**Unit #3 Linear Equations**

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| --- | --- | --- |
| **Literacy Strategies**  (Check all that apply.) | **Habits of Success**  (Check one per unit.) | **Multiple Intelligence Areas** |
| 1. Admit/Exit slips 2. Graphic organizer 3. Know/Want to Know/Learn chart (KWL) 4. Open-response questions 5. Double-entry/Two-column notes 6. Retelling 7. Reflection 8. Jigsaw reading 9. Anticipation guide   RAFT (Role/Audience/Format/Topic)   1. Interactive reading guide 2. Concept definition maps 3. Frayer model 4. Visual prediction guide 5. Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Create relationships 2. Teamwork, responsibility, effective communication) 3. Study, manage time, organize 4. (Organization, time management, study skills) 5. Improve reading/writing skills 6. (Use reading and writing to learn strategies) 7. Improve mathematics skills 8. (Estimate, compute, solve, synthesize) 9. Set goals/plan 10. (Set goals, plan, monitor progress) 11. Access resources 12. (Research, analyze, utilize) 13. USE OF TECHNOLOGY | 1. Logical/Mathematical 2. Spatial 3. Musical 4. Bodily—Kinesthetic 5. Interpersonal 6. Intrapersonal 7. Naturalist 8. Linguistic |

**UNIT Assessments: Post and pre test will be made at a later time.**

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| --- |
| Pre-Assessment: |
| Daily/Weekly: (Included on daily activities plans) |
| Post-Assessment: |

State Standards and Benchmarks:

1. **9-12.A.1.8** Solve formulas for specified variables.
2. **9-12.A.2.7** Graph a linear inequality in two variables.
3. **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.
4. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically
5. **9-12.A.3.5** Solve applications involving systems of two equations in two variables.
6. **9-12.A.3.8** Determine whether the graphs of two given linear equations are parallel, perpendicular, coincide or none of these.
7. **9-12.G.4.8** Describe the intersections of a line and a plane, intersections of lines in the plane and in space, or of two planes in space.

**Day 1&2-Intro to Solving Systems by Graphing**

1. Benchmark: **9-12.A.1.8** Solve formulas for specified variables.

Learning Objective: By the end of the section, students will learn how to solve systems of linear equations and inequalities in two variables and learn how to apply system of equation to real world situations.

Assessment: Project: This project will require students to find two sets of comparable data to analyze. Students will graph both sets of data and look at the trends in their data sets in order to form conclusions about the topic.

Accommodations:

Tier 2:

Tier 3:

Materials:

**Unit Vocabulary\***

1. Independent variable
2. Dependent variable

**Equilateral Triangle**

* **3 sided polygon**
* **60**° **central angles**
* **Sum of angles = 180**°
* **All sides are equal**

1. Approximate Solution
2. Boundary line
3. Common solution
4. Consistent System
5. Dependent system
6. Addition (Elimination) Method
7. Inconsistent System
8. Independent System
9. Linear inequalities
10. Solution
11. Substitution Method
12. System of Equations

**\*Have students create note cards for each vocabulary term as it is introduced throughout the unit.**

**KWL –Know /Want to know/Learn Chart ( See Forms)**

|  |  |  |
| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work |  |  |
| Introduction/Engage |  |  |
| Explore/Review |  | Introduction of vocabulary. (See Forms: Vocab)  KWL Form (See Forms)  Calculators are there to check your homework. All work must be shown in order to receive full credit. |
| Assessment |  | Pretest given. Can be taken home. |
| Closure |  | Make sure to remind students of materials needed. |

Reflection:

**Day 3- Solving for Y**

Benchmark: **9-12.A.1.8** Solve formulas for specified variables.

Learning Objective: to solve two variable equations for y.

