + 7 \)  
   \( y = 2x + 1 \)

2. Solve the following by graphing: \( y = -3x - 3 \)  
   \( y = 2x + 2 \)

3. Tickets for a concert cost $10 each if you order them online, but you must pay a service charge of $8 per order. The tickets are $12 each if you buy them at the door on the night of the concert.
   a. Write a system of equations to model the situation. Let \( c \) be the total cost. Let \( t \) be the number of tickets.
   b. Graph the equations and find the intersection point. What does this point represent?

Day 2--EQ: How can you solve a system of equations?
SWBAT analyze special systems that have no solutions or an infinite number of solutions.
SWBAT solve systems of equations NOT in slope intercept form by graphing.

1. Solve the following system by graphing and state the solution.
   \[ \begin{align*}
   4x - y &= -1 \\
   -x + y &= x - 5
   \end{align*} \]

2. Solve the following system by graphing:
   \[ \begin{align*}
   2x - y &= -5 \\
   2x - y &= -1
   \end{align*} \]

3. Can a system of two linear equations have exactly two solutions? Explain.

4. Suppose you find that two linear equations are true when \( x = -2 \) and \( y = 3 \). What can you conclude about the graphs of the equations?

Day 3--EQ: How can you solve a system of equations?
SWBAT solve systems of equations using substitution.

1. Solve the following system using substitution:
   \[ \begin{align*}
   4y &= x \\
   3x - y &= 70
   \end{align*} \]

2. Use substitution and tell whether the system has one solution, infinitely many solutions or no solutions.
   \[ \begin{align*}
   y &= 2x + 1 \\
   4x - 2y &= 6
   \end{align*} \]

3. Answer true or false and explain your reasoning:
   a. When solving a system using substitution, if you obtain an identity, then the system has no solution.
b. You cannot use substitution to solve a system that does not have a variable with a coefficient of 1 or -1.

**Day 4--EQ: How can you solve a system of equations?**

SWBAT solve for a variable and then use substitution to solve a system of equations.

1. Solve the following system using substitution:

   -2x + y = -1  
   4x + 2y = 12

2. Solve the following system using substitution:

   2 = 2y – x  
   23 = 5y – 4x

3. In a talent show of singing and comedy acts, singing acts are 5 minutes long and comedy acts are 3 minutes long. The show has 12 acts and lasts 50 minutes. How many singing acts and how many comedy acts are in the show?

**Day 5 – EQ: How can you solve a system of equations?**

Performance Task #1

Weekly Assessment

**Day 6--EQ: How can you solve a system of equations?**

SWBAT solve a system of equations by adding or subtracting equations to eliminate a variable.

1. Solve the following system using elimination:

   3x – 2x = 0  
   4x + 2y = 14

2. Solve the following system using elimination:

   4x – 3y = -4  
   2x + 3y = 34

3. Washing 2 cars and 3 trucks takes 130 minutes. Washing 2 cars and 5 trucks takes 190 minutes. How long does it take to wash each type of vehicle?

**Day 7--EQ: How can you solve a system of equations?**

SWBAT solve a system of equations using elimination by first multiplying one or both equation(s) by a single term.

1. Solve the following system using elimination:

   3p + q = 7  
   2p – 2q = -6

2. Solve the following system using elimination:

   3x – 2y = 1  
   8x + 3y = 2

3. A farm raises a total of 220 chickens and pigs. The number of legs of the stock in the farm totals 520. How many chickens and pigs are on the farm?

**Day 8 -- EQ: What conditions help you determine which method to use to solve a system of equations?**
SWBAT choose the best method for solving a system of linear equations.

1. Printing a newsletter costs $1.50 per copy plus $450 in printer’s fees. The copies are sold for $3 each. How many copies of the newsletter must be sold to break even?

2. Which method would you use to solve the following system? Explain.
   
   \[3x + 2y = 9\]
   \[-2x + 3y = 5\]

3. You solved a linear system with two equations and two variables and got the equation \(-6 = -6\). How many solutions does the system of equations have?
   
   A. no solution           B. infinitely many solutions           C. exactly 1 solution           D. 2 solutions

4. You solved a linear system and got the equation \(-6 = 0\). How many solutions does the system of equations have?
   
   A. no solution           B. infinitely many solutions           C. exactly 1 solution           D. 2 solutions

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**Day 9** -- **EQ:** What conditions help you determine which method to use to solve a system of equations?

SWBAT solve systems of linear equations in context.

1. A bicycle tour costs $2,400 per month to operate. The store pays an average of $60 per bike. The average selling price of each bicycle is $120. How many bicycles must the store sell each month to break even?

2. Producing a musical costs $88,000 plus $5,900 per performance. One sold-out performance earns $7,500 in revenue. If every performance sells out, how many performances are needed to break even?

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**Day 10** -- **EQ:** What conditions help you determine which method to use to solve a system of equations?

SWBAT model real-world situations using systems of linear equations.

Performance Task #2

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**Day 11** -- **EQ:** What conditions help you determine which method to use to solve a system of equations?

Mid-Unit Assessment

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**Day 12** -- **EQ:** How can you represent the solution set of a linear inequalities and systems of linear inequalities?

