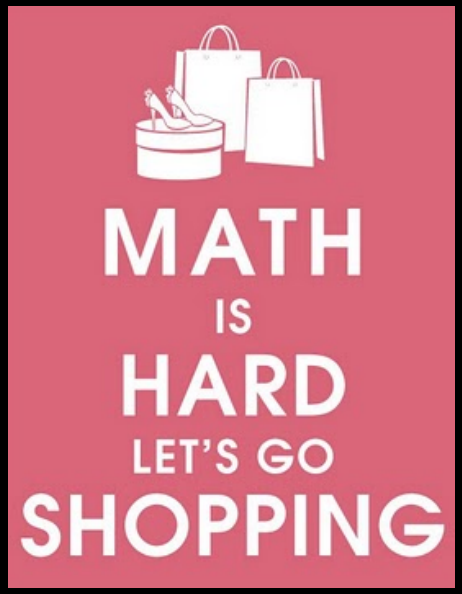
AMY LIN

EYES ON MATH
A VISUAL APPROACH TO TEACHING MATH CONCEPTS

OUR CULTURE


MATH
IS
HARD
LET'S GO
SHOPPING

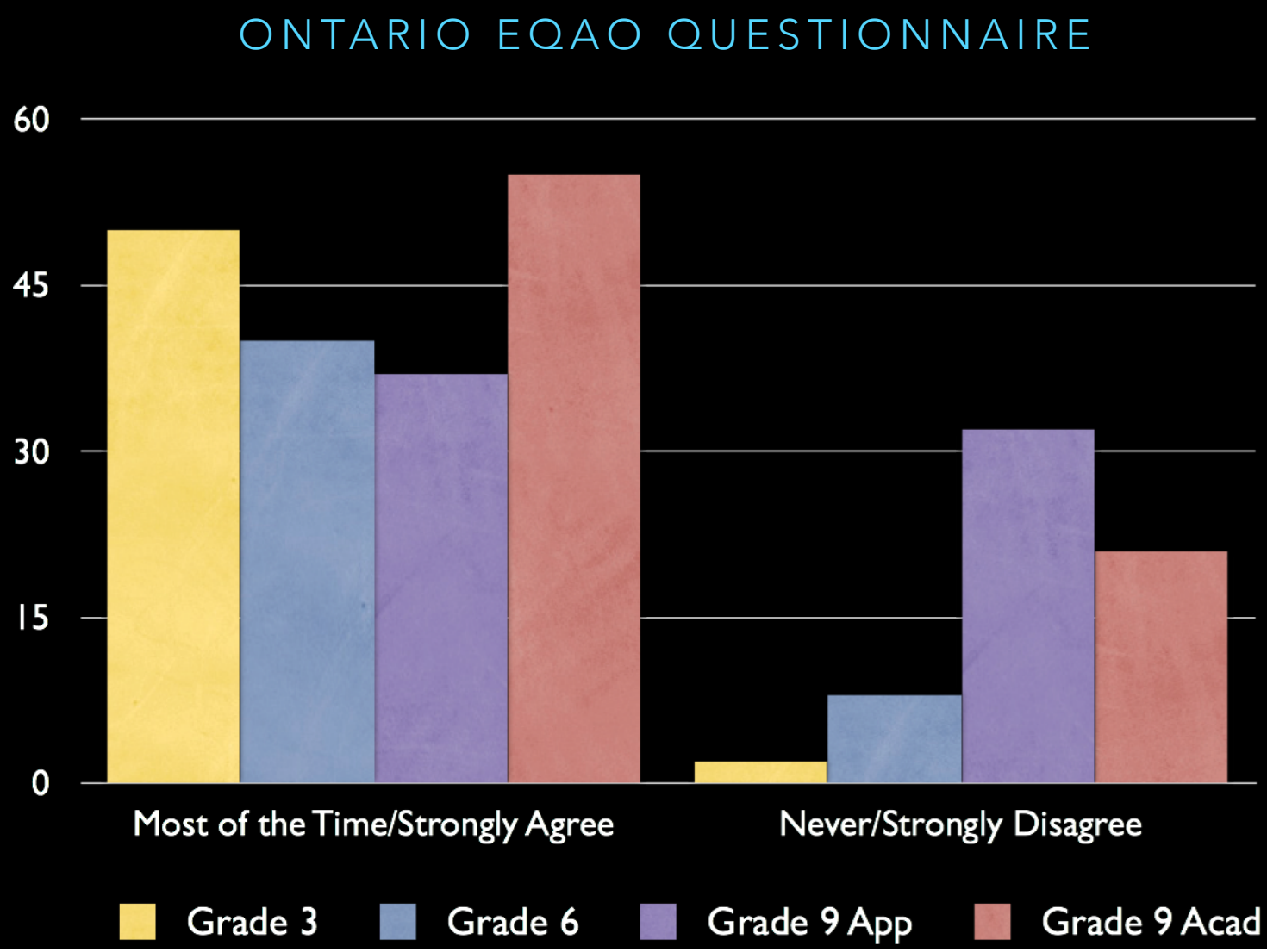

light as a feather,
tough as long division
FeatherLights reduce their school load by trimming weight off the pack. But what makes them really amazing is they do it without sacrificing durability thanks to strategically placed 420D and 600D pack cloth.
Lighter weight. Same awesome durability.
Guaranteed. Period.®
Chloe


I'm too
pretty
to do
math

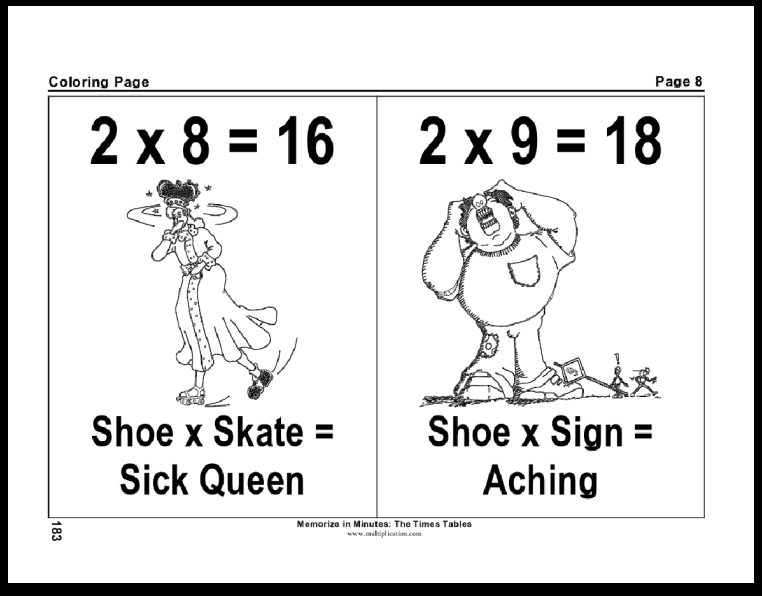

Math is hard!


