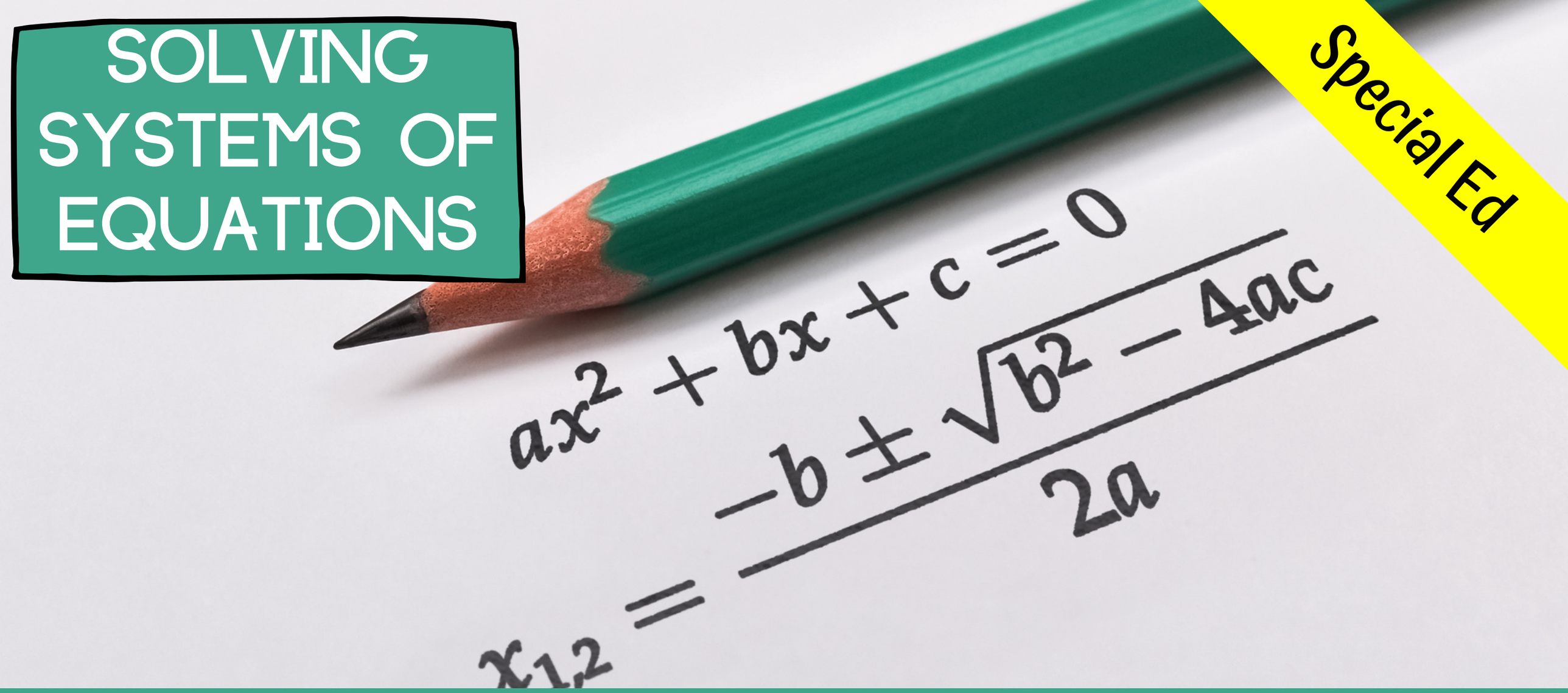
SOLVING SYSTEMS OF EQUATIONS

Special Ed



ALSO INCLUDES GOOGLE SLIDES

This unit was created with this guy in mind. He has autism and an intellectual disability. He is a non-reader and lacks many pre-requisite math skills needed for high school math. With some support, he is able to do this unit and enjoys the challenge. He is my tester!!

Table of Contents

Pages	Activity
4-40	Solving Systems of Equations
41-43	Vocabulary board
44-48	Vocabulary cards
49-58	Vocabulary cut and paste
59-60	Power cards
61-67	Practice each step using substitution
68-73	Practice each step using substitution – answer key
74-79	Practice each step using elimination
80-84	Practice each step using elimination – answer key
85-104	Practice problems with pictures - substitution
105-119	Practice problems with pictures – substitution answer key
120-133	Practice problems with pictures - elimination
134-143	Practice problems with pictures – elimination answer key
144-145	Terms of Use

Also included with this unit you will separate pdfs with:

- Lesson plans
- Links and directions to digital activities (includes narrated version of book with animation)

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This unit contains over 150 pages of material. But, don't worry!! I have included a 15 day lesson plan to help you make the most of everything packed in this unit.

Solving Systems of Equations Lesson Plan

Preparation

- Print out a vocabulary board for each student to use throughout unit
  - Laminate or place in page protector
- Book
  - Print out, laminate, and bind
  - OR your students can listen to the pre-recorded movie included in the pdf that has directions and links to digital activities.
  - The movie is a great choice because I animated this one to help students see how each problem is worked through.
- Vocabulary cards
  - Print out a set of cards onto cardstock and laminate
  - Make one set for each student and also one for the teacher to use in I Spy games

Review

- If you have the first unit in this series, Reading and understanding systems of equations, you want to go over that the day before (unless you just finished it)
- There are some references to that unit in the book/movie, but it is NOT necessary to have that unit in order to be successful with this one.

Teaching Tips

1. *Color Coding*: this is a really easy way to add more structure to a matching activity. Outline or color in an empty box or sorting label. Outline or color in the corresponding picture symbols the same colors. Becomes a color matching task.
   a. For more info, read more here: https://specialneedsforspecialkids.org/2015/09/05/using-color-coding-for-differentiation/
   b. I also have a blog post on differentiating one activity 3 ways: https://specialneedsforspecialkids.org/2018/10/22/differentiating-1-activity-3-ways-easily-and-effectively/
2. *Make you own copies of the activities*: Every day I review the activity we did yesterday. For that reason:
   a. I often complete the activity myself and often laminated it for easy review that I could use year after year.

The lesson plans contain:

Overall tips for teaching students with significant needs and who may lack some pre-requisite skills.

Quick Look

Day	Activity	Day	Activity	Day	Activity
1	• Book/movie • Vocabulary and power card introduction	7	• Book/movie • Power card review • Using substitution to solve entire problem	13	• Book/movie • Power card review • Using elimination to solve entire problem
2	• Book/movie • Vocabulary and power card review • Step 1 practice: substitution	8	• Book/movie • Power card review • Using substitution to solve entire problem	14	• Book/movie • Power card review • Using elimination to solve entire problem
3	• Book/movie • Vocabulary and power card review • Step 2 practice: substitution	9	• Book/movie • Power card review • Step 1 practice: elimination	15	• Book/movie • Vocab cards cut & paste
4	• Book/movie • Vocabulary and power card review • Step 3 practice: substitution	10	• Book/movie • Power card review • Step 2 practice: elimination		
5	• Book/movie • Vocabulary and power card review • Step 4 practice: substitution	11	• Book/movie • Power card review • Step 3 practice: elimination		
6	• Book/movie • Power card review • Step 5 practice: substitution	12	• Book/movie • Power card review • Step 4 practice: elimination		

The lesson plans contain:

