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Prove Your Point [10th grade]

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UNDERSTANDING BY DESIGN

Unit Cover Page

Unit Title: Prove Your Point

Grade Level: 10

Subject/Topic Area(s): Algebra II/Linear Equations and Systems of Equations

Designed By: Ashley Davis

Time Frame: 3 weeks

School District: North East ISD

School: International School of the Americas

School Address and Phone: 1400 Jackson Keller, San Antonio TX, 78213. 210 356-0900

Brief Summary of Unit (Including curricular context and unit goals):

Algebra II Pre-AP/GT students will demonstrate proficiency of the four ways to solve systems of equations. Throughout the unit, students will complete practice problems on systems of equations and inequalities using algebraic techniques. As the culminating piece, students will create an original system of equations word problem and then write a persuasive essay on which method would be best to solve the system. Using the STAAR writing standards to write the persuasive essay, students will support their thesis by solving the system with each of the four methods. Students will also provide a counter-example as part of the STAAR standards. Finally, students will justify the correctness of the solution and evaluate the efficiency of the method.

UbD Template 2.0

Stage 1 – Desired Results		
<p>Established Goals (e.g., standards)</p> <ul style="list-style-type: none"> • Math TEKS 2A.3 <p>The students formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations</p> <ul style="list-style-type: none"> • ELA TEKS 16 (a-e) <p>Students write persuasive texts to influence the attitudes or actions of a specific audience on specific issues</p>	Transfer	
	<p><i>Students will independently use their learning to...</i></p> <ul style="list-style-type: none"> • Demonstrate proficiency of the four ways to solve systems of equations • Create an original system of equations word problem • Use STAAR writing standards to write a persuasive essay on which method is best to solve the system 	
	Meaning	
	<p>Understandings <i>Students will understand that...</i></p> <ul style="list-style-type: none"> • Logical reasoning is needed to prove an argument. • Systems of equations are used to solve two or more equations with the same variables. • One method might be better than another for multiple reasons. • Systems of equations can be used to model real world situations. 	<p>Essential Questions</p> <ul style="list-style-type: none"> • What makes an argument convincing? • Why is one way better than another when solving systems of equations? • When do we use systems of equations in the real world? • Why are systems of equations important?
	Acquisition	
<p>Knowledge <i>Students will know...</i></p> <ul style="list-style-type: none"> • Definitions of systems of equations, linear equations, solutions, and variables • Algebraic techniques of solving linear equations • There are four methods to solve systems of equations. • Systems can have zero, one, or infinite number of solutions. • Persuasive writing techniques • Proper writing conventions 	<p>Skills <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Model systems of equations using a word problem • Solve the systems by graphing, elimination, substitution, and matrices • Prove the best method, and analyze solutions for reasonableness • Graph linear equations • Write persuasively 	

A, M, T	<p>Day 2-6 Introduction: Teacher will ask students questions to generate knowledge of vocabulary and definitions. Direct Instruction: Most of the lessons on these days will be modeled using direct instruction. Students will perform guided practice and then independent practice to reinforce learning. Some days will not require more instruction, and will simply be practice days to do in class. The teacher will act as a facilitator.</p>	<p>Check for understanding (cold calling, facilitate, think pair share)</p> <p>Guided/Independent Practice</p>
A, M	<p>Day 7-8 Quiz: Systems of Equations and Inequalities After, students will start the Applications of Systems of Equations. This will be an independent practice on Day 7 and a partner practice on Day 8. This will serve as an introduction to word problems that they will later create for their essay. When students complete the applications, they will do a challenge of systems with more than two variables. This will be completed for homework and will be extra credit for how many they complete.</p>	<p>Quiz</p> <p>Extra Credit</p>
A, M, T	<p>Day 9-11 Introduction: Teacher will begin day 9 with a real world model. Direct Instruction: Most of the lessons on these days will be modeled using direct instruction. Students will perform guided practice and then independent practice to reinforce learning. Some days will not require more instruction, and will simply be practice days to do in class. The teacher will act as a facilitator. Here, matrices will be practiced and the notes may be long, therefore, timing is flexible. Matrices are the new component of the Algebra II curriculum and thus, these days should require more focused attention to students gaining proficiency and mastery on the material.</p>	<p>Check for understanding (cold calling, facilitate, think pair share)</p> <p>Guided/Independent Practice</p>
A, M, T	<p>Day 12-15 Introductions: Students will play a “Four Corners” activity in which the teacher will ask 3-5 questions on any topic and students will go to the corner of the room they most believe (strongly agree, agree, disagree, strongly disagree”). The teacher will allow time for each group at the corner to discuss why they feel the way they do and then share out their opinions and justifications. This will act as an introduction to persuasive writing to allow students to see that they must back up their claims. Instruction: These days will be dedicated to writing the essay. Students will be required to complete parts of the mathematical process and the essay each day. The teacher will check off the accuracy of the math at the beginning of each class. As the culmination, students will upload their final product to Edublog and complete the reflection.</p>	<p>Essay</p>

