

WAMC Lab Template

Math Concept(s): Creating Inequalities, Modeling with Mathematics

Source / Text: None

Developed by: Aaron Smith and Jess Christensen

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Date: Summer Conference 2022

Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

Lab Plan

Lab Title: Grocery Store Inequalities

Prerequisite skills: Understanding inequality solutions (what does greater than/less than really mean), building equations, basic arithmetic operations

Lab objective: Students will be able to translate a real world situation into an inequality in order to determine how much candy they can buy with leftover money after their mother sends them to the store to buy something specific. They will also be able to determine which choice of candy will give them the most candy for their leftover money, by solving inequalities for each option.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- A.CED.1&3: Create equations that describe numbers or relationships
- A.REI.1: Understand solving equations as a process of reasoning and explain that reasoning
- A.REI.3. Solve equations and inequalities in one variable

Standards for Mathematical Practice:

- MP.1. Make sense of problems and persevere in solving them
- MP.4. Model with mathematics

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

- WHST.9-12.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem

K-12 Science Standards

- HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Technology

- N/A

Engineering

- HS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Leadership/21st Century Skills:

<u>21st Century Interdisciplinary themes</u> (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input checked="" type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
<u>21st Century Skills</u> (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	X Manage Projects
X Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Leadership and Responsibility
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<input type="checkbox"/> Guide and Lead Others
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	X Manage Goals and Time	<input type="checkbox"/> Be Responsible to Others
X Reason Effectively	<input type="checkbox"/> Create Media Products	X Work Independently	
X Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	X Be Self-Directed Learners	
<input type="checkbox"/> Make Judgments and Decisions	<input type="checkbox"/> Apply Technology Effectively	<u>Social and Cross-Cultural Others</u>	
X Solve Problems		<input type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input type="checkbox"/> Work Effectively in Diverse Teams	
<input type="checkbox"/> Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

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

Materials

- Objects required to buy by mom (optional, but fun)
- Price labels
- Starting dollar amounts to give to students
- Objects slips to hand out
- Student record sheet

Set-Up Required:

- Put price labels on objects
- Set out object (optional)

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Students will work through a situation and create an inequality to represent a situation without direction, requiring them to think creatively.
- This is a summative assessment for students, so they will be self-directed and need to work independently.

Cooperative Learning:

- Students will each have their own scenario to complete the activity with, but may discuss small points with other students

Expectations:

- Students will complete all 3 parts of the assignment on their own

Timeline:

- Students will have three class periods to complete the project, including the writing portions.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Money management and budgeting applications

Career Applications

- Storekeeper/manager, purchasing agent, wholesale sales representative, marketing agents

Optional or Extension Activities

- Multivariable inequalities where students combine different types of candy to buy with leftover money

Lab Instructions:

1. Pass out student record sheet and give an overview of the activity. Tell the students what the premise of the activity is, and point out where they can find the items they will be purchasing at the store.
2. Next, have students draw the card with the starting amount of money and the item their mom is sending them to the store to purchase.
3. Have students record this information on their papers.
4. Discuss the different candy options available and the price differences between them. Explain once again that after they purchase the item for their mom, they can use their leftover money to buy whichever candy they would like.
5. Have students look through the packet and explain what the expectations are for each part of the assignment and answer any questions that may come up.
6. Have students get up, find their items, and start working on their assignment.
7. Circulate the room to help students who may need help or direction.

Lab Rubric:

4–Advanced	3–Proficient	2–Basic	1–Developing
Student consistently demonstrates clear and in-depth understanding of lab and concepts.	Student demonstrates good understanding of lab and concepts.	Student demonstrates basic understanding of lab and concepts.	Student demonstrates little to no understanding of lab and concepts.

My Mom Sent Me to the Store

She gave me \$_____ to buy _____.

And it costs \$_____.

Candy Options:

Hershey's Kisses: \$0.15 each

Starbursts: \$0.50 for 5

M&Ms: \$0.65 each

Part One:

Choose your favorite candy and determine how much you can buy with your leftover money. Show your work in the box below! (Hint: first, how much money can you spend on candy?)

