Advanced Algebra
Solving Inequalities

$$5 + 3x > 21$$

This unit was created with this guy in mind. He has autism and an intellectual disability. He is a non-reader, has a very short attention span, and has a few foundational math skills. With some support, he is able to do this unit and enjoys the challenge. He is my tester!!

This unit uses the COSMIC steps when solving an equation.
1. Copying/translating the problem
2. Operation choice (addition or subtraction)
3. Subtracting or adding
4. Multiply or divide to get rid of the coefficient
5. Isolate the variable
6. Draw your answer on a number line

There are lots of worksheets to practice each step.

Color version

Advanced Algebra:
Inequalities Unit

By
Christa Joy
Special Needs for Special Kids

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Table of Contents

Also included in this resource as separate files:
- Lesson plans
- Links and directions to digital activities
- PowerPoint (this is the book in the lesson plan)
- Voice recorded PowerPoint
- Activities in black and white

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Inequalities

This unit contains over 200 pages of material and 92 google slides. I have a lesson plan to help you make the most of everything in this unit including how to add some group activities.

The lesson plans contain:

- Preparation needed
- Overall tips for teaching students with significant needs
- Daily flow of the lesson including individual and group activities

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Advanced Algebra: Solving Inequalities 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 version
- 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
- Key words cards and COSMIC cards
  - Determine the best format/size f[...]
  - Print onto cardstock and laminat[...]
- Extra Number Lines (included in Identif[...]
  - Print on cardstock and laminate
  - Students can use dry erase marke[...]

Preassessment (do day 1 before starting lesson)

- Choose the form of the assessment that [...]
- Give the assessment to assess what your [...]
- I cannot emphasize enough how impor[...] growth, this preassessment is so importa[...]

Teaching Tips

1. *Color Coding*: this is a really easy way [...] activity. Outline or color in an empty b[...] the corresponding picture symbols the s[...] task.
   a. For more info, read more here: https://specialneedsforspecialkid[...] differentiation/
   b. I also have a blog post on differe[...] https://specialneedsforspecialkid[...] 3-ways-easily-and-effectively/

Quick Look

Day	Activity		Day	Activity		Day	Activity
1	• Book • Intro vocab cards • Intro Key words cards		7	• Book • Vocab cards activity • Worksheet set 1 practice		13	• Book • Vocab cards activity • Worksheet set 3 pract[...]
2	• Book • Vocab cards activity • COSMIC cards • Drawing on a number line		8	• Book • Vocab cards activity • Worksheet set 1 practice		14	• Book • Vocal[...] acti[...] • W[...]
	• Book		9	• Book • Vocab cards activity • Worksheet set 1 practice		15	
			10	• Book • Vocab cards activity • Worksheet set 2 pract[...]			
			11	• Book • Vocal[...] activi[...] • Worksh[...] set 2 pra[...]			
			12	• Book • Vocab cards activity • Worksheet set 2 practice		1[...]	

Day 2

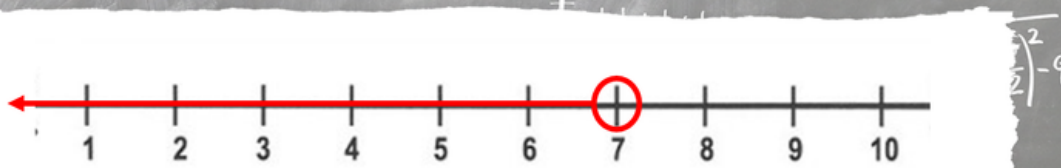| Activity	Notes	Materials
Read or listen to a recording of the book (10 minutes)	• Read through the story, asking lots of questions • Continue to make connections between book and vocabulary board	• Book • Vocabulary board

Vocabulary cards I Spy Game (10 minutes)	• I play this game, or variations of it the first few days
	  ○ Determine how many cards your students can handle in front of them. This can vary, some students may be able to have all the cards, so may only be able to handle a field of 3-5
	• Since this is the first time playing this game, I make it easy. Hold up a card, and have students find the matching one and hold it up
	• Discuss relevant points on the card
	  ○ You can also play this game in this manner having them find the symbol on their vocabulary board
		• Vocabulary cards (student set and teacher set)
		• Vocabulary board

Key words review (5 minutes)	• Review the key word cards	• Key words cards
Intro COSMIC cards (10 min)	• Determine which set is going to be best for your students. • This plan spends 3 days focused on each step (except step 2&3 are combined into one) • Talk through the cards and make connections to the book and vocabulary cards and board	• COSMIC cards • Vocabulary board • Vocabulary cards
Drawing inequalities on the number line (10 minutes)	• Do one or more of the worksheets where students draw the inequality on the number line. • Watch for the open/closed circles depending on the sign • Ask student to verbalize or point to possible values of X	• Worksheet
Sharing (10 minutes)	• Each student shares one of their finished worksheet with the group using the communication method of their choice	• Completed worksheets • Communication devices

There is a 36 page book using simple text and photos. It walks students through the steps to solving inequalities using the COSMIC steps.

