PARAMOUNT UNIFIED SCHOOL DISTRICT

GREAT THINGS ARE HAPPENING IN PARAMOUNT SCHOOLS

Mathematics Initiatives

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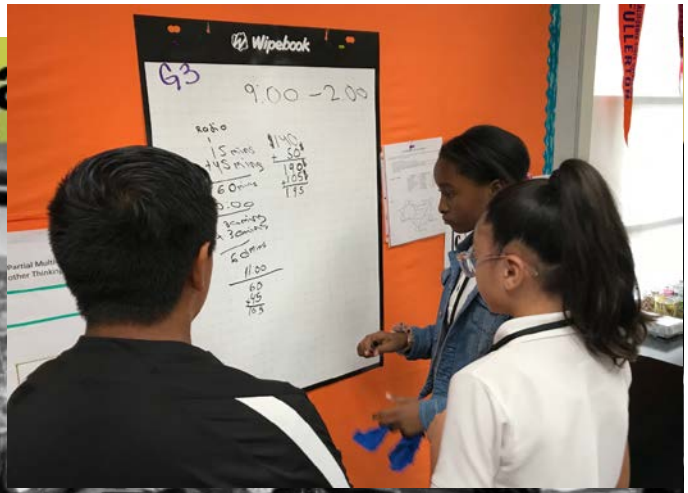
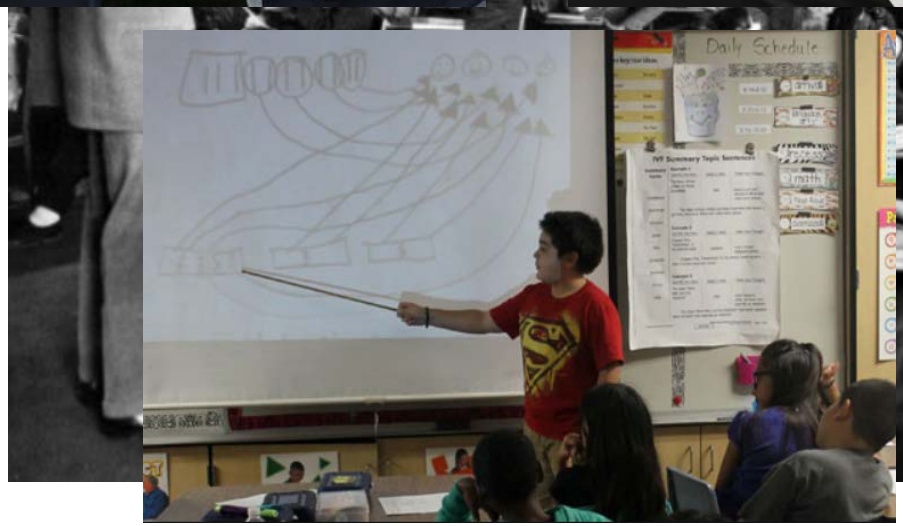
Purpose of Presentation

Provide an update on how math instruction has changed to focus on mathematical thinking and understanding in grades K-8.

How is math instruction different in a K-8 classroom?





Math Standards

Content Standards

Grade-level
K-8 standards

$3 \cdot x = 12$

Practice Standards

Address habits of mind that foster mathematical thinking

Curriculum and Instruction that Support New Ways of Teaching

Grades K-8
▪ Instruction, curriculum guides and assessments that promote inquiry and problem solving.
▪ Integration of technology.
▪ ST Math—on line program that develops conceptual understanding of math concepts.
▪ "A Thinking Classroom" pilot at Jackson (6th grade)

Professional Development that Supports New Ways of Teaching

Grades K-8
▪ Professional development on Cognitively Guided Instruction (CGI) for grades K-5 and Math Institutes (6-8).
▪ Teacher Lab: K-5 teacher teams bring evidence of CGI implementation to analyze students' understanding.
▪ Foundation of Fractions, and online course, completed by 25 teachers over summer.
▪ Math lesson study facilitated at each middle school.