Calendar of Agendas

Day 1	Day 2	Day 3	Day 4	Day 5
1. Choose the Right Text messaging 2. Text in your answers 3. HW: Pre-assessment	1. Notes: Systems by graphing 2. HW: Solving Systems by Graphing	1. Notes: Substitution 2. HW: Solving Systems by Substitution #1-2	1. Practice Substitution and Graphing	1. Notes: Elimination 2. HW: Solving Systems by Elimination

Day 6	Day 7	Day 8	Day 9	Day 10
1. Practice: Review for Quiz	1. Quiz 2. Practice: Applications	1. Finish Applications 2. More Than 2 variables	1. Notes: Intro to Matrices 2. HW: Intro to Matrices	1. Notes: Solving by Matrices 2. HW: Solving by Matrices

Day 11	Day 12	Day 13	Day 14	Day 15
1. Practice: Solving by Matrices	1. Four Corners 2. Introduction to essay 3. Write word problem and solve one way	1. Solve three more ways 2. Write thesis	1. Write essay	1. Write essay 2. Upload and reflection to Edublog 3. Due next day)

Prove Your Point

DUE _____

To bring our study of systems of equations to a close, you are going to write a persuasive essay to convince the reader of the best method to solve a system of equations.

You must provide the process and solution for all four methods: graphing, substitution, elimination, and matrices. Be sure that you include a thesis, body paragraphs, concession and refutation paragraph, and conclusion (see attached “Planning Your Persuasive Essay”).

Criteria

1. Original word problem that can be solved using systems of equations
2. The solutions must be incorporated into your essay
3. Be sure to:
 - a. Include a thesis
 - b. Use logical reasoning to support your thesis
 - c. The word problem and essay is thoughtful and engaging
 - d. Use highly effective word choices
 - e. Have varied sentences
 - f. Edit for mechanics, grammar, and spelling
4. You may include bonus detailed below

Rubric

10 points Word Problem

Graded for completion and accuracy

40 Points Essay based on the STAAR Rubric

10 points for a “One”, 20 points for a “Two”, 30 points for a “Three”, 40 points for a “Four”

40 Points Algebraic Component

Graded for accuracy (see Algebraic Component Rubric)

5 points Reflection

Graded for completion

5 points Post Essay and Reflection to Edublogs

Graded for completion

****Bonus****

5 points Use a non-linear system of equations

3 points Creative drawing or artistic depiction of word problem (on the algebraic work page or attached)

You will submit the word problem with the solutions on a separate paper along with your essay (see attached layout). Your story must be typed, but your pictures can be hand – drawn or digital. Your essay must be long enough to incorporate all the necessary components.

Created by Ashley Davis, adapted from Stacy Adame

Name _____

Period _____

Algebraic Component

Please fill out the following with the algebraic work to solve your equation.

Word Problem:

Method #1: _____

Algebraic work below

Method #2: _____

Algebraic work below

Method #3: _____

Algebraic work below

Method #4: _____

Algebraic work below

Algebraic Component Rubric

Points	Description
0	The student did not apply algebraic techniques to solve the system.
10-20	<ul style="list-style-type: none">€ The student made major algebraic mistakes.€ The student did not solve for the correct answer.€ The student did not complete all four methods.€ The student provided answers to the system but provided little to no work.
21-30	<ul style="list-style-type: none">€ The student solved all four systems of equations with some minor mistakes.€ The student showed some work in their process.
31-40	<ul style="list-style-type: none">€ The student solved all four systems of equations with no mistakes.€ The student showed all work in their process.

