

What to bring to class:  
Ask students to bring PM  
4A and 5A.

## 4.1 - Prealgebra

- \* Algebra is generalized arithmetic - we just use letters as names for numbers and rearrange as before.
- \* In school algebra evolves from arithmetic.

### \*Say/Discuss:

- \*Algebra isn't a new or different subject!  
Just quicker & more flexible way to do arithmetic.
- \*Sometimes students see no algebra until grade 7 or 8 and it is introduced as a new subject (was it that way for you??) Better to slowly introduce use of letters in arithmetic problems in elementary school.

Use of letters ("prealgebra") not hard:

EX 1:

$$\begin{array}{l} 7 + \_ = 12 \\ 7 + ? = 12 \\ 7 + x = 12 \text{ what is } x? \end{array}$$

} clearly the same.  
say: can easily be understood by elementary students.

Ex 2: (Russian grade 2) What do the letters stand for?

$$k - 17 = 28$$

$$45 \div c = 5$$

say: not always "x"

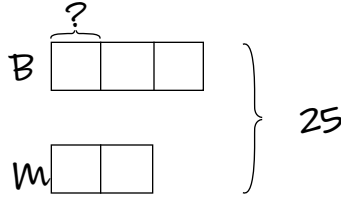
Also gives an alternate way to solve problems.

Ex 3: Kate bought 3 books & a magazine for a total of \$25.

If the magazine cost twice as much as each book, find the cost of one book.

2 Teacher Solutions:

Using diagrams



5 units = 25  
 1 unit = 5  
 Each book cost \$5.

Using algebra

Let  $b$  = cost of books in dollars

meaning  
 of letter  
 clearly  
 identified

cost of magazine =  $2b$   
 cost of 3 books =  $3b$   
 Total

$3b + 2b = 25$   
 $5b = 25$   
 $b = 5$

steps clearly  
 shown in  
 order

units specified,  
 so letter in number  
 NOT - number w/ units

Each book cost \$5. ← answer statement.

say: you will be asked to give such alg. solutions on HW - this is what I expect.

Compare: \*same reasoning (b ↔ 1 unit)

say: diagram is easier for problem with small numbers, but if you had 130 books & 48 mag's the diagram is harder & alg. the same

Caution: Letters stand for numbers.



say: In word problems (& real life) we usually deal with quantities = number & unit. Letters stand for numbers, so you must still specify the unit.

Ex: He drank x cups of water — good  
He drank x water — bad

### Expressions:

Have students read def's on pg 89 EMT

Note: \*Like complete sentences

\*notation change: "3 times x" now  $3 \cdot x$  or  $3x$

\*key feature: expression can be evaluated by replacing letters by numbers.

$$3x + 5 \rightsquigarrow 17$$

let  $x = 4$

Teach expressions by:

\* building expressions

\* word problems

\* simplifying & rearranging



Evaluating

PM 6A pg 6

\*Go over pg 6 - example of building an expression.

\*Read HW problem #9 set 16. (will start it now)

PM pg 7

- |                        |                |   |                                     |
|------------------------|----------------|---|-------------------------------------|
| 1. a) 13               | b) $x + 8$     | B | } this is how<br>HW should<br>look. |
| 2. a) $10 - 2 = 8$     | b) $m - 2$     | B |                                     |
| 3. a) $w - 5\text{kg}$ | b) $8 - 5 = 3$ | E |                                     |

\*Assign 4 - 9 to each table of students. Give 2 min.

Call on students for answers.

Ask: How many different letters used? Any letter can represent a number.

Note: notation changes

$$6 \times 3 \longrightarrow 6 \cdot 3 \text{ \& } 6c$$

$$x \div 3 \longrightarrow x/3$$

students now know  
fractions. (we will in ch 6)

4 ways to build expressions:

1) Tables - pg 6 & 8 PM 6A

Caution: Not all tables lead to expressions

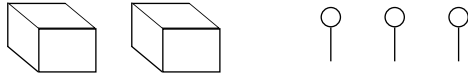
Ex	Time	Rainfall rate
	11 am	1/12" per hour
	12 pm	1" per hour
	1 pm	1 1/2" per hour
	2 pm	_____

No formula!

say - other examples, stock market, gas prices, can make table, but don't lead to algebra!

2) Set Model:

say: models which worked for whole numbers still work for expressions.

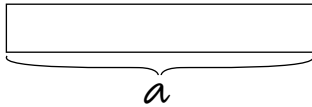


$n$  lollypops in each box

Total number of lollypops:  $2n + 3$

See: PM 6A pg 10 #10

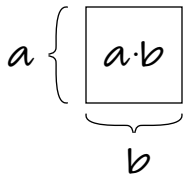
3) Measurement Model:



or scales (weight)

see PM 6A pg 7 #3

4) Rectangular Array:



(Grade 6: Students know area = product)

HW #16

#3, 6, 9 (different from syllabus)

bring PM 6A

