

# Understanding English Through Mathematics

A Research Based ELL Approach  
To Teaching Students

# The Norm

- Traditionally, math has been a curriculum taught independently of any other core area.
- Math is looked at as being universal, a language unto itself, that is understood and taught in all countries in almost the same style.
- Most elementary school kids understand what  $3 + 4 =$  represents.

# The New Approach

- By using Math and the concepts that the ELL student already understands, we can enhance the English language recognition and retention.
- This will benefit not only the English teacher, but also better the student's understanding of the language and improve any standardized test scores.

# Approaches

- Use of cognates
- Practice of translating English phrases into Mathematical expressions and equations.
- Practice of translating Mathematical expressions and equations into English phrases.
- Breaking down Mathematical word problems and solving them.

# Cognates: Cognatos

Sum : suma

divide : dividir

Minus : menos

equal : igual

Multiply : multiplicar

total : total

Perimeter : perimetro

area : area

Diameter : diametro

cube : cubo

Horizontal : horizontal

vertical : vertical (la)

Velocity : velocidad

distance : distancia

Circumference : circunferencia



- Mas – plus
- Suma – sum
- Mas que – more than
- Mayor que – greater than
- Subir – rise
- Mayor – older
- Deposito – deposit
- Mas alto - higher
- Total – total
- Perimetro – perimeter
- Incrementar – increase
- Ganar – gain
- Entero – whole
- Todo junto – all together



- Restar – subtract
- Menos – minus
- Quitar – take away
- Remover – remove
- Menos que – less than
- Perder – lose
- Vaciar - empty
- Sacar dinero – withdraw
- Lo opuesto – opposite of
- Mas chico – younger
- Caer – fall
- Diferencia – difference

# TRANSLATIONS

+

add

sum

total

greater than

increase

deposit

increment

more than

grow

accumulation

plus

larger

-

subtract

minus

difference

less than

decrease

withdrawal

diminish

narrow

fewer

smaller

shorter

take away

x

multiply

times

product

by

double (x 2)

square

half (x ½)

triple (x 3)

quadruple

dual

binary

twice

÷

divide

into

quotient

half (÷ 2)

share

split

partition

segregate

take apart

divided by

break up

separate

=

equals

same as

is

results in

as good as

comparable with

equivalent to

## SPECIAL WORDS

from

than

into



# Translating English to Math

- Find the sum of two and five.

$$2 + 5$$

- Five less than an unknown number.

$$n - 5$$

- Ten more than twice  $x$ .

$$2x + 10$$

# Translating Math to English

$$x - 3$$

A number  $x$  minus three.

The difference of an unknown number and three

Take away three from an unknown number

Three less than an unknown number.

Three subtracted from an unknown number

An unknown number decreased by three.

# Translating Math to English

$$4x + 7$$

Four times a number plus seven.

Four times an unknown number increased by seven.

The sum of four times an unknown number and seven.

The total of four times an unknown number and seven.

Seven more than four times an unknown number.

Seven added to an unknown number quadrupled.

- The sum of a number and five is twenty. Find the number. ▲
- If five times a number is decreased by two, the difference is twenty eight. Find the number.
- The length of a rectangle is three times the width. If the length is 16 feet, what is the width?
- The length of a rectangle is three times the width. If the perimeter is 20 feet, what is the width? ■

- The sum of a number and five is twenty.

$$x + 5 = 20$$

Subtract 5 from  
both sides.

$$x - 5 = 15$$

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The number is  
fifteen.

$$x = 15$$



- The length of a rectangle is three times the width. If the perimeter is 20 feet, what is the width?



$$P = 2l + 2w$$

$$P = 20 \text{ ft}$$

- The student must also be taught the difference between the operations and the inequalities.

- Four less than a number

$$x - 4$$

Four is less than a number

$$4 < x$$

- If  $\frac{3}{4}$  pound of coffee costs \$7.50, what does one pound of coffee cost?
- The sum of three consecutive integers is 24. Find the integers.
- The sum of three consecutive odd integers is -45. Find the integers.
- Separate 31 into two parts so that one part is one more than twice as much as the first part. Find each part.
- The sum of the ages of Rosie and her mother is 72 years. The difference in their ages is 22 years. How old is each?



- At this point in the complexity of the problems, the concept of personalizing them so as to empower the student to create their own story problems is brought in. This way they include themselves and their friends/family giving them a personal interest in solving the actual problem.
- Example: \_\_\_\_\_ has four more CD's than twice as many as \_\_\_\_\_ has. Altogether, they have sixty four CD's. How many CD's does \_\_\_\_\_ have?

- The sum of \$217 was divided among 3 people so that the second received \$5 less than twice as much as the first, and the third received \$2 more than the second. How much did each person receive?
- Juan, who works at a fast food restaurant, received \$7.05 in tips one afternoon, all in quarters, dimes, and nickels. There were ten less dimes than quarters and five less nickels than dimes. How many of each coin was there?

- The sum of the degree measure of two supplementary angles is  $180^\circ$ . If the measure of one of two supplementary angles is eight more than three times the measure of the other, find the measure of each angle.
- The sum of the degree measures of the angles of a triangle is  $180^\circ$ . Two of the angles of a triangle have the same measure and the third angle measures 24 more than each of the other two. Find the measure of each angle.

# The End

Presented by: Robert Perez

Hanna High School

Brownsville, Texas

[rjrperez@bisd.us](mailto:rjrperez@bisd.us)

# Resources

- Teacher-made handouts/ worksheets
- **Developing Skills in Algebra Book A:** (1984; Dale Seymour Publications)
- **Pre-Algebra By Design:** (Jacobs Publishing Company; Phoenix, Arizona)
- **Algebra By Design:** (Jacobs Publishing Company; Phoenix, Arizona)
- **Multi-Lingual Glossary** ([www.glencoe.com](http://www.glencoe.com))