ALLERGIC
-TO=
ALGEBRA

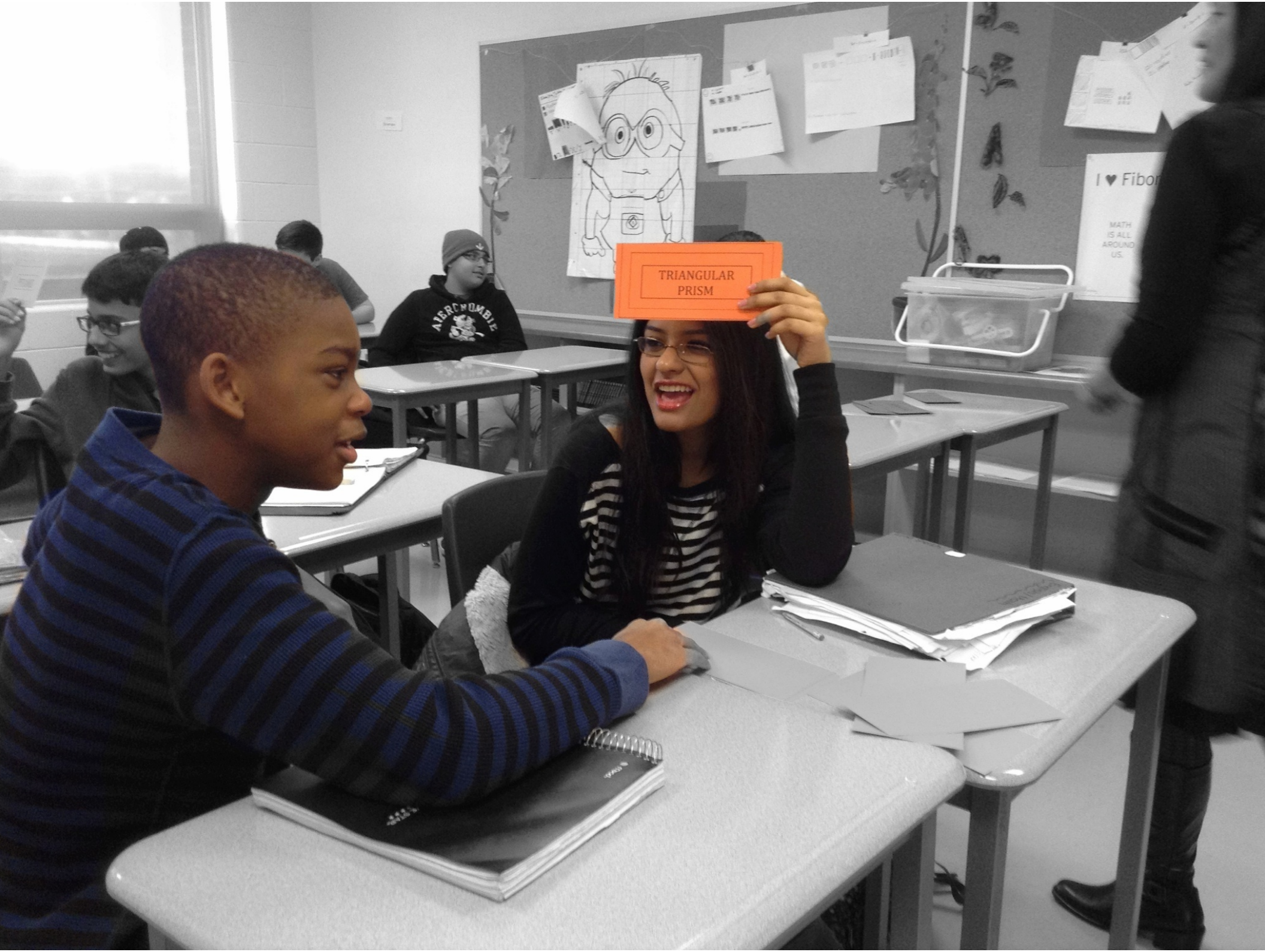
"I like math."


ONTARIO EQAO QUESTIONNAIRE
60
45
30
15
0
Most of the Time/Strongly Agree
Never/Strongly Disagree
Grade 3
Grade 6
Grade 9 App
Grade 9 Acad

WHAT DO YOU EXPECT IN A MATH CLASSROOM?



SURPRISE!


TRIANGULAR
PRISM
MATH
IS ALL
AROUND
US.

"You can teach a student a lesson for a day, but if you can teach him to learn by creating curiosity he will continue the learning process for as long as he lives. "

–CLAY B. APPLESEED

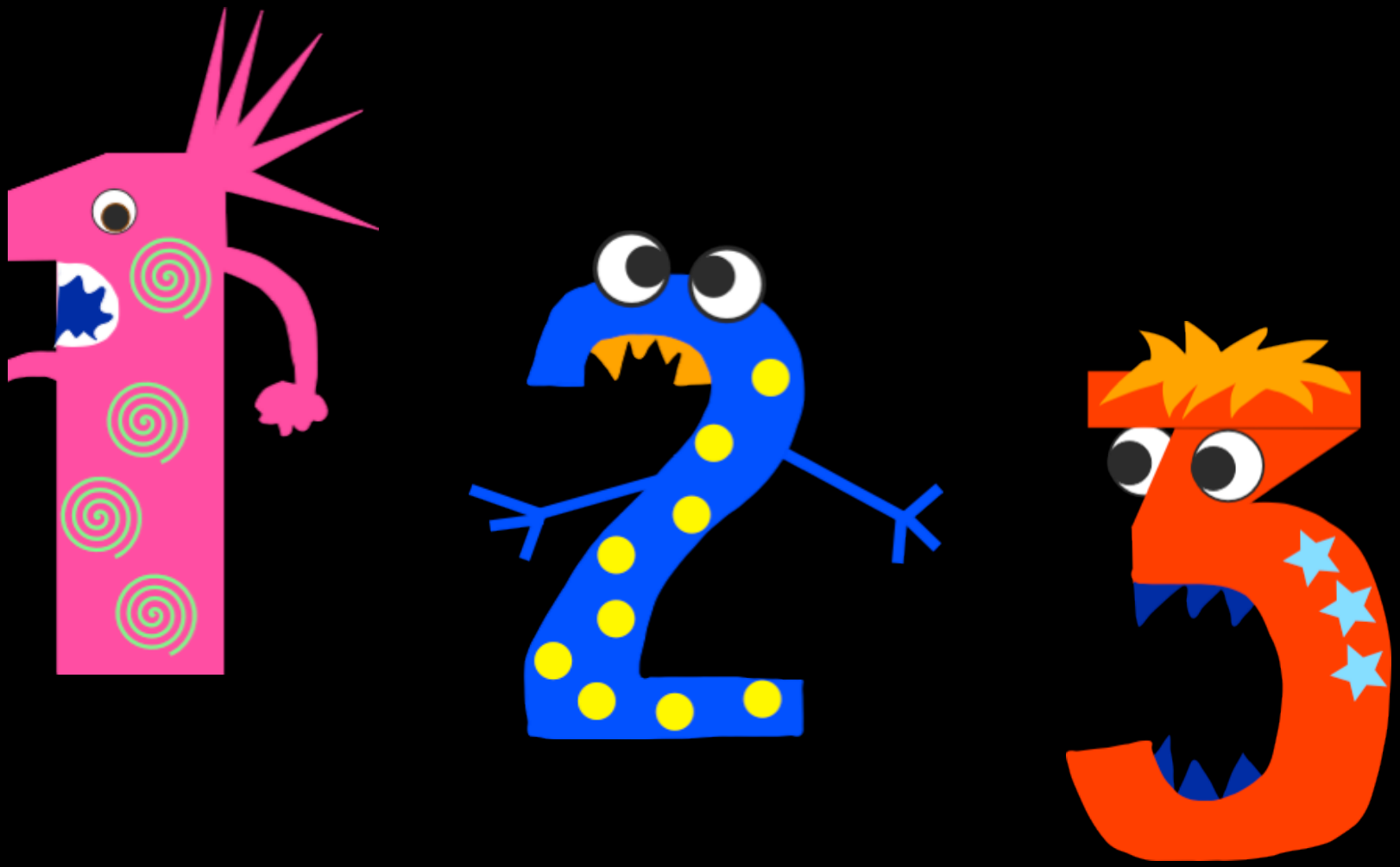
WHAT IS 58 X 38?

