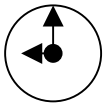
[51 minute lesson]

Japan Public Release Lesson 4 Lesson Graph [8th grade]



7 minutes

Public Class Work: Sharing Homework

The teacher assigns six students to write the solutions on the board:

(1) $6x - 4 < 4x + 10$
$6x - 4x < 10 + 4$
$2x < 14$
$x < 7$

(2) $2x - 6 \leq 7x + 4$
$2x - 7x \leq 4 + 6$
$\frac{-5x}{-5} \geq \frac{10}{-5}$
$x \geq -2$

(3) $1.2x - 4.2 > 0.4x + 0.6$
$(1.2x - 4.2 > 0.4x + 0.6) \times 10$
$12x - 4x > 6 + 42$
$8x > 48$
$\frac{8x}{8} > \frac{48}{8}$
$x > 6$

(4) $3(x + 4) > 5x + 2$
$3x + 12 > 5x + 2$
$3x - 5x > 2 - 12$
$* -2x < -10$
$\frac{-2x}{-2} < \frac{-10}{-2}$
$x < 5$

T: "At the –2, the inequality sign doesn't change yet. When you divide both sides by –2 then the direction is changed."

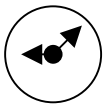
(5) $4(x - 2) \leq 5(2x - 3)$
$4x - 8 \leq 10x - 15$
$4x - 10x \leq -15 + 8$
$-6x \leq -7$
$x \geq -\frac{7}{6}$

(6) $1.8x + 2 > 0.5x + 0.7$
$18x + 20 > 5x + 7$
$18x - 5x > 7 - 20$
$13x > -13$
$x > -1$

3 1/2 minutes

Public Class Work: Posing the Problem

The teacher says that today will be the final part of word problems. He asks Genji to read the problem on the chalkboard.



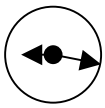
5 1/2 minutes

Private Class Work: Students Work Individually on the Problem

The teacher asks students to think about what they need to do to find out how many you can buy and find the answer.

" I don't care about what kind of method you use."

You would like to by 10 cakes all together for less than 2,100 yen, in which one cake is 230 yen each and the other cake is 200 yen each.
If you want to buy as many 230-yen cakes as possible, what is the maximum number that you can buy?



9 1/2 minute

Public Class Work: Sharing Solutions

The teacher says "Okay, we will have midway presentations". After using papers, scissors, stone to see how many students understood the problem, he asks students to share their "methods of thinking". After each method he asks which students in the class solved it in the same way.

Hara: (Thinking Method 1)
"I kept calculating and reducing."

230-yen cakes	x 3	x8	x9	x10
	690		2,070	2,300 yen

200-yen cakes	x7	x1
	14.00	2.00
	2,090	2,270

"I ran out of time at the end."

Teacher poses Thinking Method 2:
Ten 230 yen cakes cost 2,300 yen.
You are short 200 yen.
You want to substitute some with 200-yen cakes to make up the shortage. How many do you need to substitute? If you buy seven 200-yen cakes, you save 210 yen, which would take care of the shortage. Which means you buy three 230-yen cakes.

Luiko: (Thinking Method 3)
Make the number of 230-yen cakes x.
Then the number of 200-yen cakes becomes 10 – x.

230 yen	200 yen
x	10-x

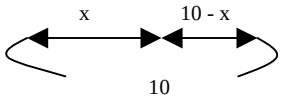
$230x + 200(10 - x) \leq 2{,}100$

9 minutes

Public Class Work: Students Solve the Problem Using an Inequality Equation

The teacher passes out worksheets and says "We are going to try and do the problem using an inequality equation.

Buy x amount of 230-yen cakes



(Equation)

$230x + 200(10 - x) \leq 2{,}100$
$230x + 2{,}000 - 200x \leq 2{,}100$
$230x - 200x \leq 2{,}100 - 2{,}000$
$30x \leq 100$
$x \leq \frac{10}{3}$ or $x \leq 3.3\ldots$

Answer: You can buy up to three 230-yen cakes

T: "Which is easier: doing it one-by-one or using an inequality equation?"
S: "An inequality equation."

Teacher puts on the board:

Having you know the good qualities of finding the answer by setting up an inequality equation.

1 minutes

Public Class Work: Teacher Poses Two Related Problems

"Try to set up an inequality equation by yourself in the same way and try to solve the problem."

11 1/2 minutes

Private Class Work: Students Work on Two Related Problems

(1) You would like to buy 20 apples and tangerines altogether for less than 2,000 yen, in which one apple costs 120 yen each and one tangerine costs 70 yen each. Up to how many apples can you buy?

(2) You would like to buy 15 pears and persimmons and a basket altogether and for less than 1,000 yen, in which one pear costs 70 yen each, one persimmon costs 50 yen each, and a basket costs 80 yen. You want to buy more pears than persimmons. Up to how many pears can you buy?

Watabe:

	120-yen apples	70-yen tangerines	Total
Amount	x	20 - x	20
Sum	120x	70(20-x)	2,000

$120x + 70(20 - x) \leq 2{,}000$
$120x + 1{,}400 - 70x \leq 2{,}000$
$120x - 70x \leq 2{,}000 - 1{,}400$
$50x \leq 600$
$\frac{50x}{50} \leq \frac{600}{50}$
$x \leq 12$
answer: 12 apples

Bancho:

	70-yen pears	50-yen persimmons	Basket	Total
Amount	x	15 - x		15
Sum	70x	50(15-x)	80	1,000

$70x + 50(15 - x) \leq 1{,}000$
$70x + 750 - 50x + 80 \leq 1{,}000$
$70x - 50x \leq 1{,}000 - 750 - 80$
$20x \leq 170$
$\frac{20x}{20} \leq \frac{170}{20}$
$x \leq \frac{17}{2}$ (8.5)
answer: 8 pears

2 1/2 minutes

Public Class Work: Students Share Solutions

Watabe and Bancho are asked by the teacher to write their solutions on the board. The teacher goes over the steps of each solution with the class.

1 1/2 minutes

Public Class Work: Teacher Sums Up the Lesson. **"When you work out problems instead of counting things one by one and finding the number, it's usually easier if you set up an inequality and find the answer."**