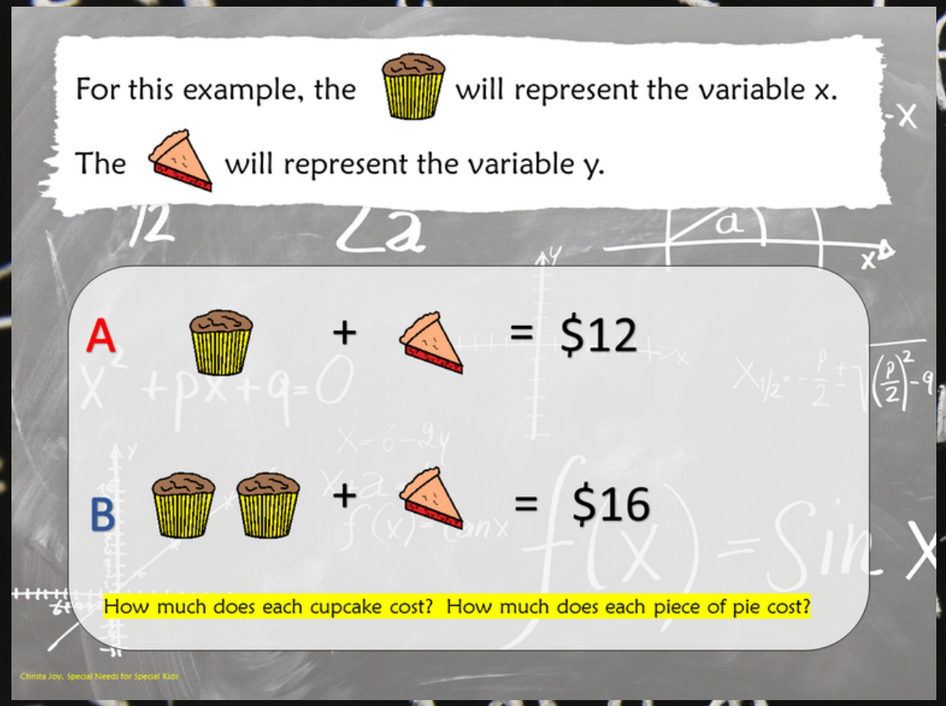
A quick look at what you will do each day.

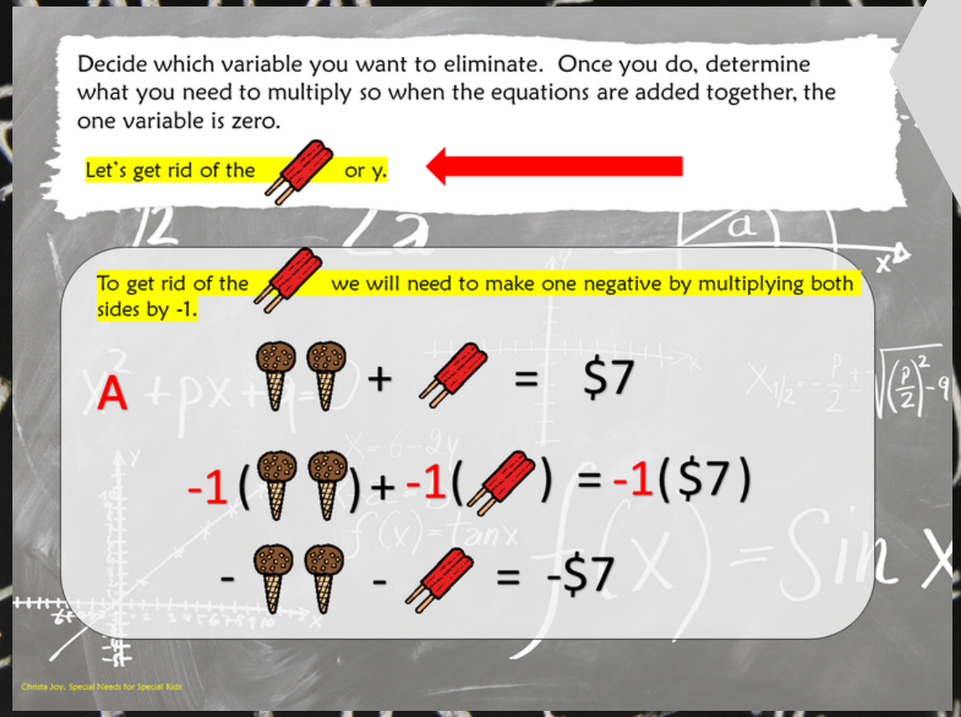
Day 11

Activity	Notes	Materials
Read or listen to a movie version of the book (10 minutes)	• Read through the story, asking lots of questions • Continue to make connections between book and vocabulary board	• Book • Vocabulary board
Power cards review (5 minutes)	• Quick review. • Make sure students have the card for elimination for this lesson.	Substitution power card
Worksheet review (5 minutes)	• Review the worksheet done yesterday	• Worksheet from yesterday
Worksheet: practice the steps of elimination (20 minutes)	• Complete the worksheet that only review step three of elimination. • There are a lot of problems (10) included. Choose the best number of problems your students can handle. Make frequent references to power card.	• Worksheet •
Sharing (10 minutes)	• Each student shares one of their finished problems with the group using the communication method of their choice	• Completed worksheets • Communication devices

The lesson plans contain:

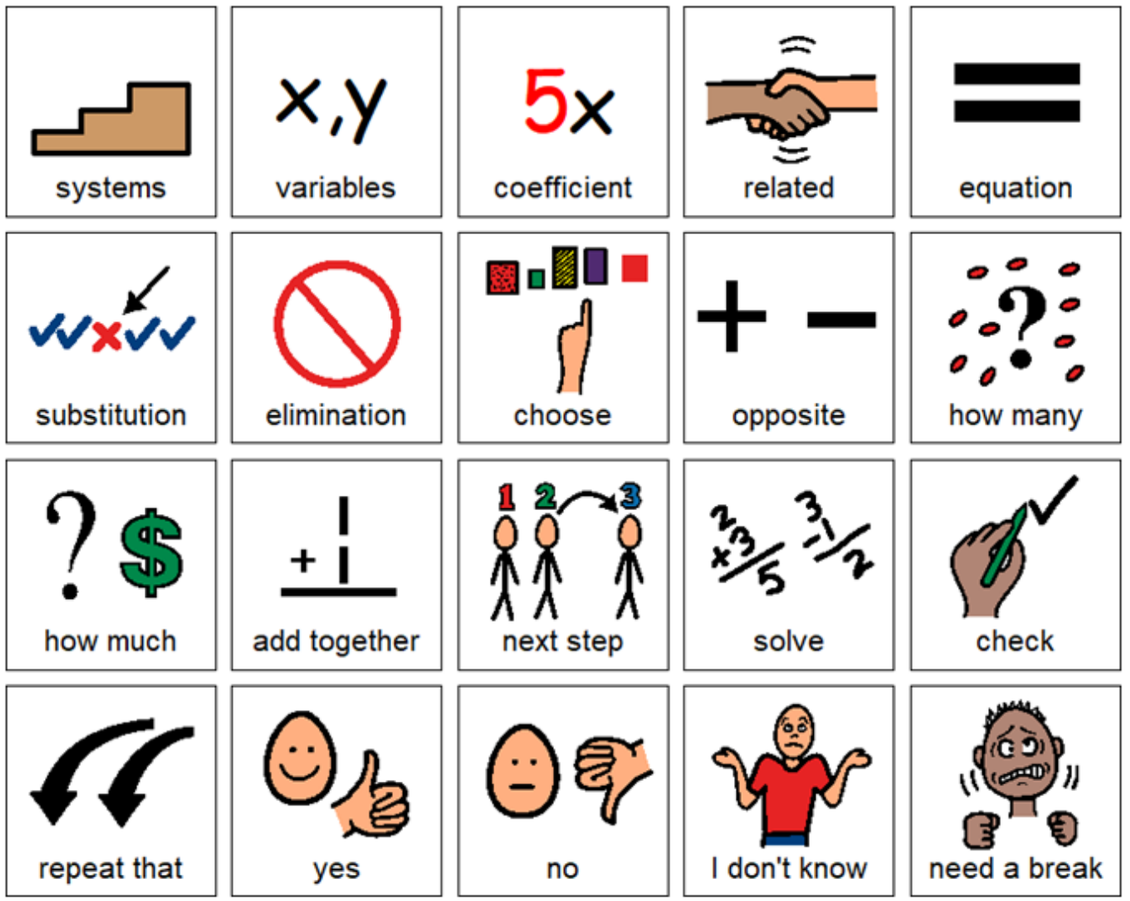
Detailed instructions on how that day's lesson should run including group and individual activities.





This unit contains a book that is 37 pages and covers how to solve systems of equations using either substitution or elimination.

It comes in a pdf version as well as an mp4 version that is animated and narrated.



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This unit comes with a vocabulary board.

Vocabulary boards are great for ALL students to assist with participation and engagement in group discussions.

Tips on how to use in the unit!!

variable

An unknown quantity in an expression or equation represented by a letter.