- PowerPoint
- voice-recorded PPT
- mp4 movie format
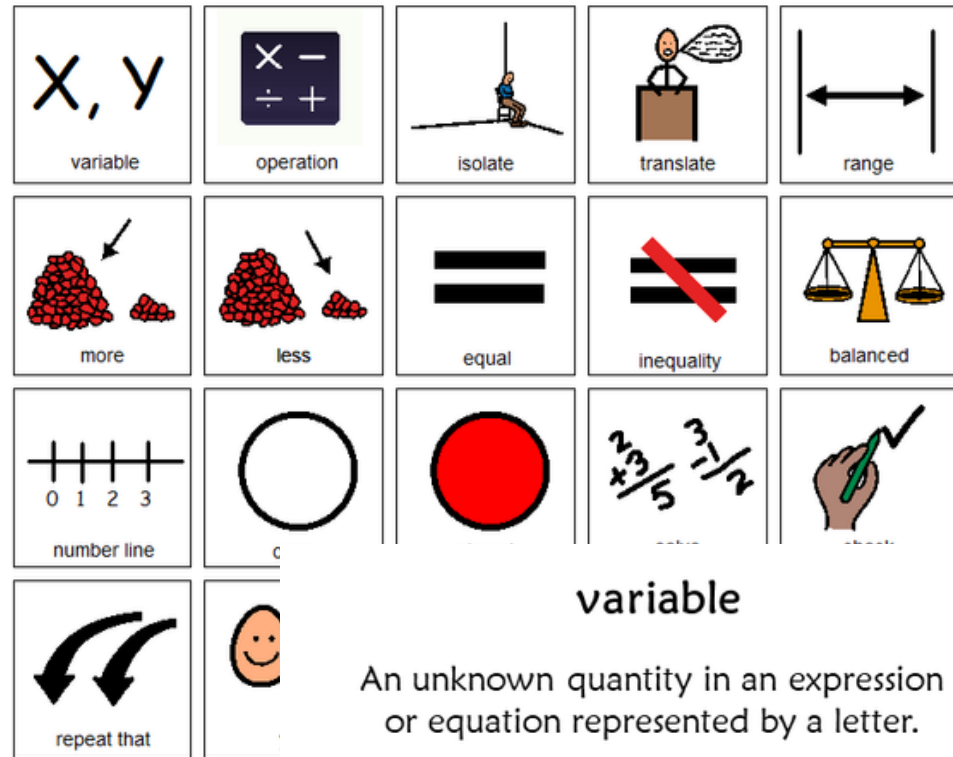
There is a vocabulary board (used for class discussion) and vocabulary cards with cut and paste activities.

Addition	Subtraction
• Add • Addition • Sum of • Plus • Increase by • More than • Total **+**	• Subtract • Decrease by • Difference • Less than • Take away • Minus **—**
Multiplication	**Division**
• Times • Product • Multiplied by • Per • Each **✕**	• Divide • Separate • Quotient • Divided by • Split into **÷**

There are 4 cards (in different sizes) that students can refer to looking for key words when solving equations.

COSMIC

1. Copy/translate the problem
2. Operation choice
3. Subtract or add
4. Multiply or divide IF coefficient
5. Isolate the variable
6. Draw you answer on the number line

COSMIC

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COSMIC cards
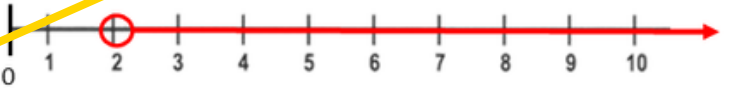
COSMIC

5. Isolate the variable

Get the X on one side of the equal sign

=

COSMIC

6. Draw you answer on the number line

0 1 2 3 4 5 6 7 8 9 10

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There are cards for students to refer to listing the steps in the COSMIC method.