Assessment: Homework

Accommodations:

Tier 2:

Tier 3:

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 15 | Have students copy notes for Solving for Y (See Forms) |
| Introduction/Engage |  | Review KWL and Grade pretest. Have students plot on consensus graph answer on butcher paper. See Form for example. |
| Explore/Review |  | Consensus graph is use to collect data on progess of the class. It shows where students are struggling and what might need to be retaught.    Intro solving for the variable. |
| Assessment |  | Homework/Classroom. See Worksheet |
| Closure |  | Student should have a good understanding of basic linear graphing, solving equations. We will continue to review throughout unit. |

**Day 4&5 – The Wave**

1. Benchmark: **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.

Learning Objective: Students will

1. Collect the data Find the equation Interpret Data

Assessment: Linear graph on Butcher Paper

Materials:

Overhead projector and markers,

Piece of linguini (flat spaghetti),

Stopwatch or a watch that displays seconds (1 per group)

Appoint one student as the “timer”.

Graph paper (1 sheet per student),

Rulers (1 per student).

|  |  |  |
| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 | Warm Up: Solving for Y (See Forms WU SolvingforY) |
| Introduction/Engage | 10 | Grade Homework  Introduction to the Wave (See form Experiment 1: Wave) In this experiment, the duration of a wave is a linear function of the number of students performing it. The number of students is the independent variable, and the time need to the wave is the dependent variable. This whole class experiment provides an opportunity to model the procedures that students will use as they completed the three sections of all the experiments: 1) Collect the Data 2) Find the Equations, and 3) Interpret the data. |
| Explore/Review | 15  15  10 | 1) Collect the Data  2) Find the Equations, and  3) Interpret the data. |
| Assessment | 10 | Group data together |
| Closure | 5 | The wave is a linear function and a equation can be made using line of best fit. Predictions can be made and result can give estimation to detect errors and inconsistent. |

Reflection:

**Day 6-Solving Linear Systems by Graphing**

Benchmark:

1. **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.
2. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically

Learning Objective: to solve systems of linear equations in two variables by graphing

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials:

Holt, Rinehart and Winston, Algebra 1, 2001

Graph paper

|  |  |  |
| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min | Warm-up: Solving for Y (Doc)  Finished incomplete discussion about data from previous day. |
| Introduction/Engage | 5 | There are three (four: Archie Wacky Method) possible solutions to systems of linear equations.  1) Graphing, 2) Addition (Elimination), and 3) Substitution Today we will focus on One…Graphing without graphing Calculators. Graphing give us a quick and easy estimate of the possible solution. |
| Explore/Review | 10-25 | Notes: Solving Systems by Graphing (No Graphing Calculators)Present class with the following equations. Example 1) Y =3x +1 and y=-x+5.  Have students graph or work example on board. Remind students sometimes they might have to solve for Y. (First lesson) Example 2 3y=4x-2 and y+2 = 2x .  Activity: Supply and Demand(See forms) |
| Assessment | 10 | Holt, Rinehart and Winston Algebra I Text  Class Work Guided Skills Practice P.323(4-9) If time permitted  Home Work P. 323(10-18) Application Aviation P.325(43) |
| Closure |  | **Summarize graphing: Graphing systems of equations in two unknowns makes it possible to solve for more than one variable at the same time. You may encounter situations in which the graph of a system of equations can be used to help make the decision that is best for you. Graphs are good for making a quick and accurate estimation. Tomorrow we will learn how to solve systems of equations using Substitution method. Often we require exact solutions; Substitution will give us exact answers.** |

Reflection:

**Day 7- Wacky Archie Method aka Double Elimination (Optional)**

Benchmark:

1. **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.
2. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically
3. **9-12.A.3.5** Solve applications involving systems of two equations in two variables.

Learning Objective: To solve systems of linear equation by Double cancelation

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials:

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work | 10 | Wartime Battle- (See Wartime battle) |
| Introduction/Engage | 10 | Wacky Archie Method is a quick and easy way to solve systems of equations. See forms: Wacky Archie Method |
| Explore/Review | 5 | Use consensus graph and Quiz to check for understanding. |
| Assessment | 10 | Home Work P. 323(19-27) |
| Closure | 5 | **Systems of Equations:** Summarize the three possible solutions to systems of linear equations. Give an example and characteristics of each. |

Reflection:

**Day 8-The Substitution Method**

Benchmark:

1. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically
2. **9-12.A.3.5** Solve applications involving systems of two equations in two variables.

Learning Objective: To solve systems of equations by Substitution method.

