Concept: Tiles, Balances, and Equations

Name:

Warm-Up:

In Partners:

With a partner play "Guess My Number". One student picks a number between 0 and 100 and the other student guesses the number through systematic trials. The student who picks the number must not talk but indicate if the number is higher or lower than the guessed number by using thumbs up and thumbs down to direct the guesser. The student who picks the number must keep track of how many guesses their partner takes to reach their number. Once the guesser locates the picked number, the students reverse roles.

Whole Class:

(Think-Pair-Share) Ask the students to explain:

1. How do they narrow down their estimates to reach a final answer?
2. How do you choose your first estimate?

COMPUTER COMPONENT

Instructions: In UMATH X follow the **Content Menu** path:

Equations > **Tiles, Balances, and Equations**

Work through all Sub Lessons of the following Lessons **in order:**

- *Definitions*
- *The Meaning of "Solving an Equation"*
- *Solve by Systematic Trials*
- *Recall Tile Concepts*
- *Balances…An Introduction*
- *Tiles, Balances, Equations*

Additional Required Materials: Pencil Crayons (red and blue)

As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

NOTES:

Match the following:

An Algebraic Expressions	**3x + 6 = 15**
	y + 7
	2
Equations	**3 (t – 4)**
	v
	4p + 2 – 4 = 6
Terms	**x + 2**
	x
	8 + 3y = 17
Variables	**3y**
	p
	2x

Fill in the blanks.

_____ are mathematical _____ that use an_____

sign to relate _____ algebraic _____.

Remember:

In an equation, the _____ must equal the _____.

To solve an equation means to find the _____ of the variable which makes the equation _____.

To find the root for an equation means to find the _____ of the variable which makes the equation _____.

Solve by Systematic Trials (*Guess and check systematically)*

Fill in the blanks in the table.

Example: 3x + 4 = 28 Solve for x

	x	3x + 4	
try	0		Too low
try	2		Still too low
try	5		Still too low
try	7		Still too low but close
try	8		We found it!

Therefore, the **solution (root)** is, x = _____.

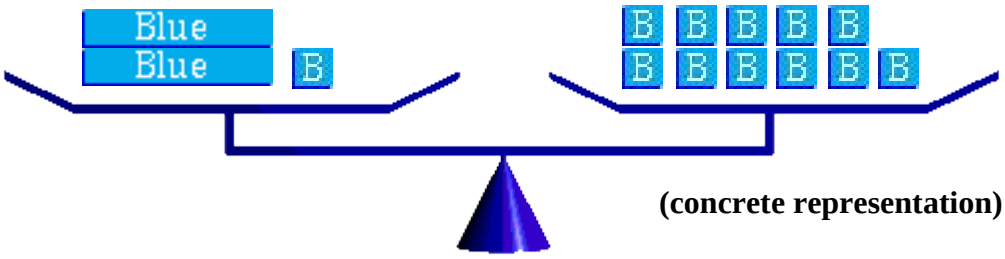
Recalling Tile Concept

Remember:

Tile	Is Called	Represents
 Blue Tile	_____	_____
 Red Tile	_____	_____
 + 		_____

Tile	Is Called	Represents
Blue	_____	_____ unknown quantity could be called an _____.
Blue Blue		_____
Red	_____	_____. unknown quantity Could be called an _____..
Red		_____
Blue Blue Red B B B B R		Algebraic Expression 2x –x + 4 - 1 or _____.

Balance: The tile representation of _____ x + _____ = _____ (abstract concept)



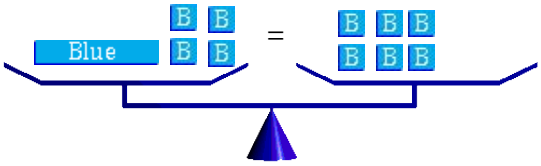
(concrete representation)

The concrete representation helps to understand the abstract concept of the equation.

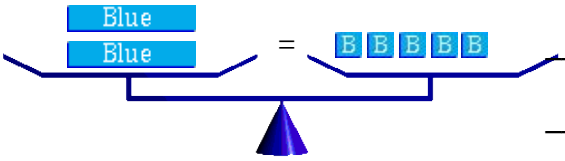
OFF COMPUTER EXERCISES

1. What equation does each set of tiles model?

(a) Equation?



(b) Equation?



2. In the equation $5x - 1 = 14$, find:

   (a) The variable is _____

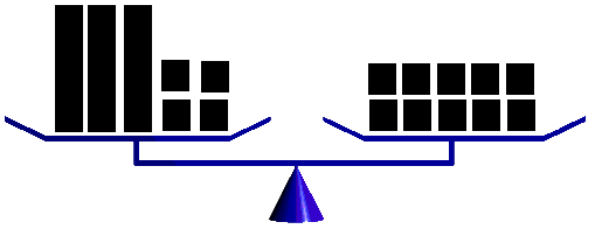
   (b) A term is _____

   (c) The algebraic expression is _____

   (d) The equation is _____

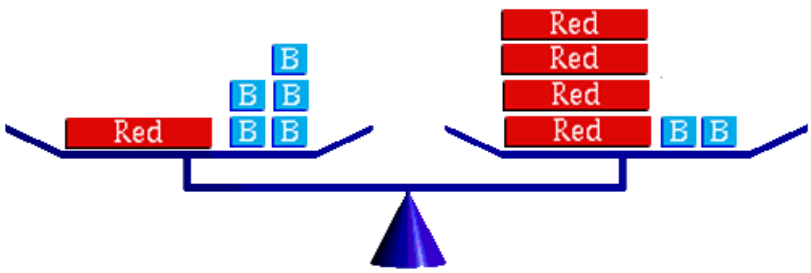
3. The left side of the balance is holding 3 containers and 4 lead weights. Each container contains an equal number of weights. The right side of the balance is holding 10 lead weights. All lead weights are identical.