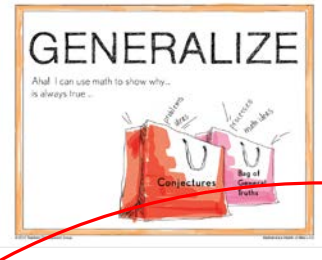
Purpose of Presentation

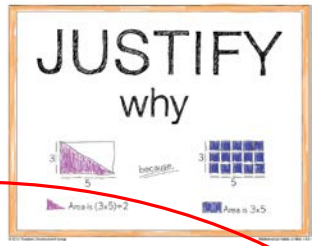
Provide an update on how math instruction the various math initiatives taking place in Paramount's high schools.

Our Work With Teachers Development Group

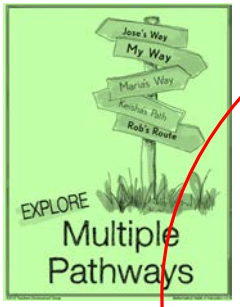
- High School Math Teams:
  - PHS West – Algebra 1 and Geometry
  - PHS Senior – Geometry, Algebra 2, and Pre-Calculus
  - Odyssey – Integrated Math Program
  - CDS/Buena Vista
- Best Practices in Teaching Mathematics Workshop
- Support for Mathematics Coaches
- 3 "Studio" Cycles for each team

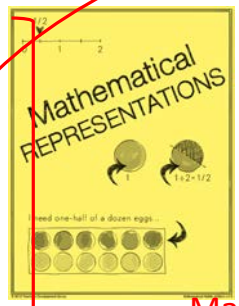
What we want students to do with their mathematical knowledge

