<u>**WAMC Lab Template**</u>
Math Concept(s): Systems Walking Graph
Source / Text:
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<u>**Attach the following documents:**</u>
- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

<u>**Lab Plan**</u>
Lab Title: Systems of Equations Walking Graphs

Prerequisite skills: Students must know: Slope intercept form, standard form, Y- intercept, slope, how to solve equations using substitution and elimination, how to graph a linear function.

Lab objective:
In this lesson students will identify important variables of linear functions. Students will estimate where their lines will intersect and then solve to find exact values. Test their solutions by walking the live graph. Then they will graph on paper. This will take place in the classroom or outside in a large enough area to tape/ paint a cartesian graph on the ground.

<u>**Standards:**</u> *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*
<u>Mathematics K–12 Learning Standards</u>:
- **HSA-REI.C.6**
Solve **system**s **of** linear **equation**s exactly and approximately (e.g., with graphs), focusing on pairs **of** linear **equation**s in two variables
- **HSA-REI.D.10**
Understand that the **graph** of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

<u>Standards for Mathematical Practice</u>:
- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 4. Model with mathematics.
- 6. Attend to precision.

<u>K-12 Learning Standards-ELA</u> (Reading, Writing, Speaking & Listening):
- ELA- Literacy SL.11-12.1.c Propel conversations by posing and responding to questions that probe reasoning and evidence. Ensure a hearing for a full range of positions on a

topic or issue. Clarify, verify or challenge ideas and conclusions and promote divergent and creative perspectives.

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K-12 Science Standards

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Technology

- Desmos online Calculator- 1.c. Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

Engineering

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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	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
Creativity and Innovation	Information Literacy	Flexibility and Adaptability	☐ Manage Projects
☒ Think Creatively	☒ Access and Evaluate Information	☒ Adapt to Change	☒ Produce Results
☒ Work Creatively with Others	☐ Use and manage Information	☒ Be Flexible	Leadership and Responsibility
☐ Implement Innovations	Media Literacy	Initiative and Self-Direction	☐ Guide and Lead Others
Critical Thinking and Problem Solving	☐ Analyze Media	☒ Manage Goals and Time	☒ Be Responsible to Others
☒ Reason Effectively	☐ Create Media Products	☒ Work Independently	
☒ Use Systems Thinking	Information, Communications and Technology (ICT Literacy)	☒ Be Self-Directed Learners	
☒ Make Judgments and Decisions	☒ Apply Technology Effectively	Social and Cross-Cultural	
☒ Solve Problems		☒ Interact Effectively with Others	
Communication and Collaboration		☒ Work Effectively in Diverse Teams	
☒ Communicate Clearly			
☒ Collaborate with Others			

Teacher Preparation: (What materials and set-up are required for this lab?)
Materials
- Tape/ spray paint to create Cartesian graph
- Summative Assessment/ Worksheet

Set-Up Required:
- To do this lab effectively you will need a big enough space that you can create a large graph on the ground. Tape or paint a grid on the ground with each square being 1x1 foot. Number of squares in the graph can depend on equations you use.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Be a responsible member to your group. Complete work, collaborate, and participate when needed, without delay.

Cooperative Learning:

- For this lab students will be placed in groups with 2-4 students in each group (depending on class size and time restrictions). Each student will be responsible for their own calculations, ultimately coming to a conclusion on 1 solution point as a group.

Expectations:

- To show students in a larger more understandable way how graphing two equations find a solution point.

Timeline:

- 5 minutes- Make Guessed about solution point given equation
- 10 minutes- solve system using substitution method as well as elimination.
- 25 minutes- Walk on graphs given equation to find solution point
- 20 minutes- Graph system on summative assessment and answer remaining questions on assignment

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Real world applications would include any field that requires employees to follow instructions.

Career Applications

- Specific career applications include engineering, economists, and data scientists

Optional or Extension Activities

- When doing the walking of the graph at each step (point) pin down caution tape creating a visual of a graph on the ground.2