CHOOSE TWO NUMBERS AROUND 50 TO MULTIPLY.

MATH IS ABOUT
REASONING AND THINKING

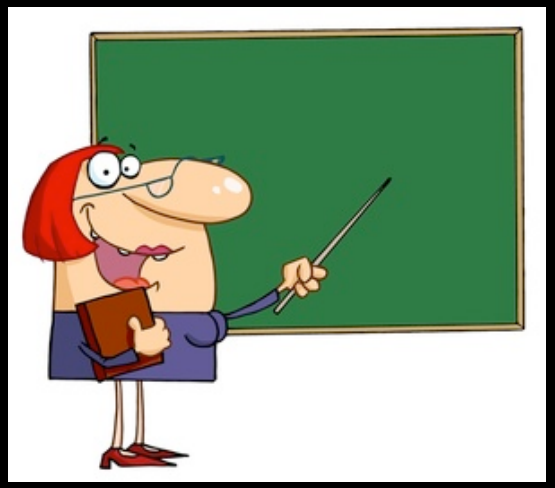
HOW DO WE KNOW WHEN STUDENTS ARE ENGAGED?

VISUALISATION




Spot Can Count
Eric Hill
A lift-the-flap book
Eric Hill
Spot Can Count
Putnam
Spot can count from 1 to 10! Young children will love learning to count along with Spot and his farmyard friends, and can share all the fun of finding the answers hidden under the flaps.
Other titles in the series
Fun with Spot
www.funwithspot.com

