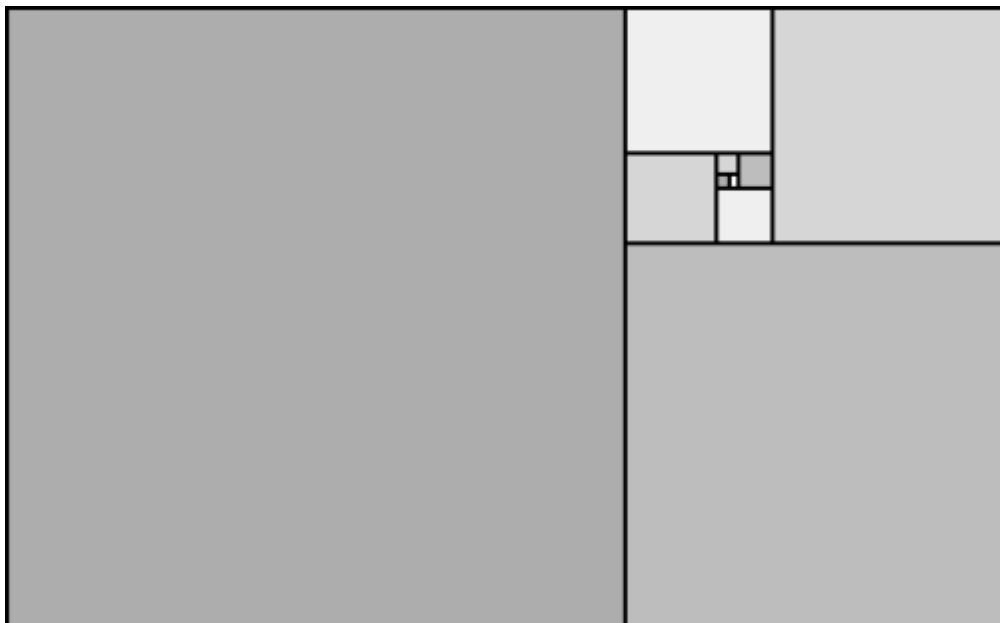


CURRICULUM MAP

Algebra I



Mr. Luper
Urban Assembly School for Law and Justice

CURRICULUM MAP

UNIT ONE: Problem Solving (≈8-10 days)

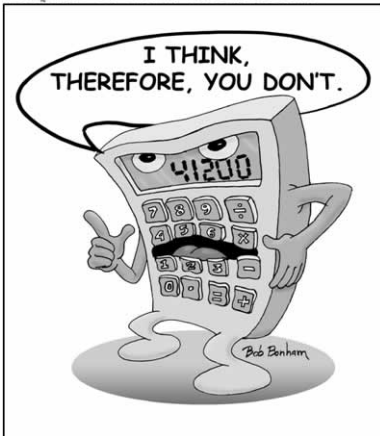
Goals and Objectives: This unit will help students develop strategies and organize their work so that they can solve challenging problems. In addition, students will be introduced to the five Ways of Thinking which are justifying, generalizing, making connections, reversing, and applying. Ultimately, the objective of this unit is to help students develop the ability to *think* about problems rather than simply *do* problems. They will be introduced to five problem-solving strategies: Guessing & Checking, Collecting Data, Finding Patterns, Drawing a Graph, and Working Backward.

Major Assessments

Formative:

- Review & Preview Problems completed & checked daily
- Group work
- Mini-presentations
- Binder Check
- Group products

Weapons of Math Destruction™



© Oak Norton

Summative:

- Individual Concept Maps
- Problem Series @ Home
- Student Created Graphic Org.
- Unit Test-Problem Solving

Process Overview

Group Problem Solving exercises

- What stories can a graph tell?
- Eucalyptus Grove
- Newton's Revenge Rollercoaster
- Generalizing a pattern
- Apartment design
- Bull's-Eye!
- Helping the homeless

Student will also have to create problems and solutions that utilize the five problem-solving strategies and identify the different Ways of Thinking involved in finding the solution.

