Intro to Algebra II

[Implement start year (2013-2014)]

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Unit #2 Graphing Linear Functions and Inequalities

Stage 1 – Desired Results

Established Goals

2009 NJCCC Standard(s), Strand(s)/CPI #
(http://www.nj.gov/education/cccs/2009/final.htm)

Common Core Curriculum Standards for Math and English
(http://www.corestandards.org/)

Create Equations A-CED: 2, 4

- Create equations that describe numbers and relationships

Reasoning with equations and Inequalities A-REI: 5, 6, 10, 11, 12

- Solve systems of equations
- Represent and solve equations and inequalities graphically

Interpreting Functions F-IF: 1, 2, 4, 5, 6, 7a

- Understand the concept of a function and use the function notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations

Building Functions F-BF: 1a, 1c, 5

- Build a function that models a relationship between two quantities
- Interpret expressions for functions in terms of the situation they model

21st Century Themes
(www.21stcenturyskills.org)

___ Global Awareness
_X__Financial, Economic, Business and Entrepreneurial Literacy
___Civic Literacy
___Health Literacy
___Environmental Literacy

21st Century Skills

Learning and Innovation Skills:
_X__Creativity and Innovation
_X__Critical Thinking and Problem Solving
_X__Communication and Collaboration

Information, Media and Technology Skills:
___Information Literacy
___Media Literacy
_X__ICT (Information, Communications and Technology) Literacy

Life and Career Skills:
_X__Flexibility and Adaptability
_X__Initiative and Self-Direction
_X__Social and Cross-Cultural Skills
_X__Productivity and Accountability
_X__Leadership and Responsibility

Enduring Understandings: Students will understand that . . . EU 1 Linear functions and inequalities can represent real-world phenomena visually on a graph. EU 2 Mathematical relationships can belong to a family of graphs. EU 3 A function models a relationship between two quantities. EU 4 Systems of equations and inequalities are used to solve problems.	**Essential Questions:** EU 1 • How does a graph of a linear function or inequality help you make predictions and solve problems? . EU 2 • What are the characteristics of linear functions and inequalities? EU 3 • How do you classify a relation as a function given different representations? EU 4 • How is mathematics used to quantify and compare multiple situations, events, and phenomena? • How do you determine what method is the most effective for solving a system?
Knowledge: Students will know . . . EU 1 • the key components that make up a linear function or inequality such as slope, intercepts, and inequality symbols.	**Skills:** Students will be able to . . . EU 1 • construct a graph of a linear equation or inequality. • find and graph the ordered pairs that satisfy a given equation. • recognize equations of horizontal and vertical lines. • graph the equations of horizontal and vertical lines. EU 2 • calculate the slope. • find the equation of the line given a graph, two points, a slope and point, and a point and a line parallel or perpendicular.

EU 2 • linear functions have degree one and a constant rate of change. • linear functions and graphs form a straight line in the x-y coordinate plane. EU 3 • utilize the domain and range to classify a function from a relation. EU 4 • solving a system by graphing, elimination, and substitution will provide the same answer.	EU 3 • define and identify relations and functions, given a diagram, ordered pairs, a table, or a graph. EU 4 • solve a system using Graphing, Elimination, and Substitution. • generate a linear system of equations or inequalities for various real-world applications.

Stage 2 – Assessment Evidence

Recommended Performance Tasks:.

Task 1: EU 1, EU4

Your family is purchasing a new car, and your parents need your educated input on whether to buy a hybrid or standard model. The car model that fits your family's needs is a sedan. Your parents need you to research the base price, fuel economy, battery replacement on the hybrid, and government tax credits for both standard and hybrid versions of the same model and year vehicle. Two excellent websites to utilize are www.autolenders.com and www.carsense.com.

In a written report you must:

- Present the information of each vehicles base price, fuel economy, battery replacement on the hybrid, and government tax credits
- Create a system of equations to model the total base price and cost per mile of each vehicle
- Solve the system algebraically to determine when the two vehicles will have the same cost
- Interpret which one will be a better value and justify your reason for selecting your vehicle.
- Graph of the systems of equations you used to provide a visual representation of the relationships and solution

Task 2: EU 1, EU2, EU 3, EU 4

Our class has been given the task of planning the seating for graduation. The problem is that the school no longer has chairs that can be brought outside for the graduation ceremony. It is our job then to find the best rental company from which to rent the chairs. We must research at least two different companies or one company with two different types of chairs. You will use the information from the company or companies to create an equation for each rental price and a graph of the equations. You will then need to determine which company will be best for renting 250 chairs, taking into account delivery and rental costs for the chairs. You must defend your choice to the principal. It is very important to define the slope and y-intercept of the equation. You must also explain the relationship between the table, equation, and graphs of the functions; making sure to explain the meaning of the independent and dependent variables in your functions.

Other Recommended Evidence: *Tests, Quizzes, Prompts, Self-assessment, Observations, Dialogues, etc.*

- Tests/quizzes on interpreting and solving linear equations, inequalities, and systems.
- "Ticket to leave" at the end of writing an equation of a line, and checking the solution of a linear system
- Student explanations of homework, do-now, class work.
- Class discussions on similarities and differences of solutions of equations and inequalities.

Stage 3 – Learning Plan

Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: *Consider the WHERETO elements. Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.*

Activities:

- Activity #1
  Exercises where students must generate the equation of a line given different criteria (i.e. given a graph, given a slope and point, given two points, real-world application) (A/M)

- Activity #2
  Use a linear model to make predictions about the future. (M)

- Activity #3
  Brainstorm real-world applications where linear models would have domain restrictions. (M/T)

- Activity #4
  Solve a system using every method to highlight that they all produce the same solution. (A/M)

- Activity #5
  http://education.ti.com/calculators/timathnspired/US/Activities/Detail?sa=1010&t=1184&id=16026
  This lesson is an interactive graphical exploration of systems of linear inequalities. (M)

The following is the suggested sequence of learning activities for the Intro To Algebra II (level3) class and should comprise 35 school days:

- YWBAT identify basic terminology for the rectangular coordinate system.
  (quadrants, intercepts, ordered pairs, table of values as method of graphing) (A)
- YWBAT state the domain and range of a function, perform the vertical line test, and express answers in function notation. (A)
- Activity #3: Real World Applications with Domain Restrictions. (M/T)
- YWBAT graph linear functions and find the slope. (A)
- Activity #2: Predictions About the Future. (M)
- YWBAT write linear functions. (A)
- Activity #1: Generating Equations of Lines. (A/M)
- YWBAT solve systems of linear equations. (A)
- YWBAT solve word problems involving systems of linear equations. (A)
- YWBAT solve linear inequalities. (A)
- YWBAT solve systems of linear inequalities. (A)
- Activity #4: Solving Systems (A/M)
- Activity #5: TI-NSpire Activity (M)