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials:

Holt, Rinehart and Winston, Algebra 1, 2001

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work |  | Note book Test: List the first example giving on graphing. Draw solution. |
| Introduction/Engage |  | In Sports, coaches often substitute one player with another who plays the same position. Ask students to suggest other situations in which substitutions are made. Tell them that you also can make substitution in equation. That is, You can replace a variable in an equation with an equivalent expression. |
| Explore/Review |  | Explore Substitution. Activity Holt Algebra 1 P. 326 |
| Assessment |  | Guided practice P.329(4-8)  Homework P.329(9-18) |
| Closure |  | Systems of equations often require exact solution. Example Business: In order to make a profit, the owner of a small business at the auto race track must know the exact amount to charge for each of her two products. Tomorrow, we will go over the Addition method also known as the Elimination method. It provide a quick solution to complex systems of equations such as the car rentals. Do a KWL to check for Understanding. Optional: Take a day to Review graphing and Substitution.(See forms:2x2 worksheet) |

Reflection:

**Day 9-The Addition (Elimination) Method**

Benchmark:

1. **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.
2. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically
3. **9-12.A.3.5** Solve applications involving systems of two equations in two variables.

Learning Objective:

1) To use the elimination method to solve a system of equations.

2) Choose an appropriate method to solve a system of equations.

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials:

Holt, Rinehart and Winston, Algebra 1, 2001

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| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work |  | Use ACED method. Solve for each system. 5x -2y=3 and y=2x. Solve using both methods. (Graphing or Substitution) What is the difference between solving system of equations using graphing and Substitution method? |
| Introduction/Engage |  | The last method to solve system of equations is the Addition (Elimination) Method. To provide a quick solution to complex systems of equations. Phone fee, Rental cars. |
| Explore/Review |  | Activity Exploring using Opposites Holt P.332 |
| Assessment |  | Guided Skills Practice P.335(10-13)  Pratrice and Apply P.335 (14-22)  Holt, Rinehart and Winston, Algebra 1, 2001 |
| Closure |  | **Systems of Equations:** Summarize the three possible solutions to systems of linear equations. Give an example and characteristics of each. |

Reflection:

**Day 10-Consistent and Inconsistent Systems**

Benchmark:

1. **9-12.A.3.8** Determine whether the graphs of two given linear equations are parallel, perpendicular, coincide or none of these.
2. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically
3. **9-12.A.3.5** Solve applications involving systems of two equations in two variables.

Learning Objective:

1. Identify consistent and inconsistent systems of equations.
2. Identify dependent and independent systems of equations.

Assessment:

Accommodations:

Tier 2:

Tier 3:

Materials:

Graphing Calculator

Graphic organizer for system of equations

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| **Strategy** | **Time** | **Activity** |
| Bell work |  |  |
| Introduction/Engage |  | Hand out Graphic Organizer (See Forms (2)) A system of equations may have one unique solution, infinitely may solutions, or no solutions at all. Systems that have one or many solutions are called consistent. Systems with no solution are called inconsistent. Consistent system of equations can be divided further into two categories…independent and dependent. An independent system hav only one solution. A dependent system has infinitely many solutions. Every ordered pair that is a solution of the first equation is also a solution of the second equation. |
| Explore/Review |  | Activity : Exploring no solution and many Solutions HoltP.338 |
| Assessment |  | Practice and Apply Holt p.342(11-27) |
| Closure |  | Some real world situations may have no solutions and some may have many solutions. A clear understanding of consistent and inconsistent systems can help you model and better understand these real world situations. |

Reflection:

**Day 11 -Solving Systems of Linear inequalities by Graphing**

Benchmark:

1. **9-12.A.2.7** Graph a linear inequality in two variables.
2. **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.
3. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically
4. **9-12.G.4.8** Describe the intersections of a line and a plane, intersections of lines in the plane and in space, or of two planes in space.