   Your task is to find the number of weights in each container.

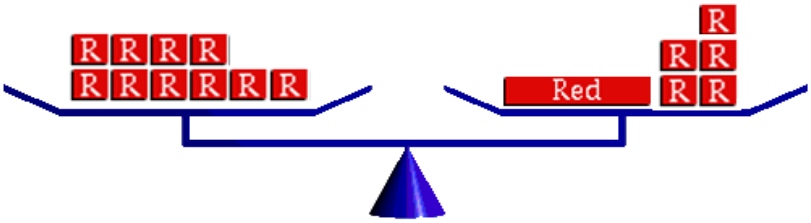


4. What is the equation represented by the balances?

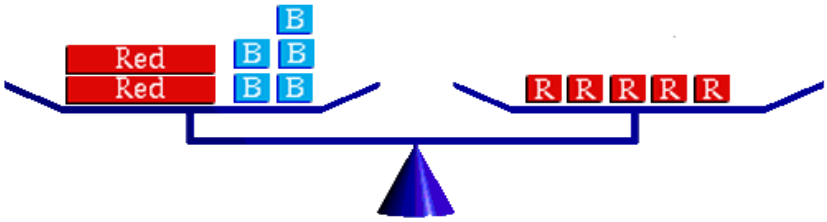
(a)



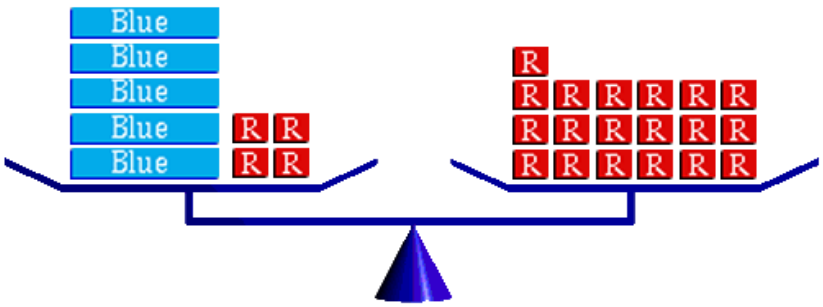
(b)



(c)

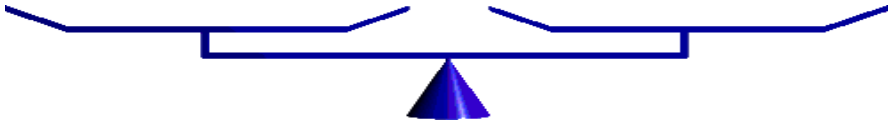


(d)



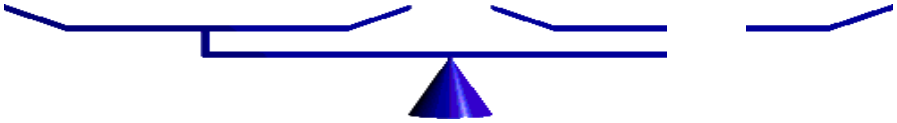
5. Sketch each equation on the balance and find the number of B (weights) that each Blue (container) holds. All lead weights are identical.

(a) $2x + 4 = 12$



Each Blue (container) holds _____ B (weights).

(b) $3x + 1 = 10$



Each Blue (container) holds _____ B (weights).

Math in the Real World

Create a list of real world incidences and for each write an equation.

Example 1:

From the United Nations

By the year 2025, it is projected that more than $\frac{1}{2}$ of the children in the world will be poor. The projected population of the world for 2025 is 7,818 million.

$\frac{1}{2}x$ = number of poor children

(This could be a good lead off to the production of a short news clip (presentation with graphics, sound and picture) to emphasis the concerns about population explosion or diminishing natural resources.

Example 2:

From World Concern

Local humanitarian organizations cut budget after 30% fall in donations. As the budget stands, 350,000 people in developing countries will not receive medication to kill parasitic worms, in order to save $50,000 in shipping costs for the medication.

$\frac{3}{10}$ x = $50 000

(This could be a good lead off to the production of a short news clip (presentation with graphics, sound and picture) to emphasis the concerns about the need for aid both at home and abroad.)

Example 3:

From If the World Were a Village

"If we could turn the population of the earth into a small community of 100 people, keeping the same proportions we have today, it would be something like this…"

6x = 59% of the entire wealth of the community

http://www.youtube.com/watch?v=oumVHSj6AE8&feature=related

(This could be a good lead off to the production of a short news clip (presentation with graphics, sound and picture) to emphasis the concerns that our world faces.)