words



words

words

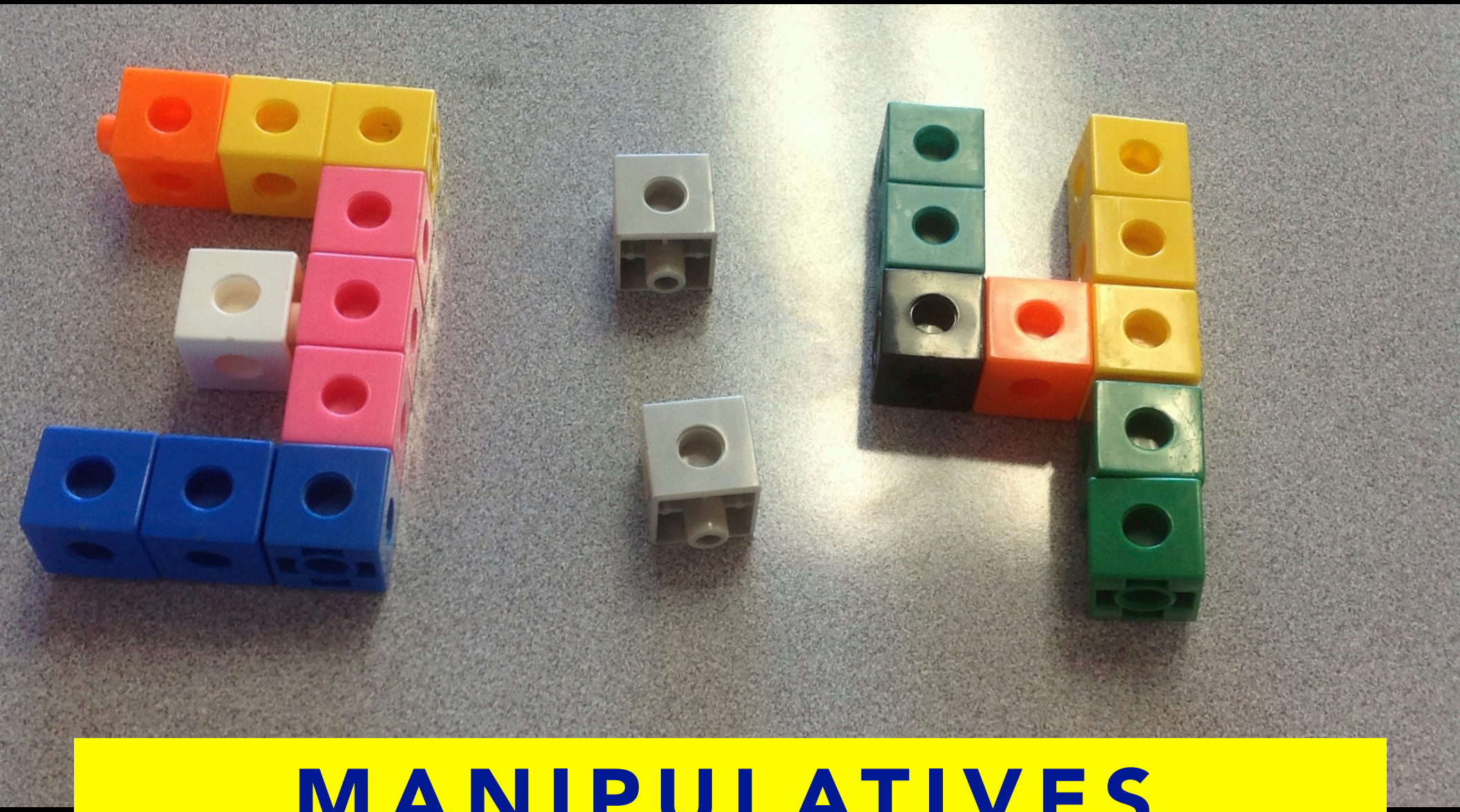
words

visual learners

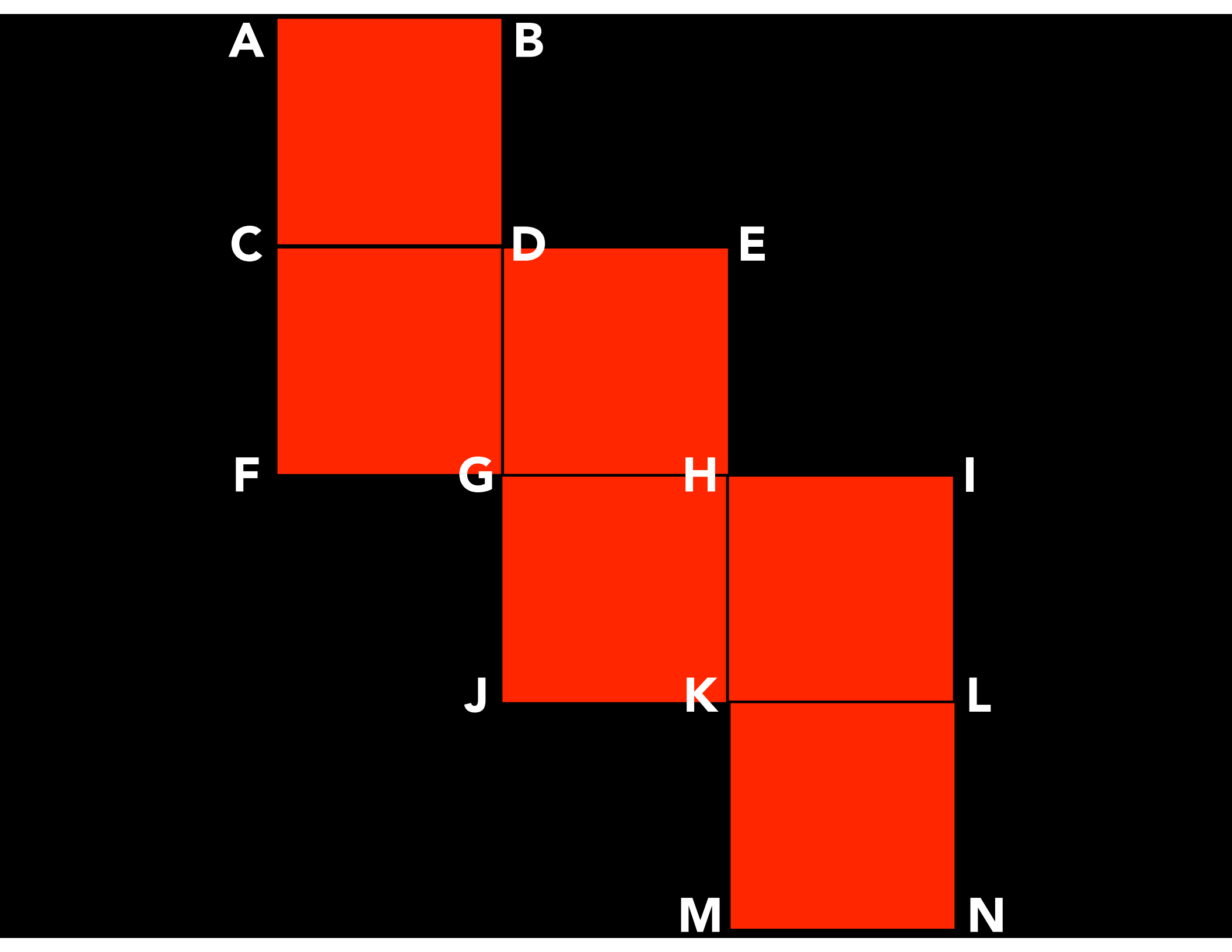
English Language Learners

language comprehension

language-based learning disabilities



MANIPULATIVES


A
B
C
D
E
F
G
H
I
J
K
L
M
N

HOW MUCH BIGGER?

KIPPER'S COOKIE CAPER

VIDEOS

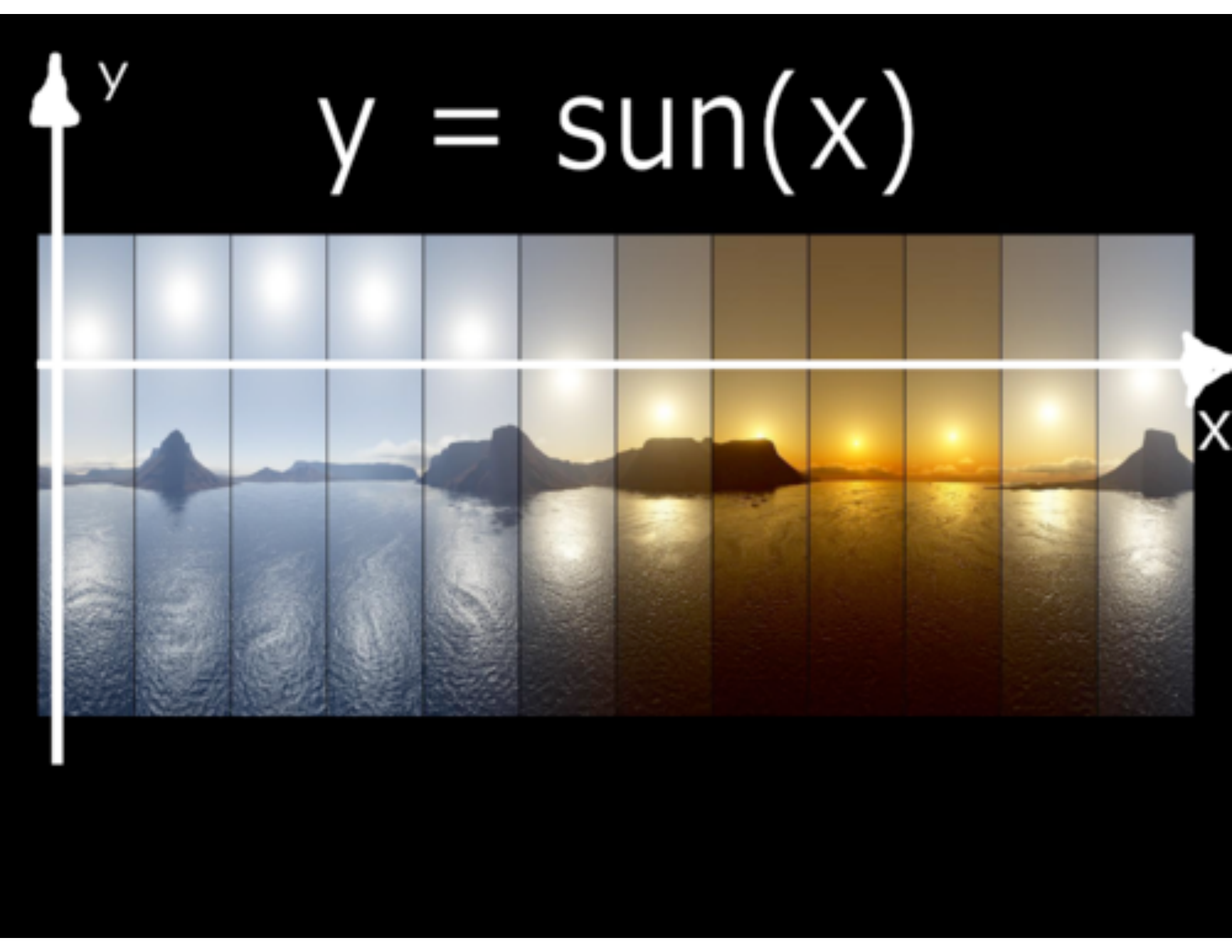
Why is your dog so picky?

Is your dog a proportional thinker?

Can your dog do fractions?

Why is this math class?