Part Two:

A). Write an **inequality** to represent how much money you were given, what you have to spend it on, and how much candy (x) you can buy. (Hint: what is the **most** you can spend? What is the amount of money that you **have** to spend, no matter what?)

B). Write an inequality that represents the situation if your mother gave you \$17.

C). Write an inequality that represents the situation if your mother asked you to buy some milk, which costs \$3.83.

D). Write an inequality that represents the situation if you mother gave you \$9 and asked you to buy some onions, which will cost you \$1.57.

Part Three:

Your mom said that whatever change you have leftover after you buy her items and your candy must be returned to her. So lets spend that money!

A). Which candy option would leave you with the **least** amount of change needed to give back to your mother? Show your work in the box below and circle the answer!

B). On the lines below, explain your answer choice to part A. Make sure you explain how you know for sure that your answer choice is the correct one for your situation.

WAMC Lesson Plan

Name(s): Aaron Smith & Jess Christensen

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Lesson Title: Creating and Solving Two-Step Inequalities

Date: Summer Conference 2022

Text: Any STEM Correlation: Lesson Length: 1-2 Classes

Big Idea (Cluster): A.CED, A.REI	
Mathematics K–12 Learning Standards: A.CED.1, A.CED.3, A.REI.1, A.REI.2	
Mathematical Practice(s): MP.1, MP.4	
Content Objectives: Students will solve practice building and solving two-step inequalities	Language Objectives (ELL): Students will explain their reasoning for answers.
Vocabulary: total, constant, change, variable, inequality, less than/greater than	Connections to Prior Learning: solving one- and two-step equations, combining like terms, simplifying
Questions to Develop Mathematical Thinking: <ul style="list-style-type: none"> Which part is the total? What does the solution represent? 	Common Misconceptions: <ul style="list-style-type: none"> inequality symbols are interchangeable with equals signs

Assessment (Formative and Summative):

<ul style="list-style-type: none"> Formative: building and solving inequalities activity, homework on solving inequalities Summative: Grocery Store Inequality Lab
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Materials:

<ul style="list-style-type: none"> Number cards Symbol cards Lab sheet and lab materials

Instruction Plan:

<p>Introduction: Discuss solving one- and two-step equations that we just learned. Compare/contrast equals sign to inequality symbols. Discuss how solving inequalities is very similar to solving equations, cover minor differences.</p>
<p>Explore: Practice solving some inequalities on the board together. Illustrate similarities and differences to solving equations.</p> <p>Hand out deck of number cards and symbol cards. Have students work in pairs to use cards to build two-step inequalities and then solve together.</p> <p>After a set amount of time, collect cards and hand out homework with solving inequality problems. Allow students class time to get started on these and walk around to clear up any misconceptions and answer questions to ensure students are prepared to finish the homework at home.</p> <p>The following day, start class by solving any homework problems together on the board, by student request.</p> <p>Once that is complete, start the Grocery Store Inequalities Lab</p>
<p>When I observe students: Ensure they are correctly building and solving the inequalities. Answer any questions that arise and clear up any misconceptions.</p>
<p>Questions to Develop Mathematical Thinking as you observe: What does the solution mean?</p>
<p>Answers: It represents the set of solutions that satisfy the inequality or makes the inequality true</p>

WAMC Lesson Plan

Career Application(s):

- Storekeeper/manager, purchasing agent, wholesale sales representative, marketing agents

Leadership/21st Century Skills:

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

- | | | |
|---|--|---|
| <input type="checkbox"/> Global Awareness | <input checked="" type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy | <input type="checkbox"/> Civic Literacy |
| <input type="checkbox"/> Health/Safety Literacy | <input type="checkbox"/> Environmental Literacy | |

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

LEARNING AND INNOVATION

Creativity and Innovation

- X Think Creatively
- X Work Creatively with Others
- Implement Innovations

Critical Thinking and Problem Solving

- X Reason Effectively
- Use Systems Thinking
- Make Judgments and Decisions
- X Solve Problems

Communication and Collaboration

- Communicate Clearly
- X Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate

Information

- Use and manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- X Manage Goals and Time
- Work Independently

Social and Cross-Cultural

- X Be Self-Directed Learners
- Interact Effectively with Others

Others

- Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
- Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others