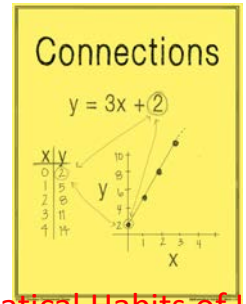


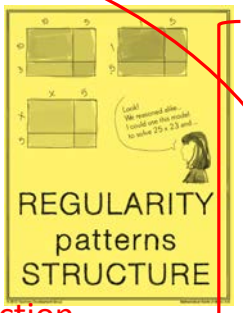


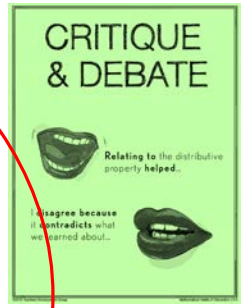
Mathematical Habits of Mind



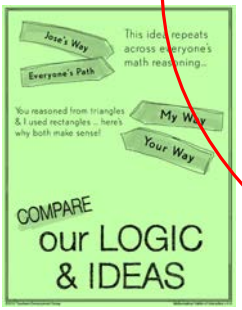


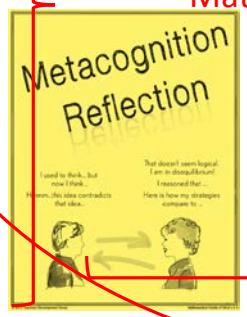


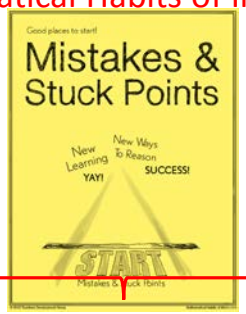


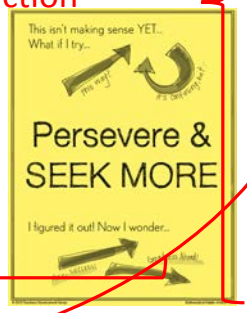


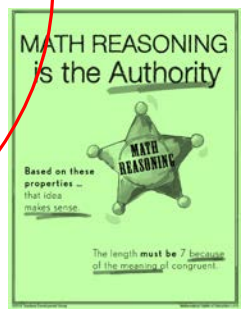
Mathematical Habits of Interaction

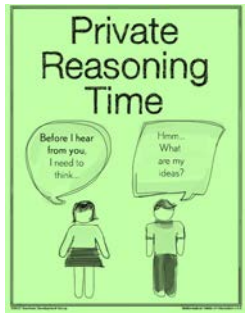


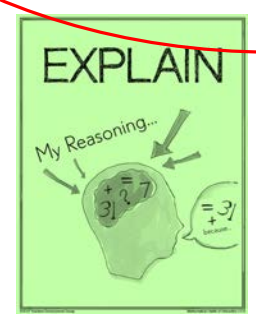


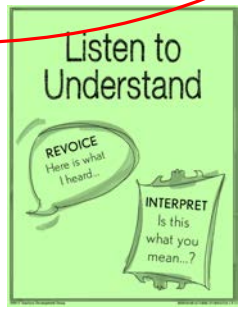


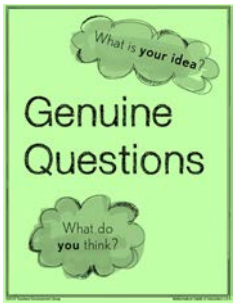












Teaching Routines

Generates student engagement in mathematically productive thinking and discourse by purposefully:

Structuring worthwhile student talk	Conferring to understand students' thinking and reasoning
Working with selected and sequenced student math ideas	Eliciting reasoning about visual representations and connections to other math representations
Working with public records of students' mathematical thinking	Working with students' math struggles, errors, and disequilibrium

The Studio Cycle

Day 1

- Leadership coaching
- TDG coach and studio teacher plan lesson

Day 2

- Preview lesson
- Observe lesson
- Debrief lesson

Follow Up

- Math Curriculum Specialist and Coaches visit other studio participants
- Plan lesson
- Observe lesson
- Debrief lesson

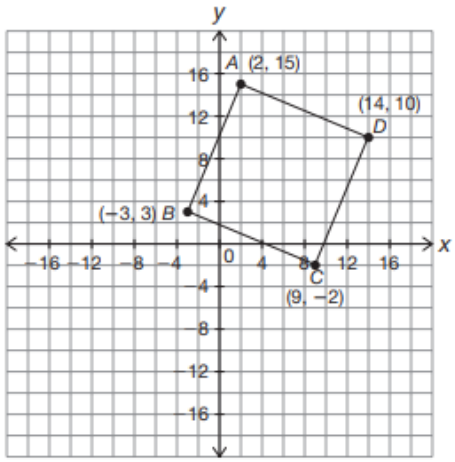
Carnegie Learning

- **Objective**: Support students who have struggled in mathematics through a course that uses blended learning.
- *Blended Learning* approach to teaching mathematics
  - Combines traditional instruction and technology
  - Personalized for each student
- Carnegie's approach to instruction:
  - Teacher facilitated problem solving
  - Mathia software
- Coaching support from Carnegie consultant
- Courses Offered:
  - PHS West: Algebra 1
  - PHS Senior: Geometry

Problem-Solving Approach

PROBLEM 1 **Pomp and Circumstance**

Marissa is throwing a party for her graduation and wants to invite all of her friends and their families. Consider the space defined by quadrilateral *ABCD*. Each of the four corners of the space is labeled with coordinates, measured in feet, and defines the dimensions of the room that Marissa's little brother says the party should be held.



1. Marissa's mom says that the room is obviously a square or a rectangle, so if you can figure out the length of one or two of the sides, then you can easily determine the area. Marissa tells her mother that you can't just assume that a shape is a square or a rectangle because it looks like one.

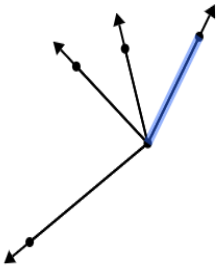
   Who is correct and why?

Mathia

< Unit Overview | Step-by-Step | Sample Problem | Hints | Solve It | I'm Done

Select the indicated object in the diagram. Then, name the object.