Name _____
Date _____
Period _____

Title: _____

Note to teacher: I will give students lined paper for this. I think it will be good practice for students to write essays by hand for the STAAR and might be easier/more efficient to write math equations by hand.

Reflection

Throughout this project of proving the best method, you used each of the ISA math performance outcomes, problem solving, reasoning and proof, communication, and connections.

Please answer the following questions on your Edublog.

Communications and Connections

You were required to “explain and justify mathematical arguments, including concepts and procedures used” and then “evaluate and defend or refute decisions that are supported by mathematics”. You will be asked to do this a lot throughout your educational and professional life. For example, when you write your college thesis, provide a report for a future boss, or are asked to back up your thoughts and positions in conversations, you are using this performance outcome.

1. What was most difficult for you about incorporating STAAR writing concepts in a mathematical argument and why?

Communications and Problem Solving

In proving the best method, you were asked to “describe the merits, shortcomings, consequences, and effects of mathematical arguments and processes” and “monitor and reflect on the process of mathematical problem solving”.

2. What was your main argument to defend the method that you chose? Ask your neighbor. What was their reason? How was yours similar or different?

Name:

STAAR Persuasive Writing Rubric

ONE (LIMITED)	TWO (BASIC)
<p>Organization/Progression</p> <ul style="list-style-type: none"><input type="checkbox"/> Absence of functional organizational structure causes the essay to lack clarity and direction.<input type="checkbox"/> Writer's position (thesis) is missing or unclear. Fails to maintain focus on issue or contains extraneous information. May shift abruptly from idea to idea.<input type="checkbox"/> Progression of ideas is weak, random, or illogical. <p>Development of Ideas</p> <ul style="list-style-type: none"><input type="checkbox"/> Development of ideas is weak. Argument is ineffective/unconvincing because reasons and evidence are inappropriate, vague, or insufficient.<input type="checkbox"/> Response to prompt is vague, confused, or weakly linked to the prompts. <p>Use of Language/Conventions</p> <ul style="list-style-type: none"><input type="checkbox"/> Word choice is vague or limited, reflecting little or no awareness of the persuasive purpose and appropriate tone.<input type="checkbox"/> Word choice may impede the quality and clarity of the essay.<input type="checkbox"/> Sentences are simplistic, awkward, or uncontrolled.<input type="checkbox"/> Little or no command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage. Serious and persistent errors create disruptions in the fluency of the writing and interfere with meaning.	<p>Organization/Progression</p> <ul style="list-style-type: none"><input type="checkbox"/> Essay is not always clear; organizational strategy is only somewhat suited for task.<input type="checkbox"/> Most ideas generally relate to the topic.<input type="checkbox"/> Writer's position (thesis) is weak or somewhat unclear.<input type="checkbox"/> Irrelevant information interferes with focus.<input type="checkbox"/> Progression of ideas is not always logical.<input type="checkbox"/> Repetition or wordiness causes disruptions.<input type="checkbox"/> Sentence to sentence connections are weak. <p>Development of Ideas</p> <ul style="list-style-type: none"><input type="checkbox"/> Development of ideas is minimal; the argument is superficial and unconvincing.<input type="checkbox"/> Reflects little or no thoughtfulness; formulaic approach.<input type="checkbox"/> Demonstrates limited understanding of task. <p>Use of Language/Conventions</p> <ul style="list-style-type: none"><input type="checkbox"/> Word choice is general or imprecise and does not establish a tone.<input type="checkbox"/> Sentences may be awkward or only somewhat uncontrolled.<input type="checkbox"/> Partial command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage; at times, errors may cause disruptions in fluency or meaning.
<p>THREE (SATISFACTORY)</p> <p>Organization/Progression</p> <ul style="list-style-type: none"><input type="checkbox"/> Organizing structure is appropriate.<input type="checkbox"/> Clear position (thesis); ideas are related and are clear; some minor lapses.<input type="checkbox"/> Progression of ideas is generally logical and controlled with meaningful transitions. <p>Development of Ideas</p> <ul style="list-style-type: none"><input type="checkbox"/> Development of ideas is sufficient; reasons and evidence are convincing.<input type="checkbox"/> Essay reflects some thoughtfulness.<input type="checkbox"/> Response is original rather than formulaic.<input type="checkbox"/> Demonstrates good understanding of persuasive writing task. <p>Use of Language/Conventions</p> <ul style="list-style-type: none"><input type="checkbox"/> Word choice is clear and specific; usually contributes to quality and clarity.<input type="checkbox"/> Word choice reflects an awareness of persuasive purpose; appropriate tone.<input type="checkbox"/> Sentences are varied and adequately controlled.<input type="checkbox"/> Adequate command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage.	<p>FOUR (ACCOMPLISHED)</p> <p>Organization/Progression</p> <ul style="list-style-type: none"><input type="checkbox"/> Organizing structure is clearly appropriate.<input type="checkbox"/> Essay is skillfully crafted with clear thesis.<input type="checkbox"/> Ideas strongly relate to the thesis and are clear.<input type="checkbox"/> Essay is unified and coherent.<input type="checkbox"/> Progression of ideas is logical and well controlled with meaningful transitions. <p>Development of Ideas</p> <ul style="list-style-type: none"><input type="checkbox"/> Argument is forceful and convincing.<input type="checkbox"/> Essay is thoughtful and engaging; writer may recognize complexity of the issue, consider opposing points of view, use unique experiences or world view.<input type="checkbox"/> Demonstrates thorough understanding of persuasive writing task. <p>Use of Language/Conventions</p> <ul style="list-style-type: none"><input type="checkbox"/> Word choice is purposeful and precise; strongly contributes to quality and clarity.<input type="checkbox"/> Word choice reflects keen awareness of persuasive purpose; appropriate tone.<input type="checkbox"/> Sentences are purposeful, varied, and well controlled; enhance effectiveness.<input type="checkbox"/> Consistent command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage.