Reading/Writing Skills

Daily "Learning Logs" summarizing key points from lesson

"You Be the Teacher" assignments

Written explanations (using technical writing) of problem solving processes

Major Concepts

- How can a graph tell a story?
- How can you plot a point using its (x, y) coordinates?
- How do I approach problems that I have never seen before?
- How does organization help me to solve problems?

Major Concepts (cont.)

Content Information

- Interpreting Graphs
- Using the Coordinate Plane
- Collecting, Organizing, Analyzing Data
- Finding and Generalizing Patterns
- Solve problems with Guess and Check

	<ul style="list-style-type: none"> • How can you use the results from one guess to make your next guess better? • What are the alternative approaches to finding a solution? • What is algebra? 	
<p>Texts/Materials Needed</p> <ul style="list-style-type: none"> • CPM Handouts • Materials listed in Lesson Plans • SmartBoard 	<p>Regents/SAT Preparation</p> <p>Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.</p>	

CURRICULUM MAP

UNIT TWO: Working with Variables and Solving Equations

Goals and Objectives: This unit develops the foundation of algebra. Students will be introduced to the concept of variables and how they are utilized in algebra in order to solve problems. Students will use manipulatives to explore how and where to use variables. They will write and simplify algebraic expressions, and solve for given variables.

Major Assessments

Formative

- Daily team classwork using algebra tiles and reporting findings
- Student team presentations using SmartBoard
- Quiz on simplifying algebraic expressions
- Review & Preview Problems completed & checked daily
- Binder Check
- Group products

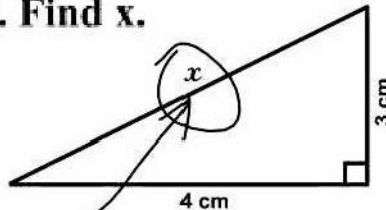
Summative:

- Group Exam-writing and simplifying algebraic expressions (key component of this test will be the group roles)

Process Overview

- Students use Algebra Tiles (with expression mat) to simplify algebraic expressions
- Students use Algebra Tiles (with expression comparison mat) to compare expressions
- Students use Algebra Tiles (with equation mat) to solve equations

3. Find x .



Here it is

Reading/Writing Skills

Daily "Learning Logs"

Written exercise about algebraic processes

Students read excerpt from The History of Zero, a novel, write short essay

Major Concepts

- **What is a variable and why is it important in algebra?**
- What does it mean to simplify and expression as much as possible?
- What does it mean to solve for a variable?
- How can we compare quantities involving variables?
- How do we balance equations?
- How can I solve a problem using guess & check?
- How can I use proportions to

Content Information

- Variables and Like Terms
- Simplifying expressions by combining like terms
- Writing Algebraic Expressions
- Using Algebra Tiles to simplify algebraic expressions
- Using Algebra Tiles to compare expressions
- Using algebra tiles to solve for X
- Utilizing proportional relationships to make predictions

	<p>predict situations?</p> <ul style="list-style-type: none"> • What is the meaning of "minus"? • What is zero? • What if zero didn't exist? 	
<p>Texts/Materials Needed</p> <ul style="list-style-type: none"> • CPM Handouts • Materials listed in Lesson Plans • SmartBoard 	<p>Regents/SAT Preparation</p> <p>Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.</p>	

CURRICULUM MAP

UNIT THREE: Graphs and Equations

Goals and Objectives: This unit introduces different representation of patterns such as pile patterns, tables, graphs, and equations. **Students will also explore the connections between graphing and solving equations.**

Major Assessments

Formative

- Review & Preview Problems completed & checked daily
- Group work
- Mini-presentations
- Binder Check
- Group products
- Concept Cards
- Tile Pattern exercise
- Graphic Organizer/Presentations (for exam review)
- John's Giant Redwood problem

Summative

- Art Project-Fibonacci numbers in Nature
- Unit Exam-graphs, tables, rules, solving equations

Process Overview

- Students use in/out tables to determine the rule
- Students use function box to consider input/output
- Students predict outcomes from data samples
- Students graph data from data tables
- Students use the graphing calculator to identify solutions
- Students use algebra tiles to solve equations and check solutions
- Students use equations to solve problems
- Students play "silent board game" to determine a function's input and output
- Students create art project based on Fibonacci sequence
- Good tipper
- Identifying common graphing errors
- Guess my number

Reading/Writing Skills

Learning Logs

Writing assignment: How do you write a rule without words?