They come with and without pictures.

Laminate so students can check off when complete.

Worksheet 1:

Read each problem and translate into an inequality.

1. A number increased by six is less than twenty

2. A number decreased by four is more than five

3. Eight more than a number is greater than or equal to ten

4. A number minus ten is less than or equal to fifteen

5. Seven take away a number is greater than nine

Worksheet 2:

Read each problem and circle the correct inequality.

1. A number increased by fourteen is less than twenty

   $X+5\leq7$ $10-x>20$ $X+14<20$

2. A number decreased by six is greater than or equal to fourteen

   $X-6\geq14$ $7-x>14$ $X+6<$

3. Ten more than a number is less than or equal to

   $X+1\geq8$ $X+10\leq15$ $X-4<15$

4. A number minus one is less than thirteen.

   $X-7\leq23$ $1+x>13$ $X-1<13$

5. Nine take away a number is greater than one

   $9-x>1$ $12+x<18$ $X-17\geq25$

There are 15 worksheets where students will practice copying and translating the problem into an algebraic equation.

Students can write in answers or cut and paste answers provided on a separate page.

COSMIC step #2

There are 4 worksheets where students **will identify the operation** in the equation.

There are 2 using pictures and 2 with numbers.

There is an example (shown here) worked out for you.

1. Decide if you need to multiply or divide from both sides.
2. Write to the side if you will multiply (x) or divide (÷).
3. Circle the coefficient.
4. Either multiply or divide by the correct coefficient as a step in isolating the variable on one side.
5. Draw your answer on the number line.

Example:

1

X

$5X > 25$
$÷5 > ÷5$

$X > 5$

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

COSMIC step #3

There are 4 worksheets where students will practice which operation they need to do in order to eliminate a coefficient.

There is an example (shown here) worked out for you.

COSMIC step #4

1. Translate the problem.
2. Decide if you need to add/subtract.
3. Write the new problem.
4. Decide if you need to multiply/divide.
5. Is the variable isolated? Draw your answer on the number line.

Example: Two times a number plus ten is greater than twenty.

$2X + 10 > 20$ ①

+
−
$2X + 10 > 20$
$-10 \quad -10$ ②

$2X > 10$ ③

X
÷
$2X \,.10$
$\div 2 \quad \div 2$ ④

yes
$X > 5$ ⑤
no

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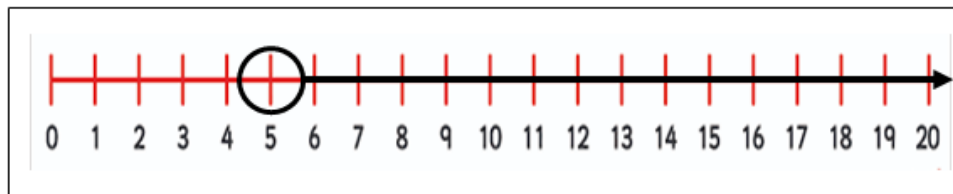
There are 10 worksheets where students will practice isolating the variable.

There is an example (shown here) worked out for you.

Addition/subtraction

1. Decide if you need to add or subtract from both sides.
2. Circle either the + or – sign.
3. Either add or subtract the correct number as the first step in isolating the variable on one side.
4. Draw your final answer on the number line.

Example:

(1)

$X \, \textcircled{+} \, 2 \quad > \quad 10$
$-2 \qquad\qquad -2$
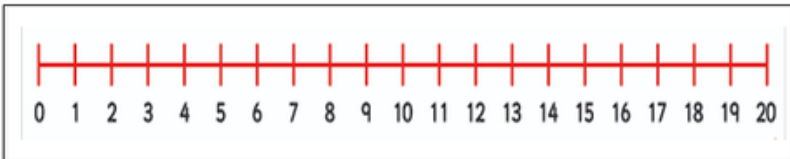
$X \quad > \quad 8$

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

1. Decide if you need to multiply or divide from both sides.
2. Write to the side if you will multiply (x) or divide (÷).
3. Circle the coefficient.
4. Either multiply or divide by the correct coefficient as a step in isolating the variable on one side.
5. Draw your answer on the number line.

Example:

(1)

X

$5X \, > \, 25$
$÷5 \, > \, ÷5$

$X > 5$

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
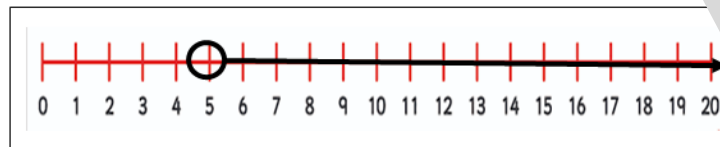
There are 11 worksheets where students will draw all possible answers on a number line.