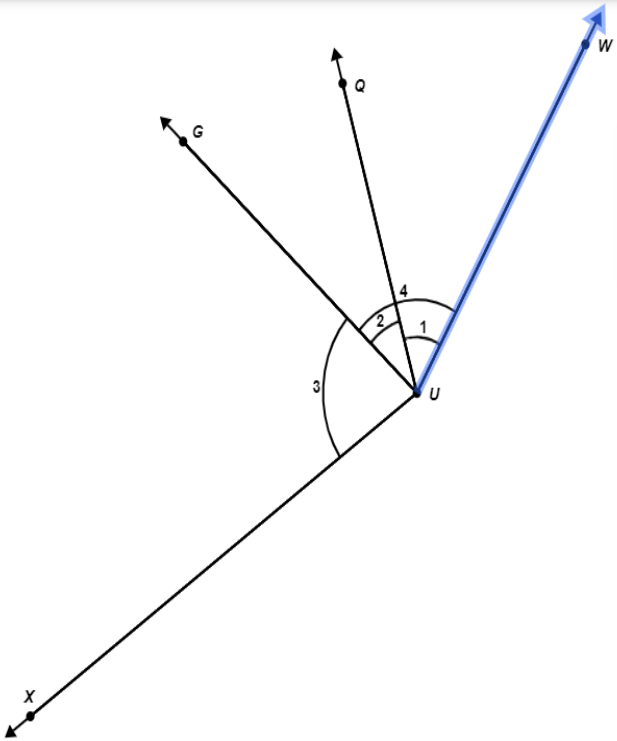
1. Select the object that is highlighted in the diagram.



The name of the highlighted element is $\overline{UW}$.

Another name for the highlighted element is $\overline{WU}$

2. Select the object that is highlighted in the diagram.



Name:

Mathia

Algebra with Coding

- Objectives:
  - Address the growing demand in the workplace for coding
  - Develop the connection between mathematics and coding
  - Ensure equity
  - Use coding to enhance Algebra instruction
  - Increase student engagement in mathematics
- Unique partnership with TechSmart
- Teacher Support:
  - "Coding Bootcamp"
  - Coaching Days
  - Phone, online, and chat support
- Year 1: Teaching coding along side Algebra
- Year 2: Coding fully integrated within Algebra

TechSmart

Fastest Growing Occupations

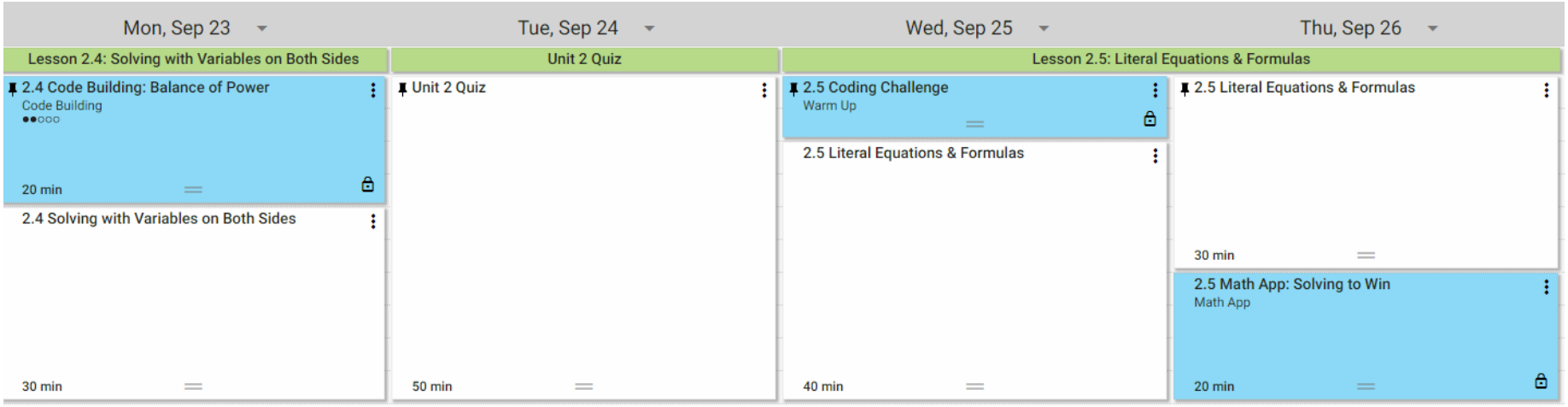
PRINTER-FRIENDLY

Fastest growing occupations: 20 occupations with the highest percent change of employment between 2018-28.