X, Y

equation

The values of two mathematical expressions are equal.

system

Two of more problems that are related and have the same variables.

coefficient

The number in front of the variable.

$5x$

substitution

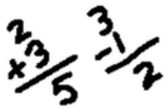
Solving for one variable and putting that answer into the other equation to solve for another variable.

elimination

Solving for one variable by multiplying one equation by a number that will make the coefficients of one variable opposites.

solve

Finding the value of all variables in both/all equations.



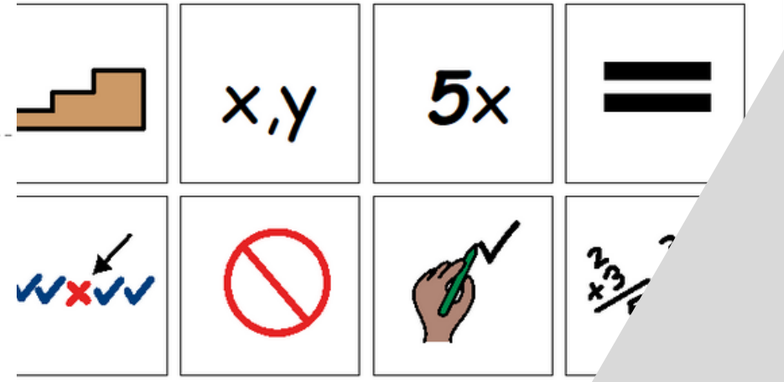
check

Insert the value you got for each variable and make sure both/all equations are still true or equal.

This unit comes with 8 vocabulary cards.

The first week students will do a group activity using these cards to get more familiar with words that are likely new to them.

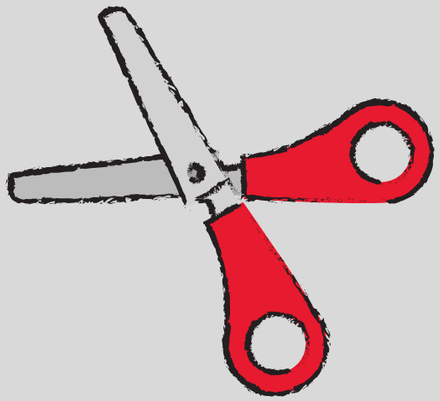
variable	equation
An unknown quantity in an expression or equation represented by a letter.	The values of two mathematical expressions are equal.
system	**coefficient**
Two of more problems that are related and have the same variables.	The number in front of the variable.

