WAMC Lab #2 Desmos Activity:Make Them Balance

Math Concept(s): Solving Linear Equations
Source / Text: Big Ideas Algebra One/Desmos
Developed by: Kathy James E-Mail: kjames@sheltonschools.org
Date: WAMC Summer Conference 2021

Attach the following documents:

- **Lab Instructions:** Join the Desmos activity (Put class code here) and follow the directions provided.
- **Student Handout(s):** Chrome books, paper & pencil
- **Rubric and/or Assessment Tool:** Initial Formative assessment to walk around the class and look at students work; Continue formative assessment reviewing students input in Desmos slides with teacher comments added. Summative Assessment: Quiz (See quiz in the folder of the thumb drive.)

Short Description (Be sure to include where in your instruction this lab takes place):
Students will join the Desmos Class Activity and follow the steps in the lesson as they attempt to solve first one linear equation and then a System of Equations.

Lab Plan
Lab Title: Desmos Activity: Make Them Balance

Prerequisite skills: Students can already solve a linear equation. They will use this knowledge to help them solve linear equations and then use this prior knowledge to start solving a systems of equations.

Lab objective: Students will be able to create a balanced system of equations using a graph or hanger in a picture representation.

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*
Mathematics K–12 Learning Standards:

- A-REI5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produce a system with the same solutions.
- A-REI6 Solve systems of linear equation, exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them
- Reason abstractly & quantitatively
- Construct viable arguments & critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for & make sure of structure

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the test.
- RST.9-10.4 Determine meaning of symbols, key terms, or other domain specific words and phrases as they are used in specific technical context.
- RST.9-10.7 Translate quantitative or technical information expressed n words in a text into visual form and translate information expressed verbally or mathematically into words.

Technology

- 1.2.1 Communicate and collaborate to learn with others.
- 1.3.2 Locate and organize information from a variety of sources and media.
- 2.2.1 Develop skills to use technology effectively.
- 2.4.1 Formulate and synthesize new knowledge.

Engineering

- Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions with in and between systems relevant to the problem.

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☐ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION
Creativity and Innovation
x Think Creatively
☐ Work Creatively with Others
x Implement Innovations
Critical Thinking and Problem Solving
x Reason Effectively
x Use Systems Thinking
☐ Make Judgments and Decisions
x Solve Problems
Communication and Collaboration
x Communicate Clearly
☐ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS
Information Literacy
x Access and Evaluate Information
x Use and manage Information
Media Literacy
☐ Analyze Media
☐ Create Media Products
Information, Communications and Technology (ICT Literacy)
x Apply Technology Effectively

LIFE & CAREER SKILLS
Flexibility and Adaptability
☐ Adapt to Change
x Be Flexible
Initiative and Self-Direction
☐ Manage Goals and Time
x Work Independently
☐ Be Self-Directed Learners
Social and Cross-Cultural
☐ Interact Effectively with Others
☐ Work Effectively in Diverse Teams

Productivity and Accountability
☐ Manage Projects
x Produce Results
Leadership and Responsibility
x Guide and Lead Others
☐ Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials-

Chrome books; Desmos Activity; code to join class.

Set-Up Required:

- Students have spirals for working out each page in the Desmos Activity when necessary.
- Individual computers for each student

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Think Creatively; Reason Effectively; Use Systems Thinking; Solve Problems; Communicate clearly; Access and evaluate information; Apply technology Effectively; Be flexible; Produce results; work independently and Guide & lead others.

Cooperative Learning:

- Students will be arranged in a Complex Instruction Groups.
- Students are given card to explain their roles and help questions to guide them in fulfilling their roles.

Expectations: Students will discuss their work with their group. Each person is responsible for an individual submission in the Desmos Activity.

-

Timeline:

- One Class period

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Almost any situation where there is an unknown quantity can be represented by a linear equation, like figuring out income over time;

Career Applications

- Starting a business with total cost of materials and income generated. Supply and Demand Analysis.

Optional or Extension Activities

- Create a mobile with balanced objects.

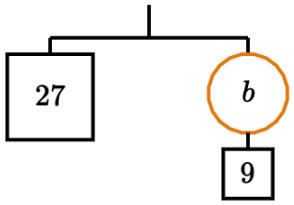
Quiz Desmos Activity: Make them Ballance

Name_____

Period_____

1)

The hanger image below represents a balanced equation.



Select an equation that represents the image.

Choose 1 answer:

(A) $27 = b + 9$

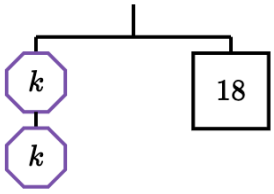
(B) $27 = b \cdot 9$

Find the value of b that makes the equation true.

$b =$ ____

2)

The hanger image below represents a balanced equation.



Select an equation that represents the image.

Choose 1 answer:

(A) $2 + k = 18$

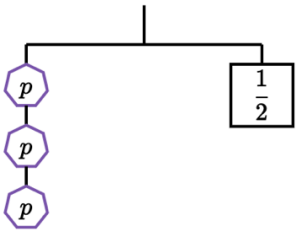
(B) $2k = 18$

Find the value of k that makes the equation true.

$k =$ ____

3)

The hanger image below represents a balanced equation.



Write an equation to represent the image.

____

4) Make a hanger for the following equation.

$3x + 2 = y$

5) Make a hanger for the following equation.

$$5x + 1 = y$$

6) Use a hanger or graph to figure out where the equations for #4 and #5 intersect. In other words, what is the solution for this system of equations.

$3x + 2 = y$ and $5x + 1 = y$

Challenge: Can you solve this system? What does each figure equal in terms of the others? Can you assign values to each figure?