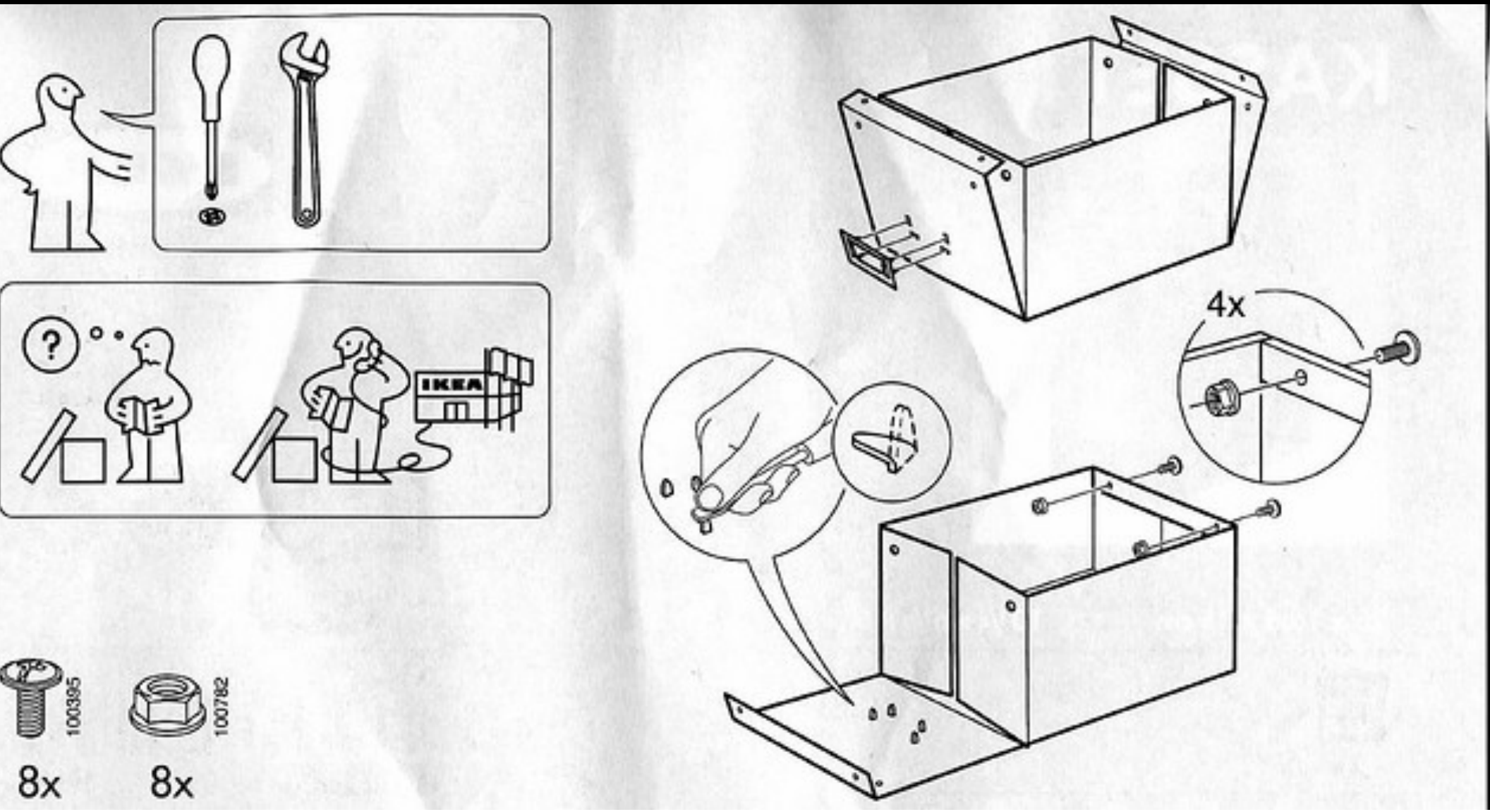
How do we fix it so Kipper is happy again?


