

Hometown Parade

Problem

A town is organizing a Fourth of July parade. There will be two sizes of floats in the parade, 15 ft and 30 ft. A space of 10 ft will be left after each float. The parade must be at least 150 ft long, but less than 200 ft long. What combinations of large and small floats are possible? Large floats cost \$600 to operate. Small floats cost \$300 to operate. The town has a budget of \$2500 to operate the floats. How does this change your answer? What combinations of large and small floats are possible?

Lesson Summary

Students will write and graph a system of linear inequalities to find all possible combinations of floats for the parade. They will be assigned a branch of the Roman republic along with a god/goddess they must represent in their float. Students will design a float board to represent their float and a newspaper article advertising the details of the parade, including the combinations of floats and the Roman republic theme.

Major Topic and SOL

Math SOL (2009)	A.4e; A.5a,c,d
History SOL (2008)	WHI.6b,c
Language Arts SOL (2010)	7.1; 7.3e; 7.7c,k; 8.2c,d,f,g,h; 8.3c; 8.7; 8.8

Length of Time 7 – 90 minute classes

Student Objectives

- Apply prior knowledge of inequalities and systems of inequalities to find the possible combinations of floats for the parade.
- Use the Hummingbird kit to animate their parade float boards.
- Write a newspaper article to advertise the upcoming parade.

21st Century Skills

- Critical-Thinking and Problem Solving
- Communication
- Creativity and Innovation
- Collaboration
- Information and Media Literacy
- Contextual Learning

Assessment Evidence

- Formative Assessment on Linear Inequalities and Systems of Linear Inequalities
- Project Criteria Rubric

Supplies/Materials/Technology

Lesson 1:

- iBook
- Linear Inequalities Notes
- Linear Inequalities Cut and Paste
- Homework 8: Linear Inequalities
- SmartBoard
- Calculators

Lesson 2:

- Formative – Linear Inequalities
- iBook
- Systems of Linear Inequalities Notes
- Homework 9: Systems of Inequalities
- SmartBoard
- Calculators

Lesson 3:

- Formative – Systems of Linear Inequalities
- iBook
- Parade Problem Assignment
- SmartBoard
- Calculators
- Graph Paper
- Colored Pencils

Lesson 4-7:

- iBook
- Parade Problem Assignment
- Calculators
- Graph Paper
- Colored Pencils
- Hummingbird Kit
- Poster Board
- Laptops
- Project materials – pipe cleaners, pom-poms, colored paper, popsicle sticks, glue gun, tape, various boxes, foam balls and pieces, various cardboard, google eyes
- Power strips

Lesson 1: (1 – 90 minutes class)

- Students will take notes on Linear Inequalities.
- Students will practice graphing linear inequalities using dotted and solid lines, shading, and a test point.
- Students will discuss what the shaded area of the graph represents and determine solutions.
- Students will use a cut and paste activity to match a linear inequality with its graph.
- Students will complete Homework 8: Linear Inequalities for homework.

Lesson 2: (1 – 90 minute class)

- Students will graph a linear inequality as a warm up and go over the answers to the homework.
- Students will answer 2 questions as a formative grade on linear inequalities.
- Students will take notes on systems of linear inequalities.
- Students will practice graphing linear inequalities using dotted and solid lines, shading, and a test point.
- Students will discuss how to use the graph to determine the solutions to the system.
- Students will use task cards to write a system of inequalities given a graph.
- Students will complete Homework 9: Systems of Inequalities for homework.

Lesson 3: (1 – 90 minute class)

- Students will graph a system of linear inequalities as a warm up and go over the answers to the homework.
- Students will answer 2 questions as a formative grade on systems linear inequalities.
- The teacher will present the first part of the Parade Problem on the board and divide students into groups of three.
- The teacher will explain that the students must help figure out how all the possible combinations of floats needed for the parade if it is to be at least 150 ft long, but less than 200 ft long.
- Students will first write a system of equations to represent the situation.
- In order to determine the possible combinations, students will need to graph their system.
- The teacher will give the students a four quadrant coordinate plane to graph on.
- The teacher will then ask the students to determine if the entire graph represents all reasonable solutions. If not, then which parts do and do not and why.
- Students should determine that only the first quadrant contains all the reasonable answers.
- Students should then record all possible solutions from quadrant I.

Lesson 4: (1 – 90 minute class)

- The teacher will announce to the students the new parameters for the parade: the cost and budget.
- Students will then have to write a linear inequality to represent the cost and budget.

- To determine the possible solutions given the cost and budget, students will need to determine which possible previous solutions will still be solutions using their linear inequality.
- Now that students have all possible solutions they will start writing their newspaper article and designing their floats.
- The teacher will provide the requirements for the poster and newspaper article. Students will take on the role of Designer, Engineer, or Publicist and will be assigned a branch of the Roman republic and a god/goddess to represent.
Designer – collects necessary supplies and helps with the construction of the poster.
Engineer – oversees the programming and running of the Hummingbird
Publicist – writes the newspaper article and presents
All group members are responsible for contributing ideas and deciding what goes into each assignment.
- The teacher will go over the parts of the Hummingbird kit they will be using and what each part can do. Students will use this information to start brainstorming ideas for the poster and newspaper article.

Lesson 5: (2 – 90 minutes classes)

- The teacher will go over how to use the Hummingbird kit to program.
- Students will spend the next two days constructing their posters and programming their Hummingbird.