How do you make a prediction?

Write-up on Fibonacci project.

Major Concepts

- What is a variable?
- What is the pattern?
- What is the rule?
- How can I represent it?
- How can I solve?
- How can I check my answer?

Content Information

- Extending patterns and finding rules
- Using graphs, tables, rules, to make a prediction
- Using the graphing calculator to solve problems
- Solving and checking equations
- Determining number of solutions
- Using equations to solve problems

Texts/Materials Needed

- CPM Handouts
- Materials listed in Lesson Plans
- SmartBoard

Regents/SAT Preparation

Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.

CURRICULUM MAP

UNIT FOUR: Using Multiple Representations

Goals and Objectives: This unit spirals the work from Units 2 and 3 looking for connections between graphs, tables, patterns, and equations (rules). Students will explore situations that can be represented by a line and study what it means when two lines intersect.

Major Assessments

Formative:

- Review & Preview Problems completed & checked daily
- Group work
- Mini-presentations
- Binder Check
- Group products
- Quiz on Multiple Representations

Summative:

- Project-students represent companies, compare sales and profit using systems of equations
- Unit Exam-multiple representations

Process Overview

- Several team challenges enable students to brainstorm, analyze, and present connections between patterns, rules, graphs, tables, and equations
- Students build, over the course of the unit, a "representation web," that connotes the interconnection between tables, graphs, patterns, rules, and equations
- Students use pile patterns to investigate growth

Reading/Writing Skills

Learning Logs

Writing assignment-comparing and contrasting patterns, finding connections between equations/tile patterns

Major Concepts

- How many different ways can you represent something?
- How does a pattern grow?
- What is a system?
- How do we apply concepts to make connections?

Content Information

- Writing a rule from a graph
- Drawing a graph from a pattern
- Writing equations from word problems
- Finding the point of intersections (solution to a system)
- Discovering the connections between graphs, tables, rules, and patterns
- Graphing a linear equation in $y=mx+b$ form
- Finding equations from lines

Texts/Materials Needed

- CPM Handouts
- Materials listed in Lesson Plans
- SmartBoard

Regents/SAT Preparation

Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.

CURRICULUM MAP

UNIT FIVE: Operations with Polynomials

Goals and Objectives: During this unit, students will learn how to multiply algebraic expressions, and how to solve equations that have products

Major Assessments

Formative

Daily homework-review and preview
Daily classwork-team work using algebra tiles, diamond patterns
Binder Check

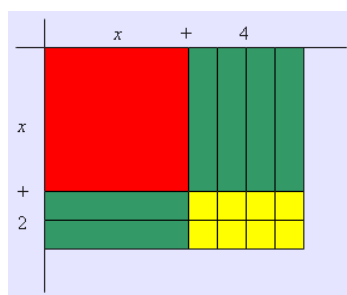
Summative

Short Story-polynomials

Unit Exam-multiplying algebraic expressions, using distributive property, understanding polynomials

Process Overview

- Students use algebra tiles to find the area of rectangles
- Students apply area concepts to multiplying binomials and using the distributive property
- Students use generic rectangles to multiply algebraic expressions
- Students use algebra tiles to work with 2-variable equations
- Students work on practice problems-solving equations without manipulatives



Reading/Writing Skills

Learning Logs

Short story-polynomial
fairy tale

Major Concepts

- How can we build it?
- What is the relationship?
- What is multiplication?
- How do I solve it?
- What do these variables mean?
- How can I isolate the variable?
- What is area?

Content Information

- Understanding distributive property
- Solving equations without manipulatives
- Multiplying algebraic expressions
- Solving equations that have products

Texts/Materials Needed

- CPM Handouts
- Materials listed in Lesson Plans
- SmartBoard

Regents/SAT Preparation

Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.

CURRICULUM MAP

UNIT SIX: Proportions

Goals and Objectives During this unit, students will develop problem solving strategies that can be used to solve proportion problems. Students will use proportional reasoning to solve problems, as well as formal proportions.