y
y = sun(x)
x

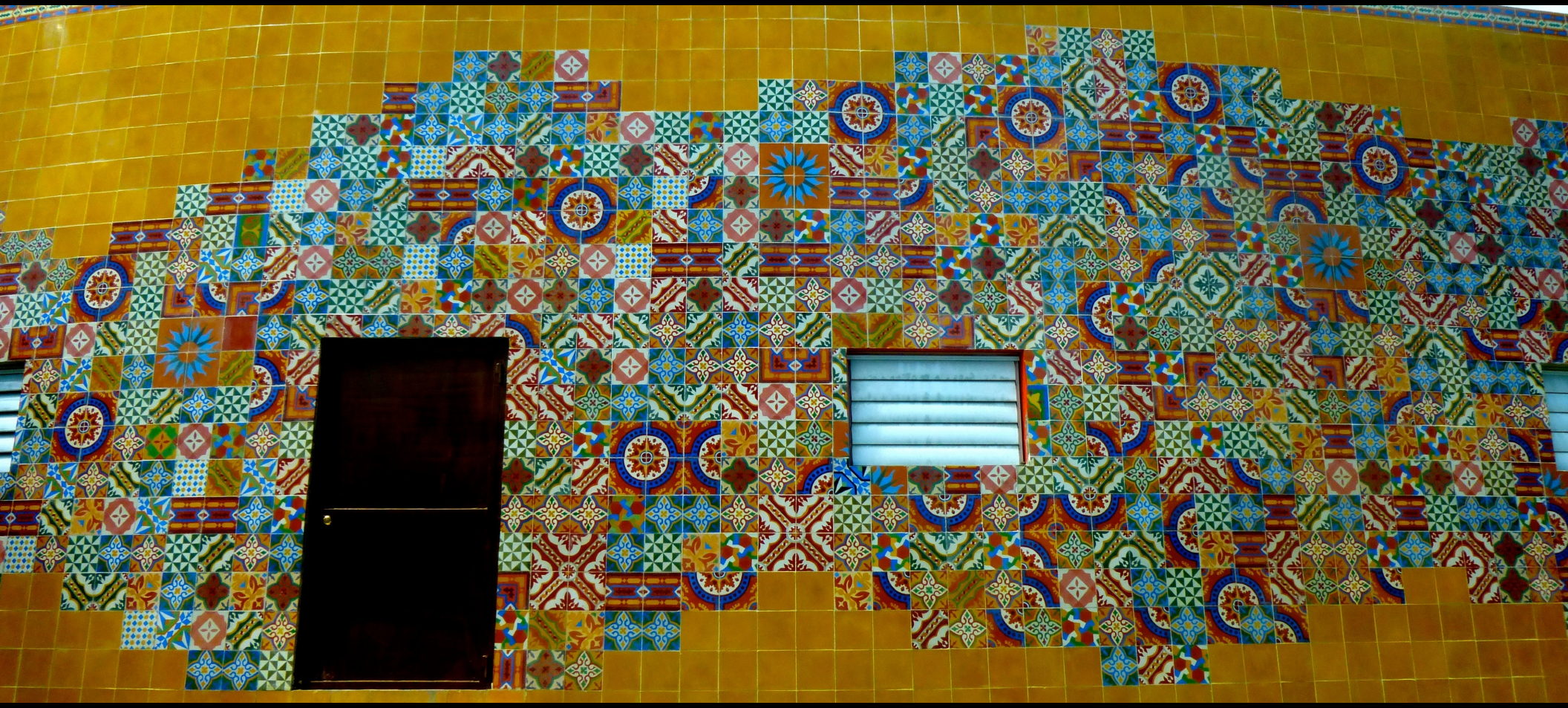
VISUALISATION

MATH-TALK COMMUNITY

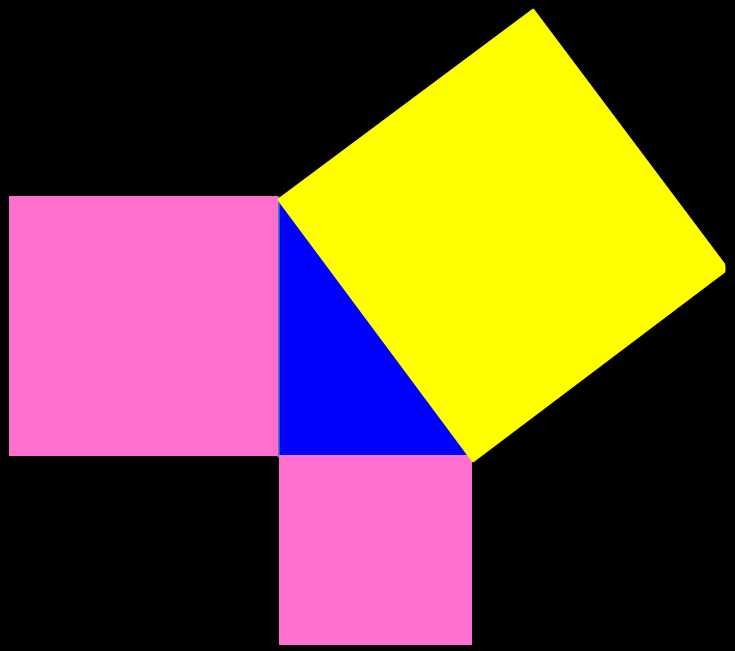
WE LIKE VISUALS

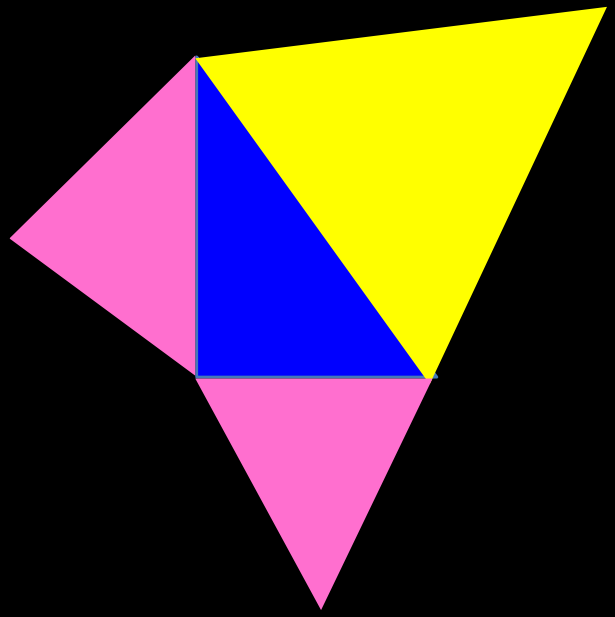


USING VISUAL APPROACHES TO TEACHING MATH CONCEPTS