SWBAT graph linear inequalities in two variables.

SWBAT identify the solution set of a linear inequality.

1. Is \((-1, 4)\) a solution of the inequality \(y < 2x + 5\)?

2. Graph the following linear inequalities in a coordinate plane and determine whether the ordered pair is a solution:
   
   \[y \leq -2x + 1; (2,2)\]

3. Graph the following linear inequalities in a coordinate plane and determine whether the ordered pair is a solution:
   
   \[3y > 5x - 12 ; (-6,1)\]

---

**Day 13** -- **EQ:** How can you represent the solution set of a linear inequalities and systems of linear inequalities?

SWBAT write an inequality from a graph.

SWBAT apply models of linear inequalities to real-world situations.

1. Write an inequality represented by the graph to the right.

2. You and your friends have $30. You want to order large pizzas (p) that are $9 each and drinks (d) that cost $1 each. Write and graph an inequality that shows how many pizzas and drinks you are able to order.
Day 14 -- EQ: How can you represent the solution set of a linear inequalities and systems of linear inequalities?

SWBAT solve a system of linear inequalities by graphing.
SWBAT write a system of linear inequalities from a graph.

1. Graph the following system of linear inequalities:

   \[ y > 3x - 2 \]
   \[ 2y - x \leq 6 \]

2. What system of inequalities is represented by the graph at the right?

Day 15 -- EQ: How can systems of inequalities model real-world situations?

EQ: How do the solution sets of linear equations and inequalities in two variables differ? How are these differences expressed graphically?

SWBAT model real-world situations using systems of linear inequalities.

1. Cherries cost $4/lb. Grapes cost $2.50/lb. You can spend no more than $15 on fruit, and you need at least 4 lb in all. Write and graph a system and linear inequalities to represent this situation.

2. How is finding the solution of a system of inequalities different from finding the solution of a system of equations? Explain.

3. Mark is a student, and he can work for at most 20 hours a week. He needs to earn at least $75 to cover his weekly expenses. His dog-walking job pays $5 per hour and his job as a car wash attendant pays $4 per hour. Write a system of inequalities to model the situation, and graph the inequalities.

Day 16 -- EQ: How can systems of inequalities model real-world situations?

EQ: How do the solution sets of linear equations and inequalities in two variables differ? How are these differences expressed graphically?

SWBAT model real-world situations using systems of linear equations and inequalities.

1. It takes a florist 3 hours and 15 minutes to make 3 small centerpieces and 3 large centerpieces. It takes 6 hours and 20 minutes to make 4 small centerpieces and 7 large centerpieces. How long does it take to make each small centerpiece and each large centerpiece? Write and solve a system of equations to find your answer.

2. You have 60 megabytes (MB) of space left on your portable media player. You can choose to download song files that use 3.5 MB or video files that use 8 MB. You want to download at least 12 files. Create a graph to show the number of songs and video files you can download.

Day 18 -- EQ: How can systems of inequalities model real-world situations?

EQ: How do the solution sets of linear equations and inequalities in two variables differ? How are these differences expressed graphically?

Performance Task #3

Unit Review

Day 18 -- EQ: How can systems of inequalities model real-world situations?

EQ: How do the solution sets of linear equations and inequalities in two variables differ? How are these differences expressed graphically?

Unit Assessment
<table>
<thead>
<tr>
<th>Vocabulary to Review</th>
<th>New Vocabulary</th>
</tr>
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<tbody>
<tr>
<td><strong>Linear Inequality</strong> – A linear inequality in two variables can be formed by replacing the equals sign in a linear equation with an inequality symbol.</td>
<td><strong>Consistent</strong> – A system of equations that has at least one solution is consistent.</td>
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<td><strong>Coefficient</strong> – A numerical factor of a term.</td>
<td><strong>Dependent</strong> – A consistent system that is dependent has infinitely many solutions.</td>
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<tr>
<td><strong>Constant</strong> – A term that has no variable.</td>
<td><strong>Inconsistent</strong> – A system of equations that has no solution is inconsistent.</td>
</tr>
<tr>
<td><strong>Consistent</strong> – A system of equations that has at least one solution is consistent.</td>
<td><strong>Independent</strong> – A consistent system that is independent has exactly one solution.</td>
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<tr>
<td><strong>Dependent</strong> – A consistent system that is dependent has infinitely many solutions.</td>
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</tr>
<tr>
<td><strong>Inconsistent</strong> – A system of equations that has no solution is inconsistent.</td>
<td><strong>System of linear equations</strong> – Two or more linear equations form a system of linear equations.</td>
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<td><strong>Independent</strong> – A consistent system that is independent has exactly one solution.</td>
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<td><strong>Solution of a System of Linear Equations</strong> – Any ordered pair that makes all of the equations in a system true is a solution of a system of linear equations.</td>
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<td><strong>Half-Plane</strong> – A half-plane is the part of the graph on one side of a boundary line.</td>
<td><strong>Break-Even Point</strong> – When independent and dependent variables are equal.</td>
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<td>UNIT RESULTS</td>
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**Thoughts and Resources for the Future**