Major Assessments

Formative

Classwork-similar triangles, investigating proportions and ratios (multiplicative relationships)

Homework-review and preview, parts of the proportions project

Mini-presentations during portfolio project

Quiz-proportions

Binder Check

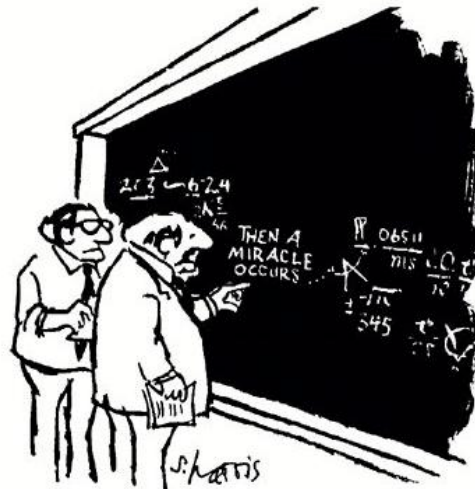
Summative :

Portfolio Project-Proportions. Multi-faceted project includes classroom experiments, team challenges, activities (M&Ms, Gummy worms, goldfish), newspaper articles

Unit Exam-ratios and proportions

Process Overview

- This unit centers on a large-scale, interactive project. The students will create a portfolio from this project which will include 1.data 2. writing assignments 3. data analysis 4. creative assignments (word problems) 5. class presentations
- Daily classwork and homework provides foundation for rational thinking/proportional reasoning.



"I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO."

Reading/Writing Skills

Learning Logs

Writing assignments based on newspaper articles in the proportions project

Major Concepts

- How can we build it?
- How are these related?
- Why do we multiply?
- Is this rational?
- When do proportions work? Why?

Content Information

- using proportional reasoning to solve problems
- writing and solving proportions
- rational numbers

Texts/Materials Needed

- CPM Handouts
- Materials listed in Lesson Plans
- SmartBoard

Regents/SAT Preparation

Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.

CURRICULUM MAP

UNIT SEVEN: Systems of equations

Goals and Objectives: During this unit, students will learn how to multiply algebraic expressions, and how to solve equations that have products

Major Assessments

Formative

Daily classwork
Daily homework
Writing assignment-mathematical sentences
Team Quiz-Substitution
Team Quiz-Elimination
Binder Check

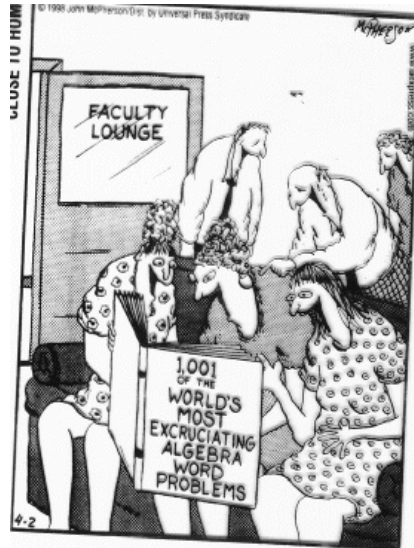
Summative

Extension on company project (ch.4)-students act as consultants and make recommendations to CEO of companies

Unit Exam-systems of equations

Process Overview

- Students write mathematical sentences to help them draw out and elucidate mathematical reasoning. Mathematical sentences use one and two variables
- Word problems with real-world applications are used to help students use substitution and elimination
- Periodic quizzes will be given on Substitution and Elimination, because these strategies are often complicated for students



Reading/Writing Skills

Learning Log

Writing Assignment-technical writing. How can we write using algebra?
Comparing mathematical sentences to English sentences

Writing Assignment/Presentation-letter to CEO

Major Concepts

- What is a solution?
- What happens when there is no solution?
- What strategy works best?
- What does the graph of a system look like?
- Where is the solution on the graph?

Content Information

- Students solve systems using substitution
- Students solve systems using elimination
- Students understand the terms coefficient and constant
- Students understand what it means to have no solution, infinite solutions
- Students understand what the solution means in a situation

Texts/Materials Needed

- CPM Handouts
- Materials listed in Lesson Plans
- SmartBoard

Regents/SAT Preparation

Students will be given all the Regents problems from the last six years that involve the skills learned in this unit.