Learning Objective:

1. to solve real world systems of linear equations by graphing .
2. To Describe the intersections of a line and a plane, intersections of lines in the plane and in space, or of two planes in space

Assessment: Class Work Guided Skills Practice P.323(4-9)

Accommodations:

Tier 2:

Tier 3:

Materials:

Graph paper

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| **Strategy** | **Time** | **Activity** |
| Bell work | 5 min |  |
| Introduction/Engage |  | Today will continue graphing with no calculators |
| Explore/Review |  | Notes: Solving Systems by Graphing (No Graphing Calculators) |
| Assessment |  | Holt, Rinehart and Winston Algebra I Text  Class Work Guided Skills Practice P.323(4-9) |
| Closure |  | **Summarize graphing: Graphing systems of equations**  **Systems of Equations:** Summarize the three possible solutions to systems of linear equations. Give an example and characteristics of each. |

Reflection:

# Day 12 &13– Graphing systems of inequalities, including non-linear inequalities

Benchmark:

1. **9-12.A.2.7** G,raph a linear inequality in two variables.
2. **9-12.A.3.1** Model real-world phenomena using linear equations and **linear inequalities** interpret resulting solutions, and use estimation to detect errors.
3. **9-12.A.3.4** Solve systems of linear equations in two variables algebraically and graphically

**Objectives:** The students will be able to:

* solve systems of linear inequalities in two variables, and describe the shaded region as the set of all points that solve each inequality in the system.
* identify which inequalities in a system are **not** satisfied by a given non-solution point by looking at the graph.
* graph non-linear inequalities (such as quadratic and absolute value function inequalities).

**Materials:** Hw #3-1 answers overhead; tally sheets; Do Now and answers overhead; special note-taking templates; pair work and answers overhead; homework #3-2

|  |  |
| --- | --- |
| Time | **Activity** |
| 5 min | Quiz: Intersection of lines, planes, in space. (See Forms)  **Review Homework**  Show the answers to #3-1 on the overhead. Students correct their answers. Pass around a tally sheet. |
| 10 min | **Homework Presentations**  Review the top 2 or 3 problems.  Problems to grade: 3, 5, 6c, 6e, 6f |
| 20 min | **Do Now**  Hand out **Where Does the Point Fit In?** Worksheet. Show answers on the overhead. Point out that the overlapping section of the shaded regions is the solution set to a **system of inequalities**. In other words, every point in that region is a solution to **both** of the inequalities. The shaded regions that don’t overlap give you all the solutions to one, but not the other inequality. The region that has no shading has points that don’t solve either of the inequalities. |
| 20 min | **Direct Instruction**  Hand out special note-taking template.  **Lesson 2:** Graphing systems of inequalities  **Portfolio Section:** Systems of equations and inequalities  **Background:**  **Solving a** **system** of equations/inequalities means that you are solving more than one at the same time.  A **solution** to a system must make all equations/inequalities true.  **Concepts:**  To graph a system of inequalities:   * Graph each inequality separately. Lightly shade the solution region for each. * Find where all shaded regions overlap and mark it more darkly. Label it “S” for solution. * This works the same, even if the inequalities are not **linear**.   To graph a non-linear inequality:   * Graph the border function. Determine if it is solid or dashed. * Use a test point to determine which side to shade.   **Examples:**  Work through the first one together and let them do the second in pairs. |
| 25 min | **Pair Work**  Hand out the **Graphing Systems of Inequalities** worksheet. Show answers on the overhead. |

Homework #3-2: More Systems of Inequalities (see Forms)

**Day 14**

Benchmark:

Learning Objective:

To review

Assessment:

Practice Test

http://www.phschool.com/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=ata&wcsuffix=0752

Accommodations:

Tier 2:

Tier 3:

Materials:

|  |  |  |
| --- | --- | --- |
| **Strategy** | **Time** | **Activity** |
| Bell work |  | Kwl over Systems of equations |
| Introduction/Engage |  | Review Systems of Equations: Solving by Graphing, Substitution, Elimination, Identifying Consistent and inconsistent systems |
| Explore/Review |  |  |
| Assessment |  | Ch Assessment P.362 and P364  Notebook due. (Notes, Vocab cards, and Kwl chart) |
| Closure |  | Ch. Test Systems of Equations |

Reflection:

Project: Type of problem that may be used

* 1. Minimun cost, Maximum profit
  2. Coin Puzzles
  3. Chemical-solution Puzzle
  4. Number Digit Puzzle
  5. Wind and current puzzle
  6. Age Puzzle
  7. Perimeter of a rectangle
  8. Mixture problem

Practice Test

http://www.phschool.com/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=ata&wcsuffix=0752