Lesson 6: (1 – 90 minute class)

- Students will present their projects to the class.

Hometown Parade!

Systems of Inequalities LDC Mini-Task

Group Members:

Part 1: Task 3 Word Problem (25 pts)

a. The parade must be at least 150ft long, but less than 200ft long. What combinations of large and small floats are possible?

b. Large floats cost \$600 to operate. Small floats cost \$300 to operate. The town has a budget of \$2500 to operate the floats. How does this change your answer to part (a)?

What combinations of large and small floats are possible?

Part 2: Mini-Tasks (50 pts)

(to be filled out by teacher!)

<p>Newspaper Article Ad (25 points)</p> <p>___ Executive Branch (5 pts) ___ Legislative Branch (5pts) ___ Judicial Branch (5 pts) ___ Float combinations (5 pts) ___ Float costs (5 pts)</p>	<p>Poster (25 points)</p> <p>___ God/Goddess (5pts) ___ Duties of branch (5 pts) ___ Powers of branch (5 pts) ___ Lights and movement (5 pts) ___ Presentation (5 pts)</p>
<p>Group Work (25 points)</p> <p>___ Designer – gathers supplies, helps with construction of poster (5 pts) ___ Engineer – programs and operates the Hummingbird (5 pts) ___ Publicist – write the article and speaks on behalf of the group (5 pts) ___ Used materials with care and respect (5 pts) ___ Worked well together. Everyone was respectful, courteous, compromising, and contributed. (5 pts)</p>	

TEACHER ANSWER KEY Hometown Parade!

Systems of Inequalities LDC Mini-Task

Group Members: _____

Part 1: Task 3 Word Problem (25 pts)

a. The parade must be at least 150ft long, but less than 200ft long. What combinations of large and small floats are possible? $25x + 40y \geq 150$, $25x + 40y < 200$, (1, 4), (2, 3), (3, 2), (3, 3), (4, 2), (5, 1), (6, 1)

b. Large floats cost \$600 to operate. Small floats cost \$300 to operate. The town has a budget of \$2500 to operate the floats. How does this change your answer to part (a)? There are only 5 possible combinations now

What combinations of large and small floats are possible? $300x + 600y \leq 2500$, (2, 3), (3, 2), (4, 2), (5, 1), (6, 1)

Part 2: Mini-Tasks (75 pts)

(to be filled out by teacher!)

<p>Newspaper Article Ad (25 points)</p> <p>___ Executive Branch (5 pts) ___ Legislative Branch (5pts) ___ Judicial Branch (5 pts) ___ Float combinations (5 pts) ___ Float costs (5 pts)</p>	<p>Poster (25 points)</p> <p>___ God/Goddess (5pts) ___ Duties of branch (5 pts) ___ Powers of branch (5 pts) ___ Lights and movement (5 pts) ___ Presentation (5 pts)</p>
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<p><u>Executive Branch</u></p> <ul style="list-style-type: none"> • Leader – President • Duties – carries out federal law and recommends new, directs national defense and foreign policy, perform ceremonial duties. • Powers – directing gov't, commanding Armed Forces, dealing with international powers, acting as chief of law enforcement officer, vetoing laws. 	<p><u>Legislative Branch</u></p> <ul style="list-style-type: none"> • Leader – Congress (House and Senate) • Duties – make laws. • Powers – passing laws, originating spending bills, impeaching officials, approving treaties. 	<p><u>Judicial Branch</u></p> <ul style="list-style-type: none"> • Leader – Supreme Court • Duties – interpret state laws, settle legal disputes, punish violators, hear civil cases, protect individual rights, determine guilt or innocence • Powers – interpreting the Constitution, reviewing laws, deciding cases involving states' rights
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What an honor! You have been asked to help with your hometown parade! The parade will showcase floats that represent the three branches of Roman government (Executive, Legislative, and Judicial Branches) and will feature a Roman God or Goddess. You have been assigned one branch of government and a God or Goddess to represent. But first you need to help figure out how many floats can be in the parade.

Part 1

All group members must work together to complete the following mathematics problem. Show your answer to your teacher to move on to Part 2.

Solve the problem. Show all of your work and explain your steps.

There will be two sizes of floats in the parade, as shown below. A space of 10 ft will be left after each float.



- a. The parade must be at least 150 ft long, but less than 200 ft long. What combinations of large and small floats are possible?
- b. Large floats cost \$600 to operate. Small floats cost \$300 to operate. The town has a budget of \$2500 to operate the floats. How does this change your answer to part (a)? What combinations of large and small floats are possible?

Part 2

- Each group must create a **poster** and **newspaper article ad**.
- As a **group** decide what information will go into each task. Then decide which member will be responsible for creating which task.
- You will use a robotics kit on your poster. With the kit you will be able to add lights and make parts move. You will use the kit as a group.
- Group roles:
 - > Designer - supplies, over sees construction of poster,
 - > Engineer - robotics programmer and controller,
 - > Publicist - writes the newspaper article

Poster	Newspaper Article Ad
<p>Create a poster of your float. Your float should represent your God/Goddess, and the responsibilities and powers of your branch of government. Your poster should include lights and movement with the robotics kit.</p> <p>Group Members: _____ _____</p>	<p>Write a newspaper article to advertise the upcoming parade. Explain who, what, when, where, and why concerning the parade. Include descriptions of your God/Goddess and all the branches of government involved in the parade. Include the costs and combinations of floats in your article.</p> <p>Group Member: _____</p>