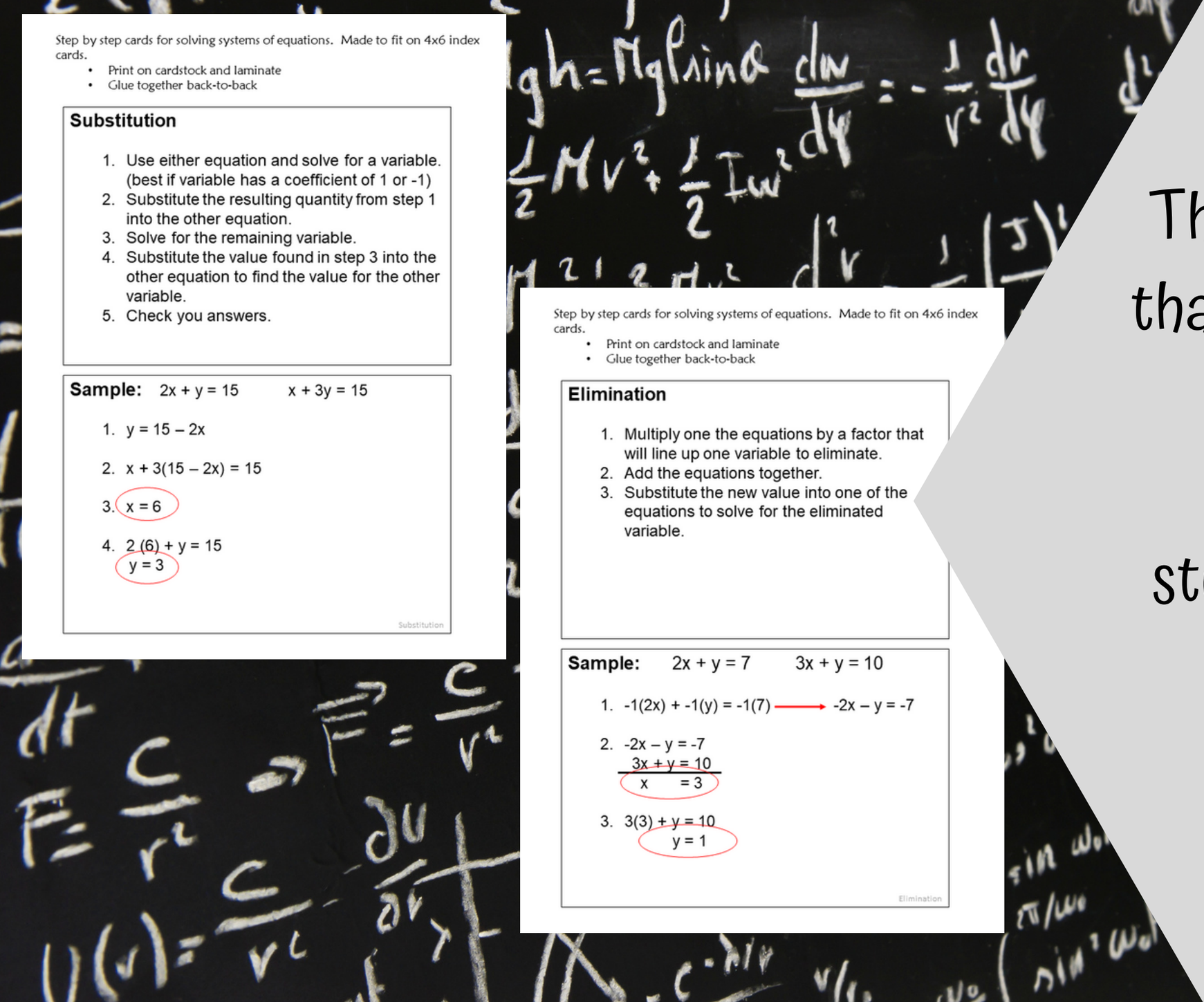


substitution	elimination
solve	**check**

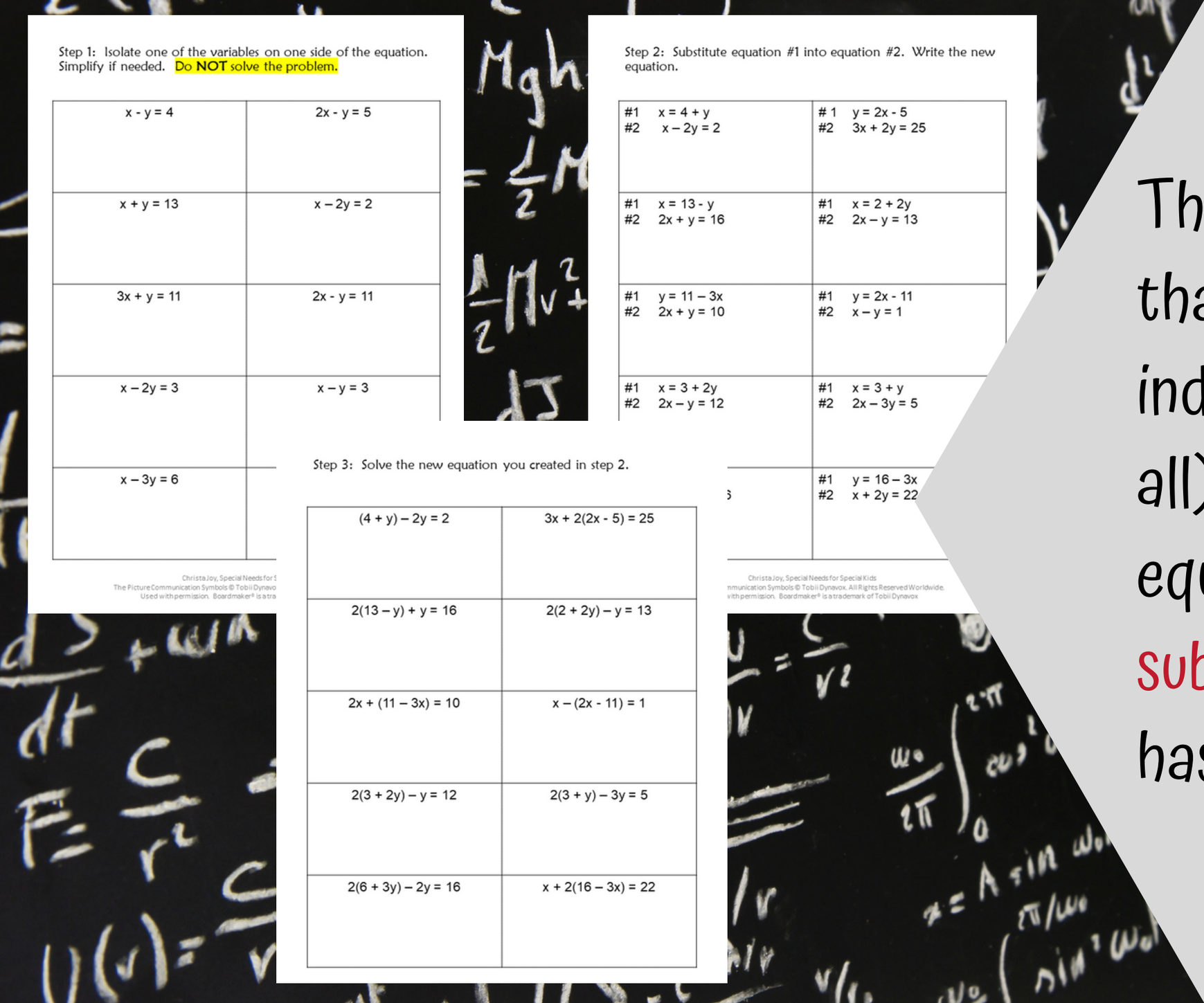
Finding the value of all variables in both/all equations.	The number in fr
Two of more problems that are related and have the same variables.	Insert the value you got for and make sure both/all equat true or equal.
Solving for one variable by multiplying one equation by a number that will make the coefficients of one variable opposites.	The values of two mathematical expressions are equal.
Solving for one variable and putting that answer into the other equation to solve for another variable.	An unknown quantity in an expression or equation represented by a letter.

Students will also test their knowledge of these new words and symbols with a cut and paste activity on the last day.

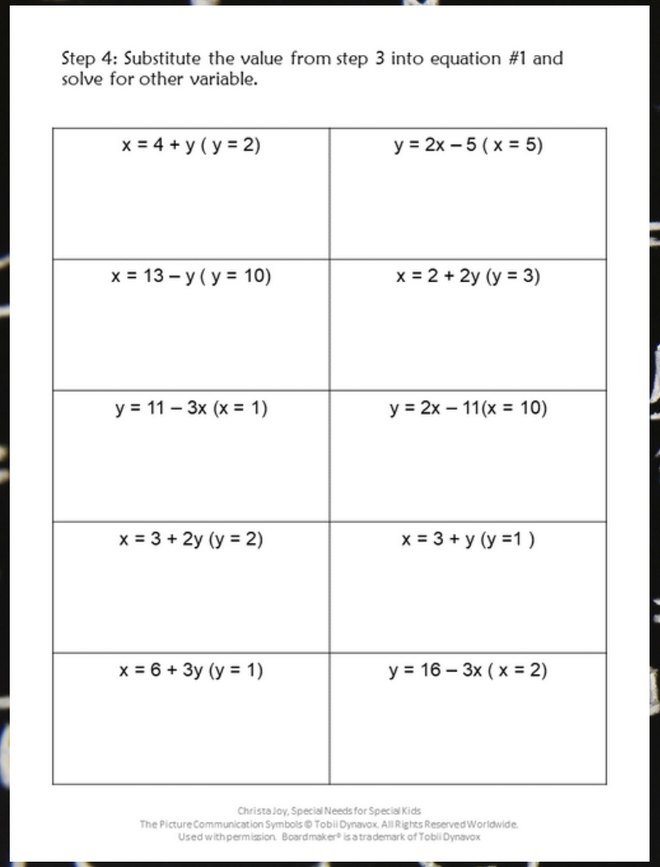




There are power cards that outline the steps of substitution and elimination which students can use when working through problems.



There are worksheets that practice each individual step (5 steps in all) solving systems of equations using substitution. Each step has 10 questions



Step 4: Substitute the value from step 3 into equation #1 and solve for other variable.

x = 4 + y (y = 2)	y = 2x – 5 (x = 5)
x = 13 – y (y = 10)	x = 2 + 2y (y = 3)
y = 11 – 3x (x = 1)	y = 2x – 11(x = 10)
x = 3 + 2y (y = 2)	x = 3 + y (y =1)
x = 6 + 3y (y = 1)	y = 16 – 3x (x = 2)

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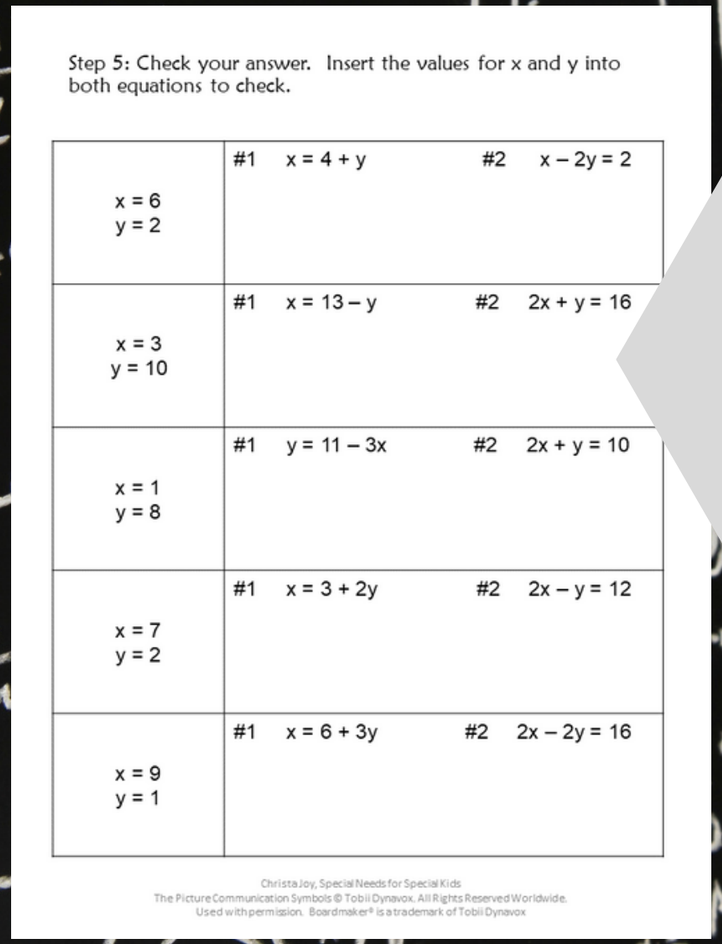

Step 5: Check your answer. Insert the values for x and y into both equations to check.

x = 6 y = 2	#1 x = 4 + y	#2 x – 2y = 2
x = 3 y = 10	#1 x = 13 – y	#2 2x + y = 16
x = 1 y = 8	#1 y = 11 – 3x	#2 2x + y = 10
x = 7 y = 2	#1 x = 3 + 2y	#2 2x – y = 12
x = 9 y = 1	#1 x = 6 + 3y	#2 2x – 2y = 16