Adapted from TEA STAAR materials

Name:

ONE (LIMITED) Organization/Progression

- Absence of functional organizational structure causes the essay to lack clarity and direction.
- Writer's position (thesis) is missing or unclear. Fails to maintain focus on issue or contains extraneous information. May shift abruptly from idea to idea
- Progression of ideas is weak, random, or illogical

Development of Ideas

- Development of ideas is weak. Argument is ineffective/unconvincing because reasons and evidence are inappropriate, vague, or insufficient.
- Response to prompt is vague, confused, or weakly linked to the prompts.

Use of Language/Conventions

- Word choice is vague or limited, reflecting little or no awareness of the persuasive purpose and inappropriate tone.
- Word choice may impede the quality and clarity of the essay.
- Sentences are simplistic, awkward, or uncontrolled
- Little or no command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage. Serious and persistent errors create disruptions in the fluency of the writing and interfere with meaning.

TWO (BASIC) Organization/Progression

- Essay is not always clear; organizational strategy is only somewhat suited for task
- Most ideas generally relate to the topic
- Writer's position (thesis) is weak or somewhat unclear
- Irrelevant information interferes with focus
- Progression of ideas is not always logical
- Repetition or wordiness causes disruptions
- Sentence to sentence connections are weak

Development of Ideas

- Development of ideas is minimal; the argument is superficial and unconvincing
- Reflects little or no thoughtfulness; formulaic approach
- Demonstrates limited understanding of task

Use of Language/Conventions

- Word choice is general or imprecise and does not establish a tone.
- Sentences may be awkward or only somewhat uncontrolled
- Partial command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage; at times, errors may cause disruptions in fluency or meaning

THREE (SATISFACTORY) Organization/Progression

- Organizing structure is appropriate
- Clear position (thesis); ideas are related and are clear; some minor lapses
- Progression of ideas is generally logical and controlled with meaningful transitions

Development of Ideas

- Development of ideas is sufficient; reasons and evidence are convincing
- Essay reflects some thoughtfulness
- Response is original rather than formulaic
- Demonstrates good understanding of **persuasive writing task**