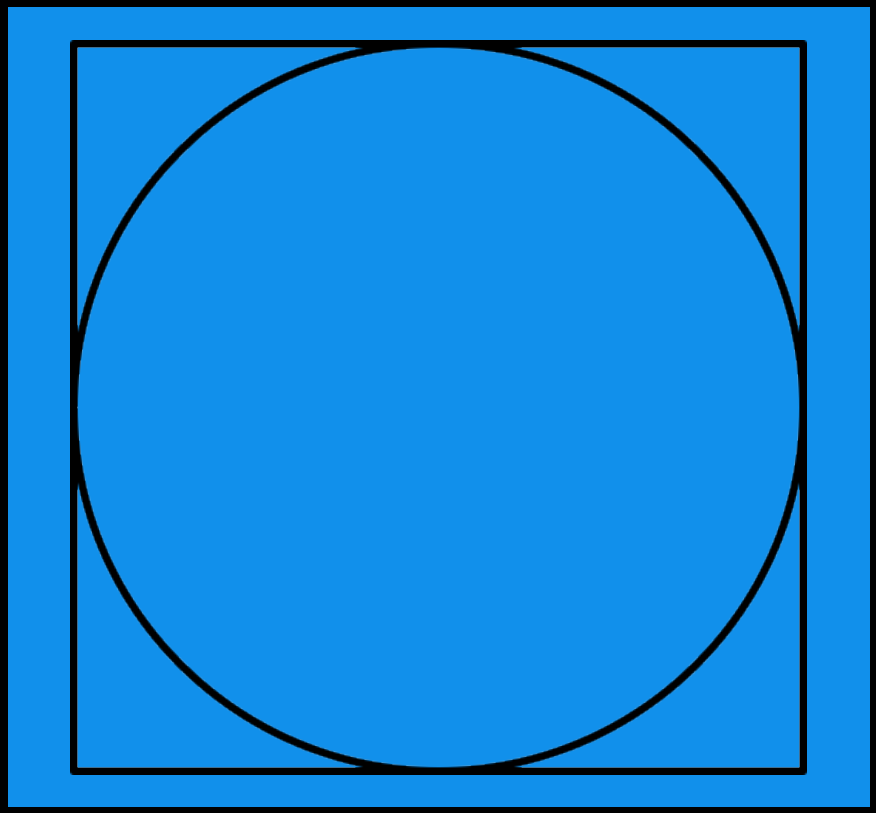


PYTHAGOREAN THEOREM

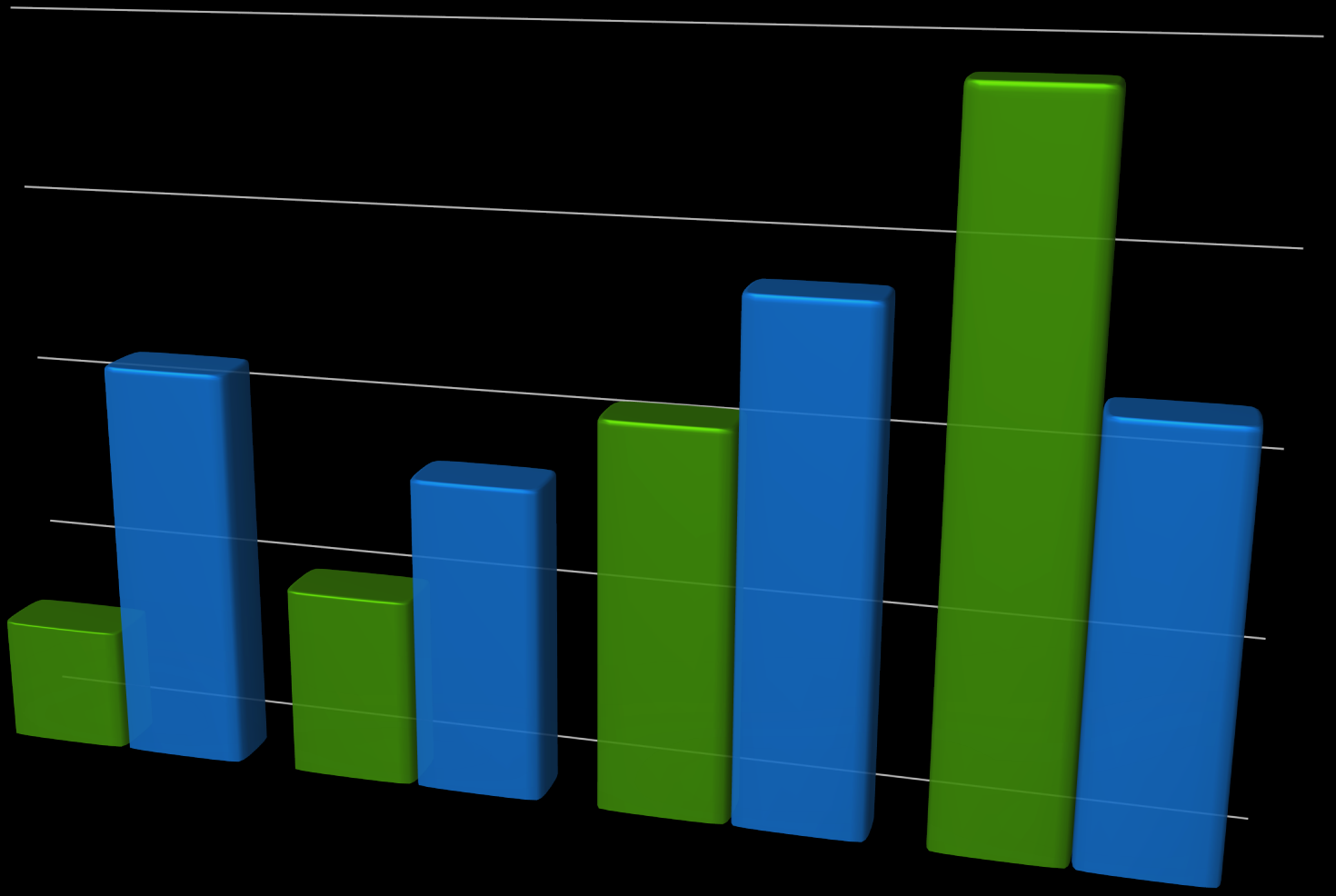


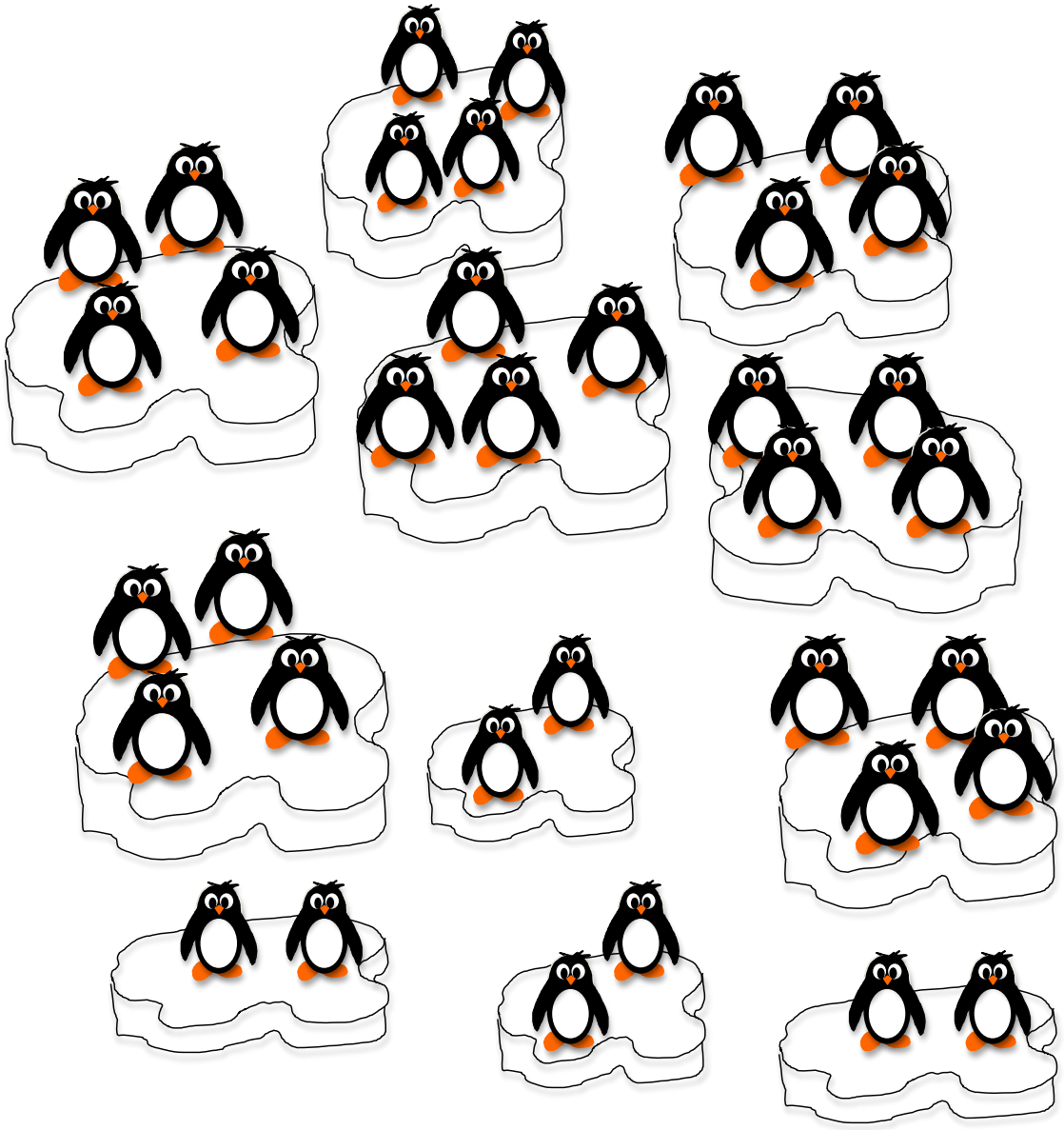


PROOF WITHOUT WORDS



WHAT IS THIS GRAPH ABOUT?