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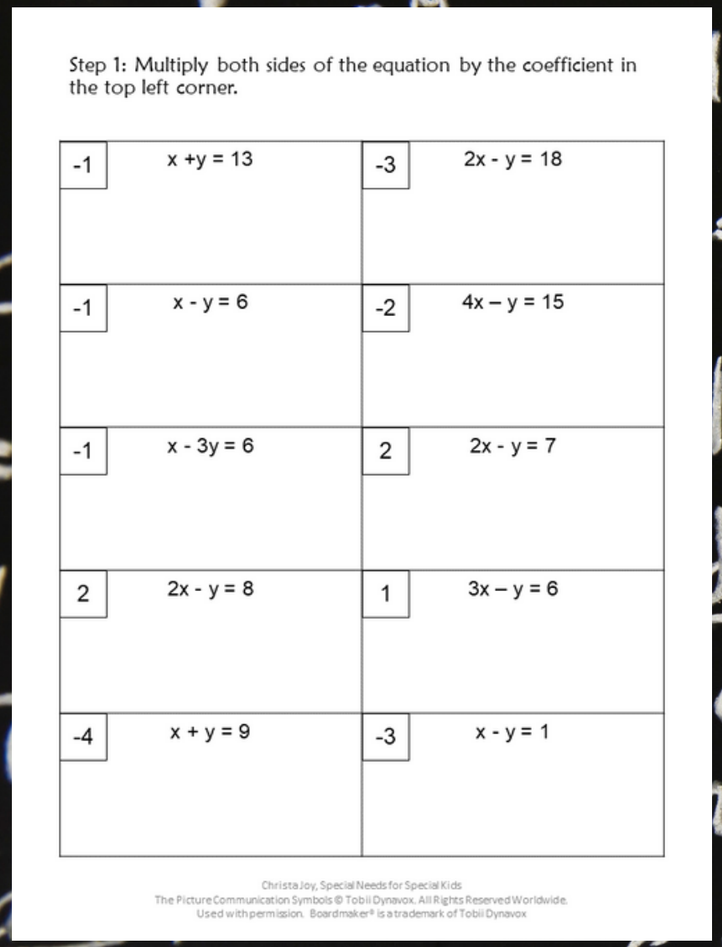
There are worksheets that practice each individual step solving systems of equations using substitution. Each step has 10 questions



Step 1: Multiply both sides of the equation by the coefficient in the top left corner.

-1	x +y = 13	-3	2x - y = 18
-1	x - y = 6	-2	4x – y = 15
-1	x - 3y = 6	2	2x - y = 7
2	2x - y = 8	1	3x – y = 6
-4	x + y = 9	-3	x - y = 1

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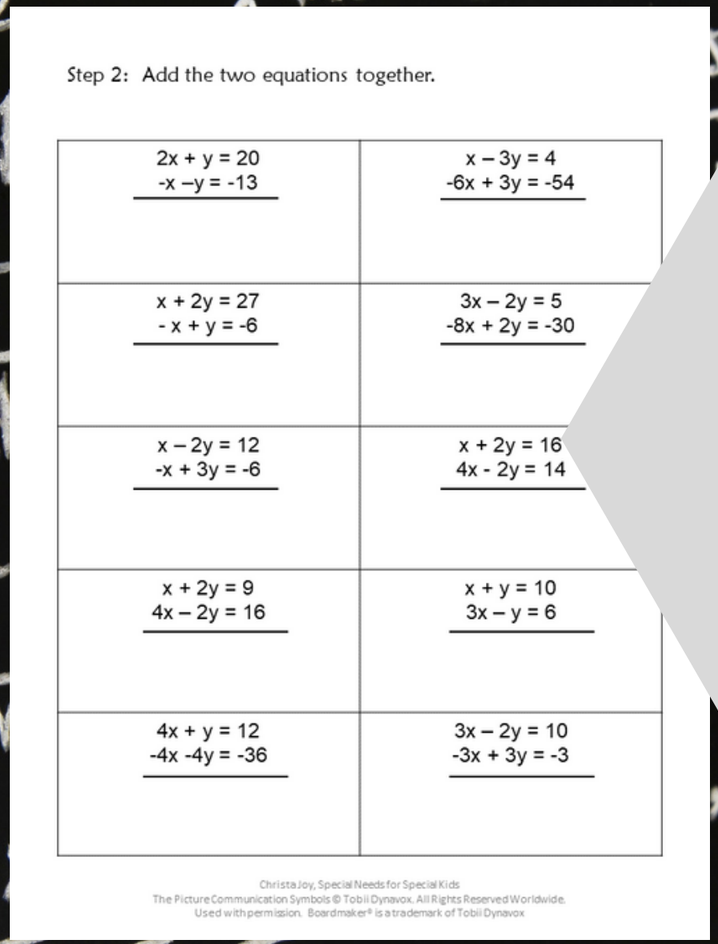

Step 2: Add the two equations together.

2x + y = 20 -x –y = -13	x – 3y = 4 -6x + 3y = -54
x + 2y = 27 - x + y = -6	3x – 2y = 5 -8x + 2y = -30
x – 2y = 12 -x + 3y = -6	x + 2y = 16 4x - 2y = 14
x + 2y = 9 4x – 2y = 16	x + y = 10 3x – y = 6
4x + y = 12 -4x -4y = -36	3x – 2y = 10 -3x + 3y = -3

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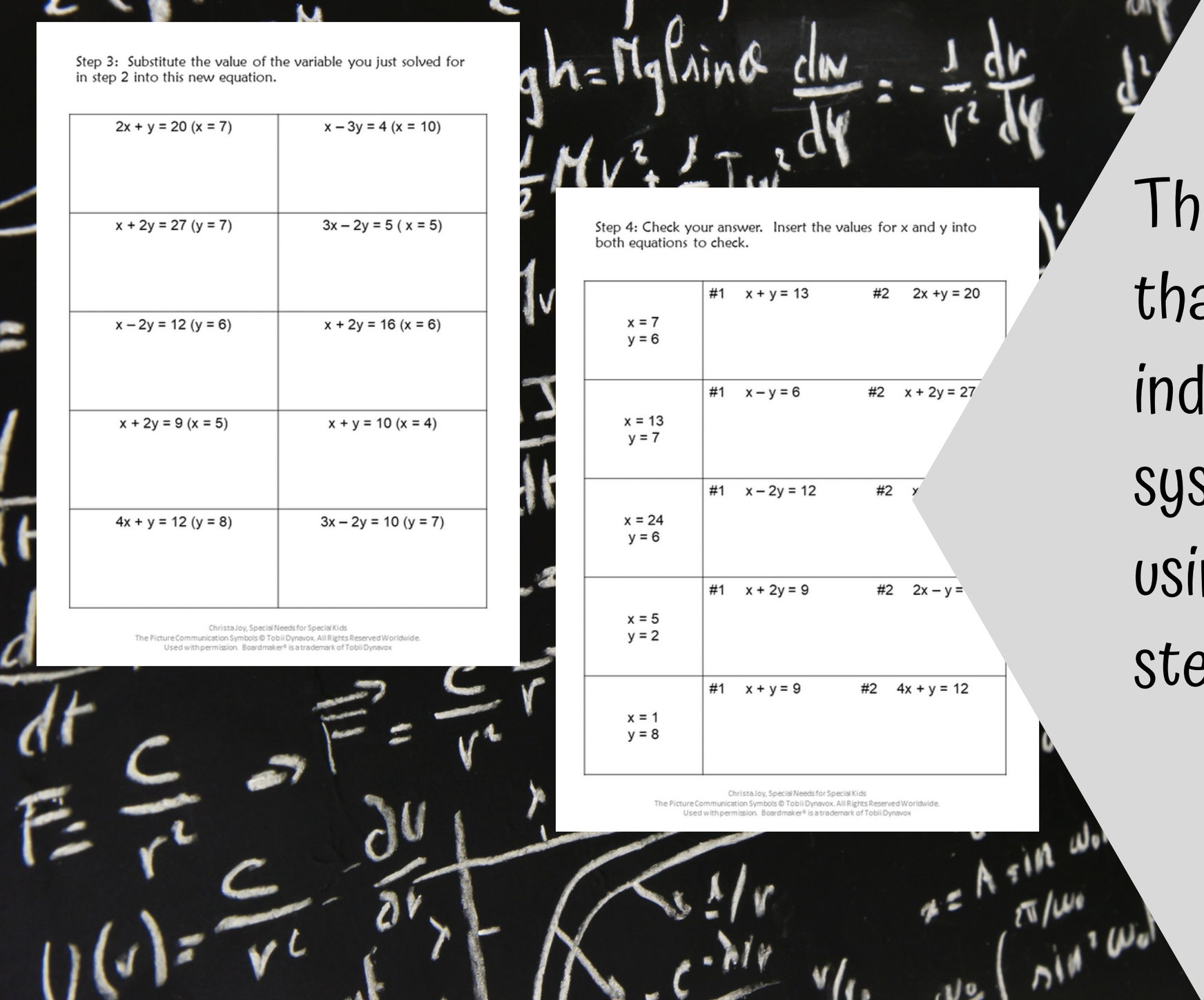
There are worksheets that practice each individual step (4 steps in all) solving systems of equations using elimination. Each step has 10 questions



Step 3: Substitute the value of the variable you just solved for in step 2 into this new equation.