Use of Language/Conventions

- Word choice is clear and specific; usually contributes to quality and clarity
- Word choice reflects an awareness of persuasive purpose; appropriate tone
- Sentences are varied and adequately controlled
- Adequate command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage

FOUR (ACCOMPLISHED) Organization/Progression

- Organizing structure is clearly appropriate
- Essay is skillfully crafted with clear thesis
- Ideas strongly relate to the thesis and are clear
- Essay is unified and coherent
- Progression of ideas is logical and well controlled with meaningful transitions

Development of Ideas

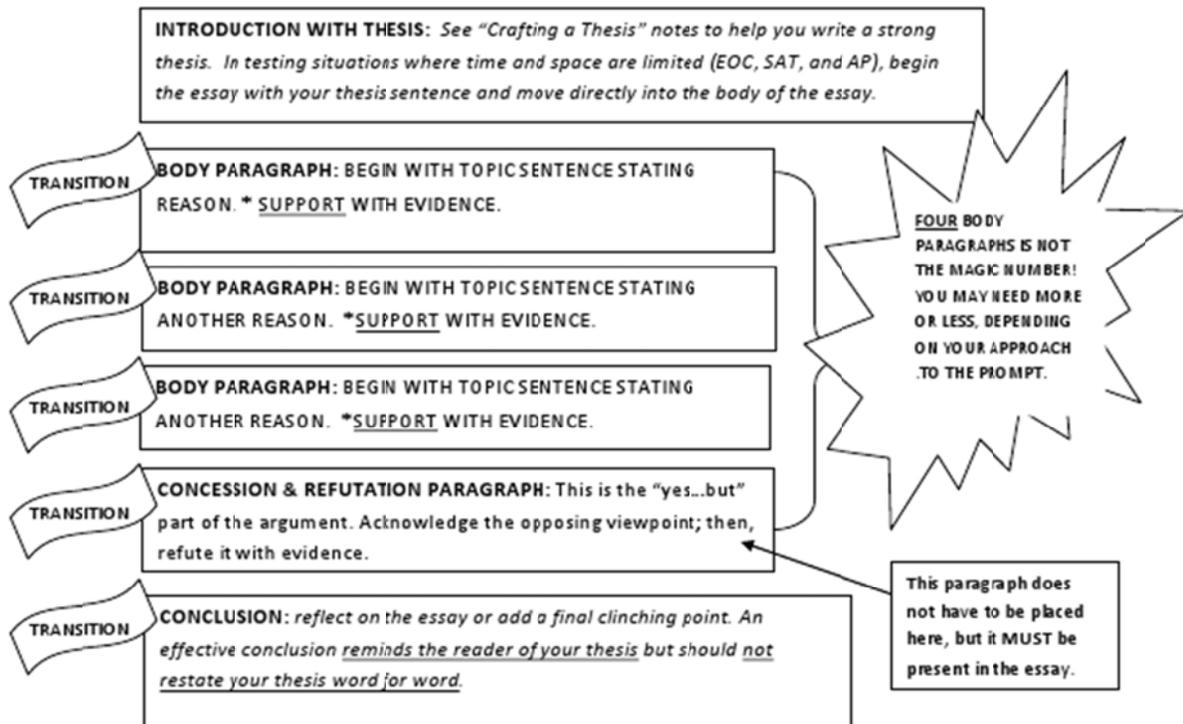
- Argument is forceful and convincing
- Essay is thoughtful and engaging; writer may recognize complexity of the issue, consider opposing points of view, use unique experiences or world view
- Demonstrates thorough understanding of persuasive writing task

Use of Language/Conventions

- Word choice is purposeful and precise; strongly contributes to quality and clarity
- Word choice reflects keen awareness of persuasive purpose; appropriate tone
- Sentences are purposeful, varied, and well controlled; enhance effectiveness
- Consistent command of sentence boundaries, spelling, capitalization, punctuation, grammar, and usage

Adapted from TEA STAAR materials

PLANNING YOUR PERSUASIVE ESSAY



***Support** your position with reasoning and evidence taken from your reading, studies, and other reliable sources.



Your **THESIS** must touch every part of your essay.