There is an example worked out for you.

There is a Sudoku puzzle in this unit as well. This is a great way to work with the new vocabulary!!
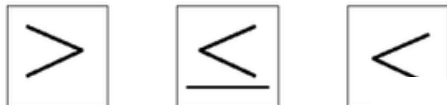
There are 2 versions plus answer keys.

Version 1

1. True or False. You solve an inequality the same way you solve a linear equation.

true | false | I don't know

2. Which symbol means greater than OR equal to?

< | > | ≥

3. Which symbol means less than?

> | ≤ | <

4. How would you draw this on a n[...]

5. Circle all the possible answers for

0 5 7 3

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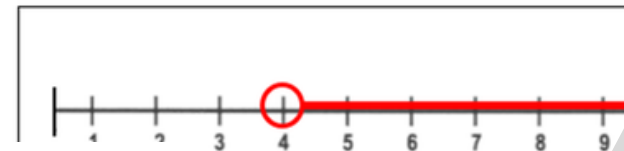Worldwide. Used with permission. Boardmaker® is[...]

Version 2

Print onto cardstock or mount on index cards. Cut pictures apart and show student answer choices for each question.
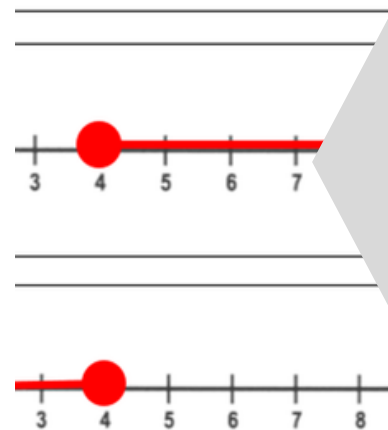
Q 3

> | < | <
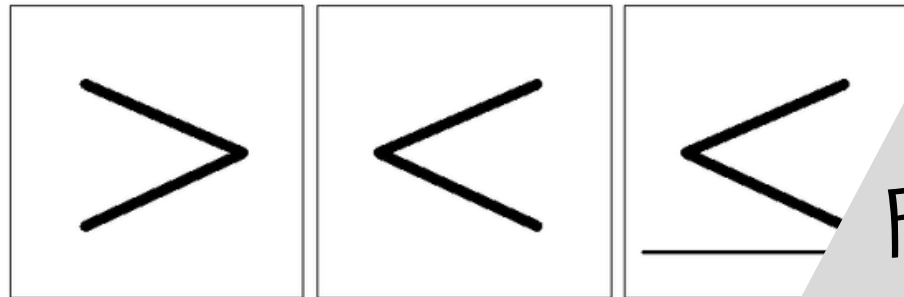
Q 4

Version 3

1. True or False. You solve an inequality the same way you solve a linear equation.
   A. True
   B. False
   C. I don't know
2. Which symbol means greater than OR equal to?
   A. <
   B. >
   C. ≥
3. Which symbol means less than?
   A. >
   B. ≤
   C. <
4. How would you draw this on a number line? X>4

5. Circle all the possible answers for Y ≤ 5
   A. 0   D. 3
   B. 5   E. 2
   C. 7   F. 9
6. Translate this inequality: a number is less than or equal to five.
   A. X < 5
   B. Y > 5
   C. X ≤ 5

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FINALLY the assessment!! There are 3 versions.
- 10 questions with 3 picture choices for each question
- cut out the answer choices and glue them on index cards
- traditional multiple choice

Answer key included.

Watch the movie on Inequalities

Then, we can begin isolating the variable on one side of the equation.

Christa Joy, Special Needs for Special Kids

This unit also has digital activities. There is a movie version of the book students can listen to read aloud.

The digital activities have students click and drag their answers. There are 2 sets slides.

Perfect for all learning levels

The second set of slides is differentiated using either color or numbers for students to match to.

This resource comes in a zipped folder. You will need to unzip the folder to access all the contents which include:

- Lesson plan
- Inequalities activities in BW
- Inequalities activities in color
- Solving Inequalities book (PowerPoint) to use with activities
- Links and directions to digital activities

Save money and get this unit in a bundle with more advanced algebra units.

Algebra Bundle