2x + y = 20 (x = 7)	x – 3y = 4 (x = 10)
x + 2y = 27 (y = 7)	3x – 2y = 5 (x = 5)
x – 2y = 12 (y = 6)	x + 2y = 16 (x = 6)
x + 2y = 9 (x = 5)	x + y = 10 (x = 4)
4x + y = 12 (y = 8)	3x – 2y = 10 (y = 7)

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Step 4: Check your answer. Insert the values for x and y into both equations to check.

x = 7 y = 6	#1 x + y = 13	#2 2x +y = 20
x = 13 y = 7	#1 x – y = 6	#2 x + 2y = 27
x = 24 y = 6	#1 x – 2y = 12	#2 x
x = 5 y = 2	#1 x + 2y = 9	#2 2x – y =
x = 1 y = 8	#1 x + y = 9	#2 4x + y = 12

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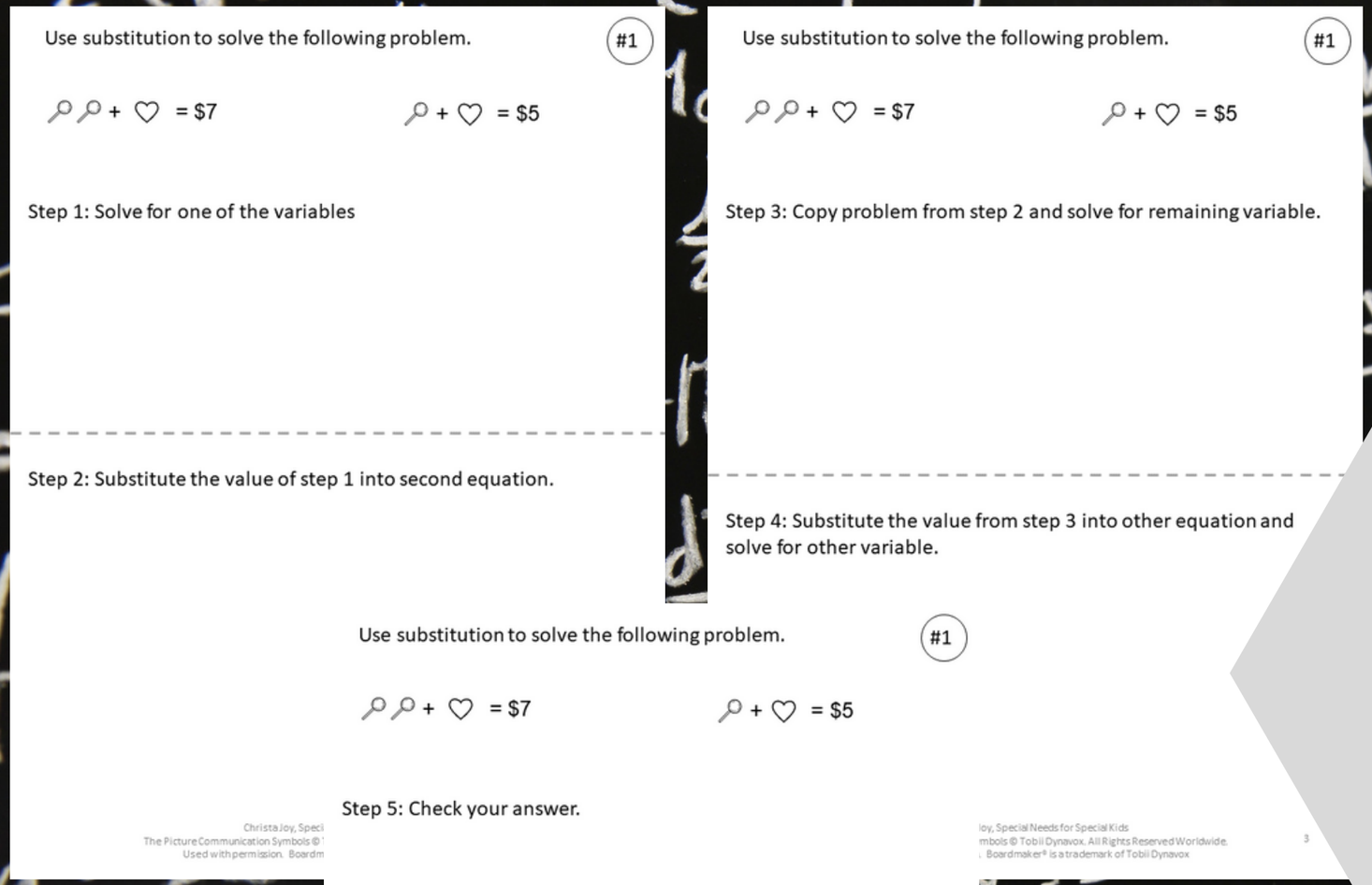
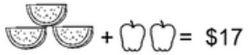
There are worksheets that practice each individual step solving systems of equations using elimination. Each step has 10 questions



There are 5 problems using each method to work through all the steps at one time using pictures.

Use elimination to solve the following problem. #4

= $4

 = $17

Step 1: Decide which variable to get rid of and multiply both sides of the equation so the coefficients will be opposites.

Step 2: Add the two equations together using the new equation you made in step 1.

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Use elimination to solve the following problem. #4

Step 3: Substitute the value of the variable you just solved for into the other equation.

Step 4: Check your answer.

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In this unit, this is used in place of my normal multiple-choice assessment.

Use elimination to solve the following problem. #3

= $18 = $15

Step 1: Decide which variable to get rid of and multiply both sides of the equation so the coefficients will be opposites.

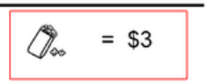
-1( ) + -1( ) = -1 ($15)

- - = -$15

Step 2: Add the two equations together using the new equation you made in step 1.

= $18

- - = -$15

 = $3

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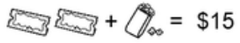
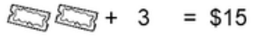
Use elimination to solve the following problem. #3

= $18  = $15

Step 3: Substitute the value of the variable you just solved for into the other equation.

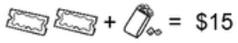
= $15

 + 3 = $15

= $12

= $6

Step 4: Check your answer.