Click on an occupation name to see the full occupational profile.

OCCUPATION	GROWTH RATE, 2018-28	2018 MEDIAN PAY
Solar photovoltaic installers	63%	$42,680 per year
Wind turbine service technicians	57%	$54,370 per year
Home health aides	37%	$24,200 per year
Personal care aides	36%	$24,020 per year
Occupational therapy assistants	33%	$60,220 per year
Information security analysts	32%	$98,350 per year
Physician assistants	31%	$108,610 per year
Statisticians	31%	$87,780 per year
Nurse practitioners	28%	$107,030 per year
Speech-language pathologists	27%	$77,510 per year
Physical therapist assistants	27%	$58,040 per year
Genetic counselors	27%	$80,370 per year
Mathematicians	26%	$101,900 per year
Operations research analysts	26%	$83,390 per year
Software developers, applications	26%	$103,620 per year
Forest fire inspectors and prevention specialists	24%	$39,600 per year
Health specialties teachers, postsecondary	23%	$97,370 per year
Phlebotomists	23%	$34,480 per year
Physical therapist aides	23%	$26,240 per year
Medical assistants	23%	$33,610 per year

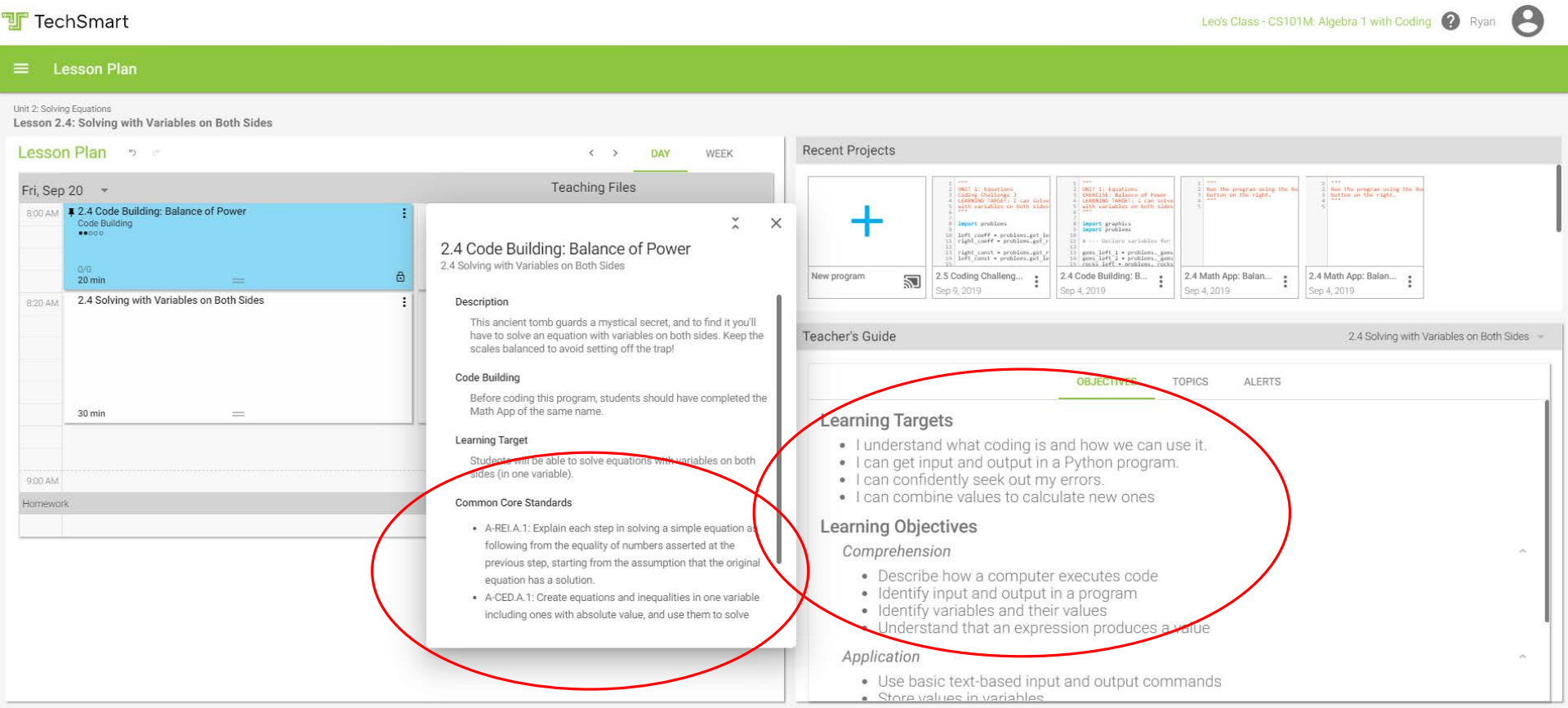
Algebra 1 –Coding Integration



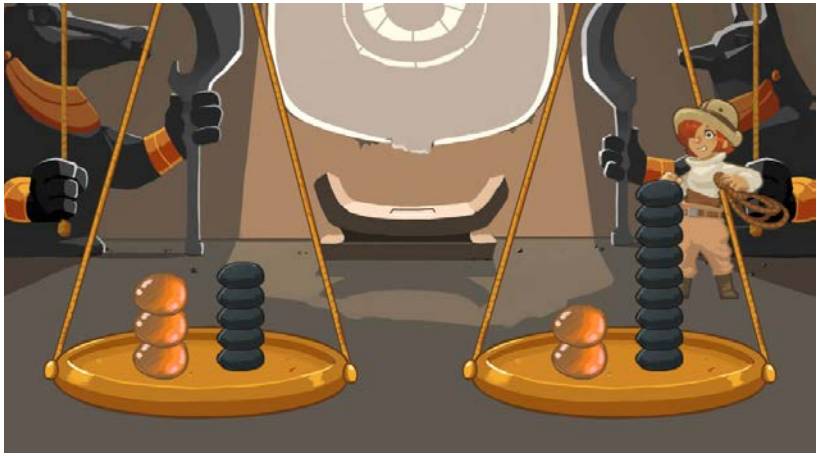
1. Math Application: Students run a program, and then investigate the mathematics behind it.