= $18  = $15

$12 + $6 = $18 ✓ $12 + $3 = $15 ✓

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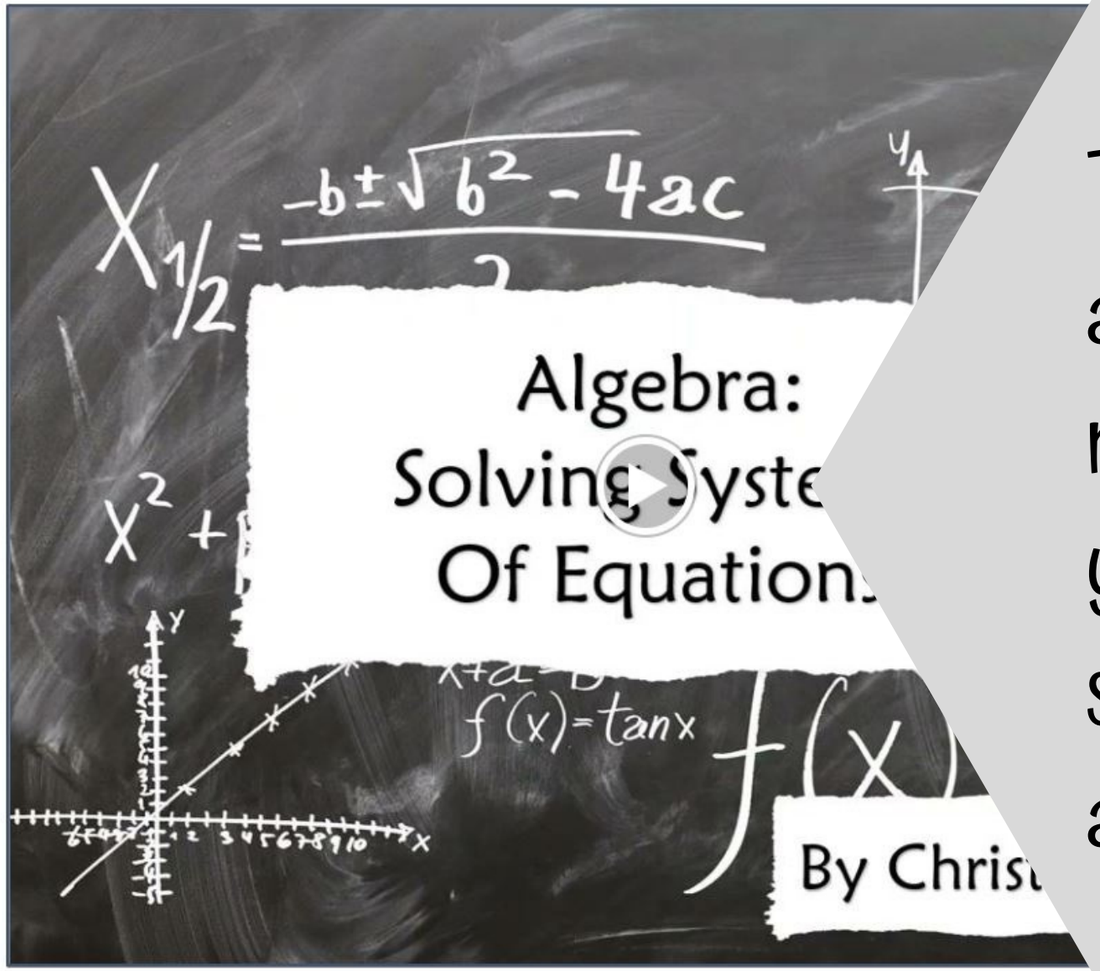
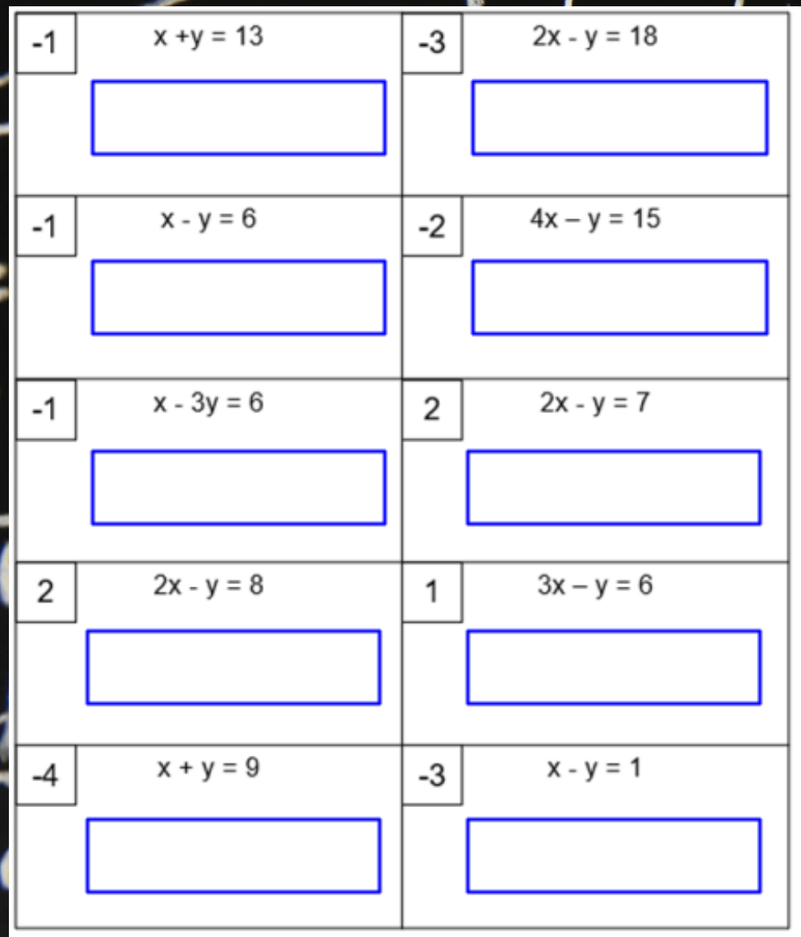
Each set of worksheets (including the ones with individual steps) has detailed step-by-step answer keys.

Please note, that this unit does not include a formal assessment or fill-in-the-blank worksheets often found in my other units.

Listen to the movie about solving systems of equations



This unit includes digital activities. Part of that is a movie version of the book you can play in a google slide. This movie is animated and narrated.

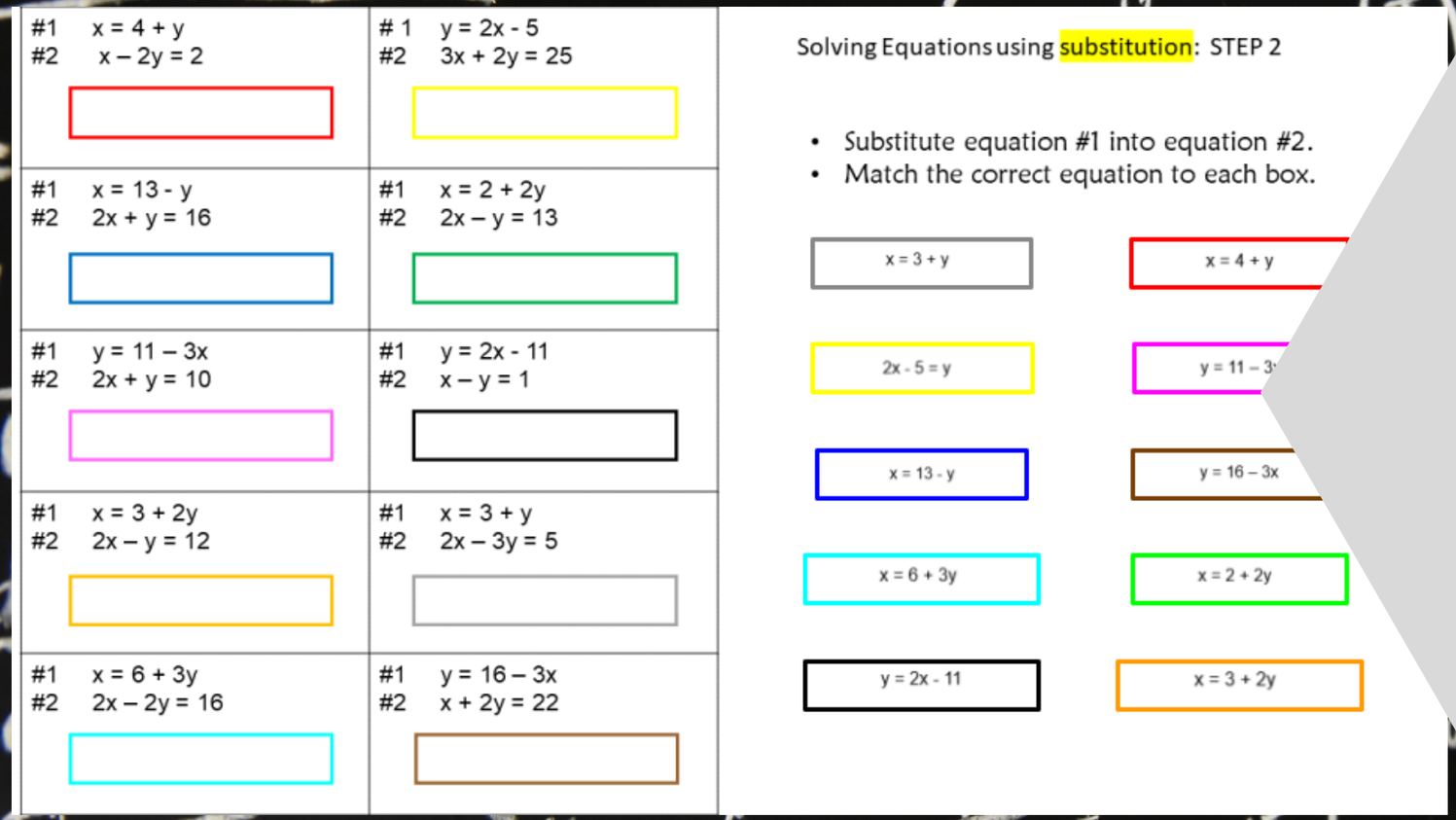


-1	x +y = 13	-3	2x - y = 18
-1	x - y = 6	-2	4x – y = 15
-1	x - 3y = 6	2	2x - y = 7
2	2x - y = 8	1	3x – y = 6
-4	x + y = 9	-3	x - y = 1

Solving Equations using elimination: STEP 1

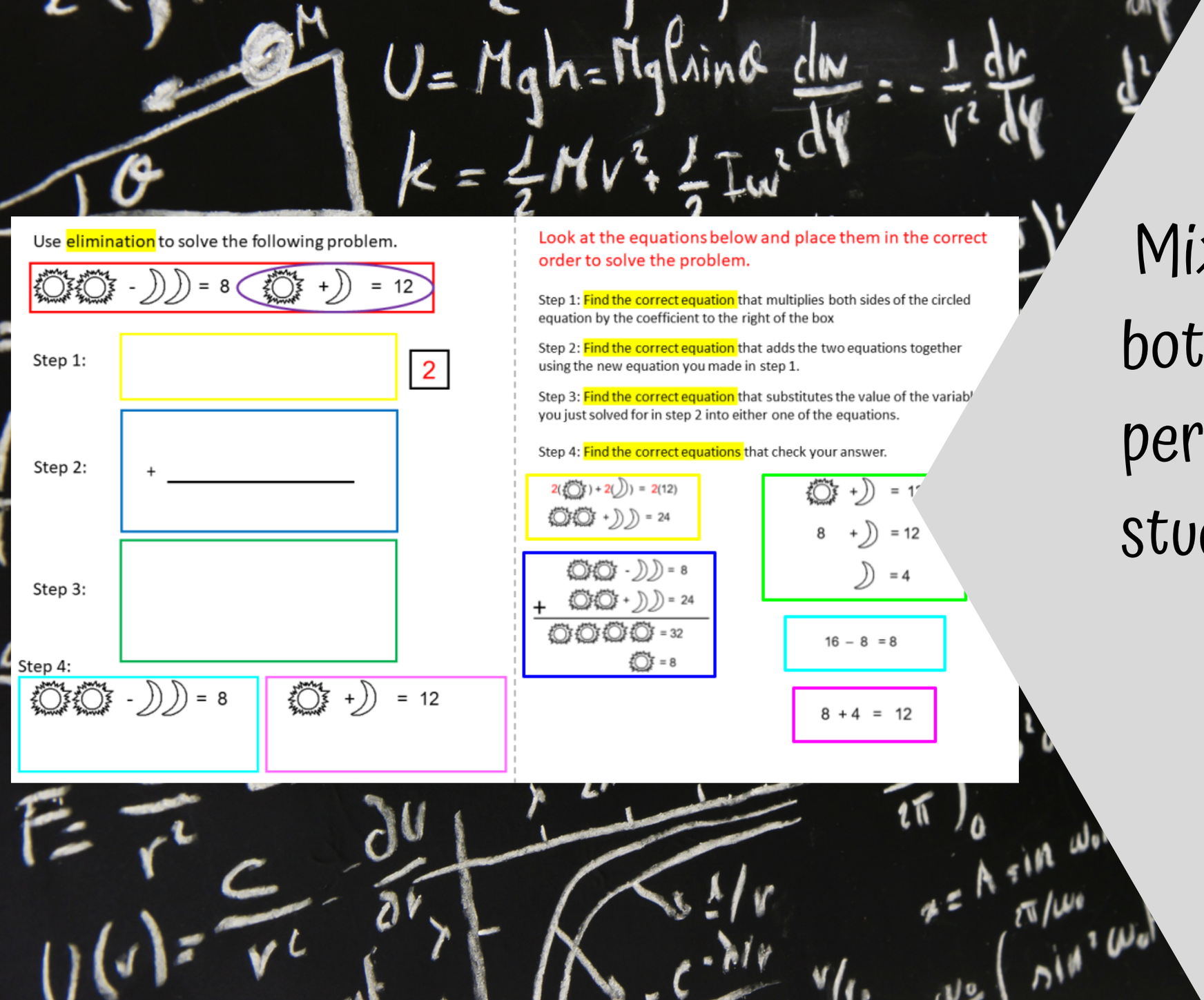
- Multiply both sides of the equation by
  coefficient in the top left corner.

There are 2 sets of 29 google slides that include all the worksheets in the unit. Students can type in the answers.

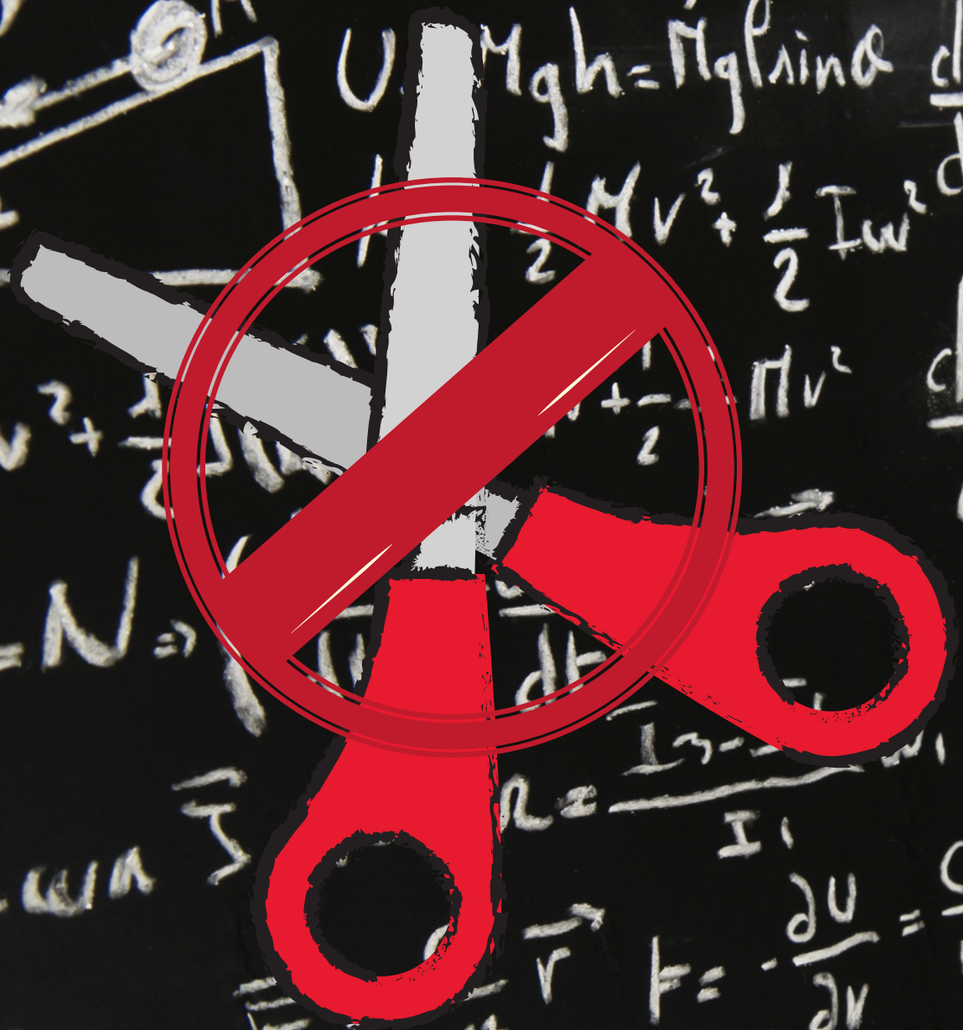


One set is differentiated with color for students who need more support.

In this set, students are NOT typing but clicking and dragging over their answers.



Mix and match from both sets to make a perfect set for each student.



I realize there will be some students out there unable to do cutting activities. I have a blog post with ways to complete activities without a pair of scissors!!

Click Here to read more!!