2. Code Building: Students study the code behind the program and attempt to write key parts.

3. Coding Challenge: Students write 3-5 lines of the math-focused code

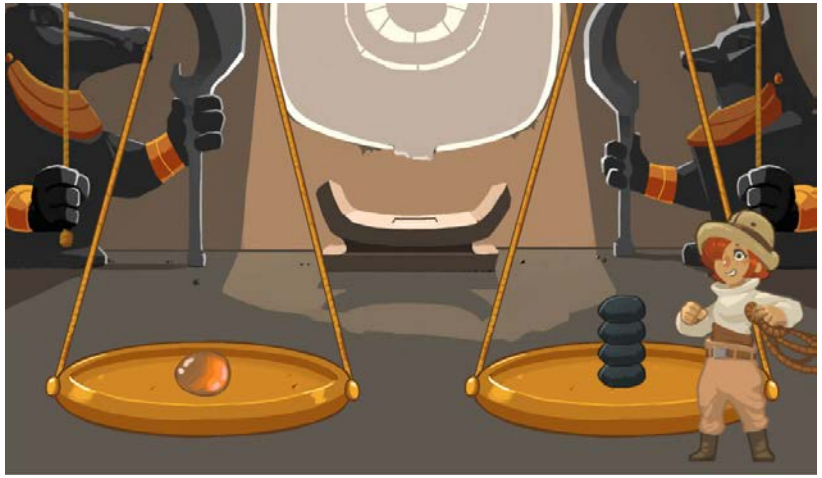

TechSmart
Leo's Class - CS101M: Algebra 1 with Coding
Ryan
Lesson Plan
Unit 2: Solving Equations
Lesson 2.4: Solving with Variables on Both Sides
Lesson Plan
DAY
WEEK
Fri, Sep 20
Teaching Files
8:00 AM
2.4 Code Building: Balance of Power
Code Building
0/0
20 min
8:20 AM
2.4 Solving with Variables on Both Sides
30 min
9:00 AM
Homework
2.4 Code Building: Balance of Power
2.4 Solving with Variables on Both Sides
Description
This ancient tomb guards a mystical secret, and to find it you'll have to solve an equation with variables on both sides. Keep the scales balanced to avoid setting off the trap!
Code Building
Before coding this program, students should have completed the Math App of the same name.
Learning Target
Students will be able to solve equations with variables on both sides (in one variable).
Common Core Standards
A-REI.A.1: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution.
A-CED.A.1: Create equations and inequalities in one variable including ones with absolute value, and use them to solve
Recent Projects
New program
2.5 Coding Challeng...
Sep 9, 2019
2.4 Code Building: B...
Sep 4, 2019
2.4 Math App: Balan...
Sep 4, 2019
2.4 Math App: Balan...
Sep 4, 2019
Teacher's Guide
2.4 Solving with Variables on Both Sides
OBJECTIVES
TOPICS
ALERTS
Learning Targets
I understand what coding is and how we can use it.
I can get input and output in a Python program.
I can confidently seek out my errors.
I can combine values to calculate new ones
Learning Objectives
Comprehension
Describe how a computer executes code
Identify input and output in a program
Identify variables and their values
Understand that an expression produces a value
Application
Use basic text-based input and output commands
Store values in variables

$2x + 5 + 1x = 2 + 2x + 7$



$3x + 5 = 2x + 9$

$1x + 5 = 9$



$x = 4$

Code Building

BalanceOfPower.py

```
20
21 # --- FIND WEIGHT OF GEMS --- #
22 # ASSIGN variable gems_left the result of calculating
23 # the total gems on the left side.
24 # Use the variables gems_left_1 and gems_left_2.
25
26 # ASSIGN variable rocks_right the result of calculating
27 # the total rocks on the right side.
28 # Use the variables rocks_right_1 and rocks_right_2.
29
30 # ASSIGN total_gems the result of combining the number
31 # of gems into one term on the left side.
32 # Use the variables gems_left and gems_right.
33
34 # ASSIGN the variable total_rocks the result of
35 # combining the rocks into one term on the right side.
36 # Use the variables rocks_left and rocks_right.
37
38 # ASSIGN the variable weight the result of
39 # calculating how many rocks each gem weighs.
40 # Use the variables total_gems and total_rocks.
41 # ---> TEST AFTER THIS LINE <--- #
42
43 # Turn in your Coding Exercise.
```

BalanceOfPower.py

```
23 # ASSIGN variable gems_left the result of calculating
24 # the total gems on the left side.
25 # Use the variables gems_left_1 and gems_left_2.
26 gems_left = gems_left_1 + gems_left_2
27
28 # ASSIGN variable rocks_right the result of calculating
29 # the total rocks on the right side.
30 # Use the variables rocks_right_1 and rocks_right_2.
31 rocks_right = rocks_right_1 + rocks_right_2
32
33 # ASSIGN total_gems the result of combining the number
34 # of gems into one term on the left side.
35 # Use the variables gems_left and gems_right.
36 total_gems = gems_left - gems_right
37
38 # ASSIGN the variable total_rocks the result of
39 # combining the rocks into one term on the right side.
40 # Use the variables rocks_right and rocks_left.
41 total_rocks = rocks_right - rocks_left
42
43 # ASSIGN the variable weight the result of
44 # calculating how many rocks each gem weighs.
45 # Use the variables total_rocks and total_gems.
46 # ---> TEST AFTER THIS LINE <--- #
47 weight = total_rocks / total_gems
48
49 # Turn in your Coding Exercise.
50
```

Questions?