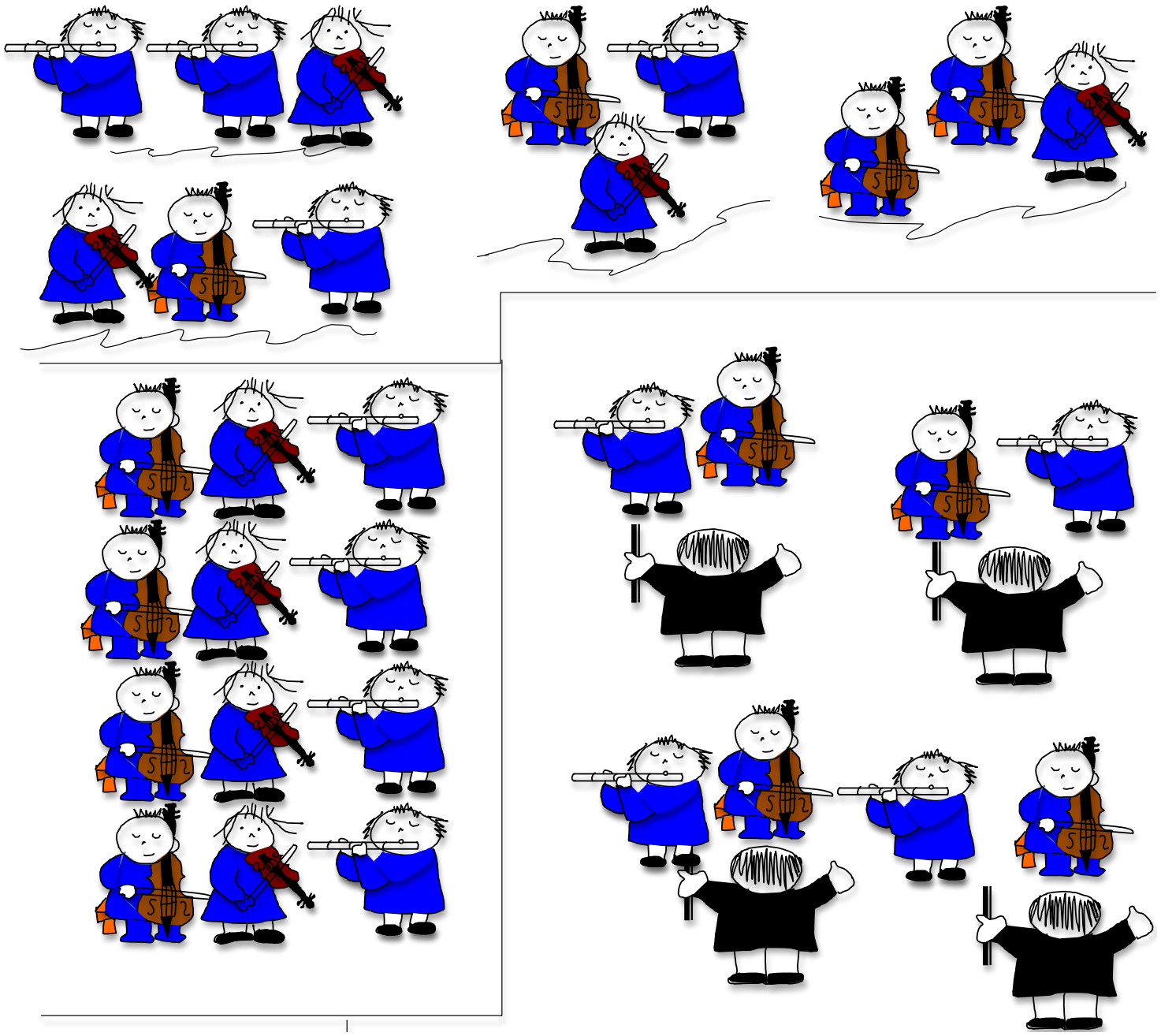




Does this picture show multiplication?

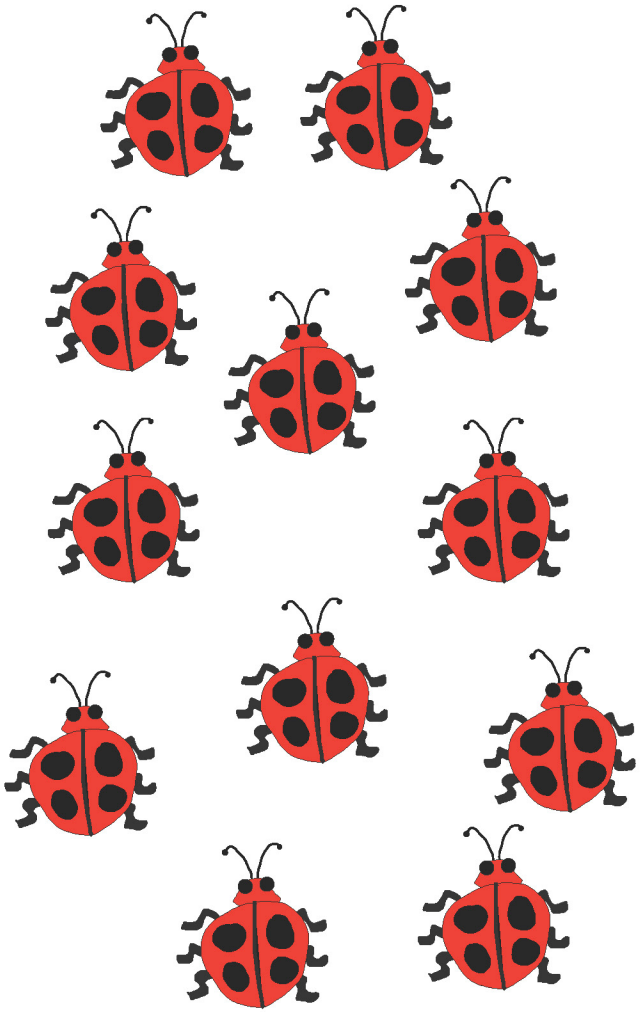
QUESTIONS

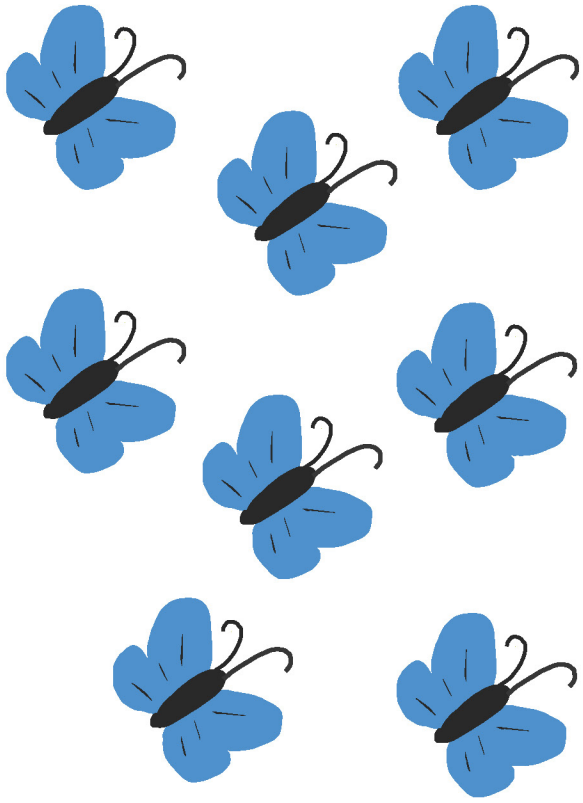
- When do we use multiplication?
- Are all the groups of penguins the same size? Does that matter when you are deciding if you can use multiplication?
- Could the penguins be rearranged into equal groups?



QUESTIONS

- What does the 4 tell you about each picture?
- What does the 3 tell you about each picture?
- How are the pictures alike? Different?





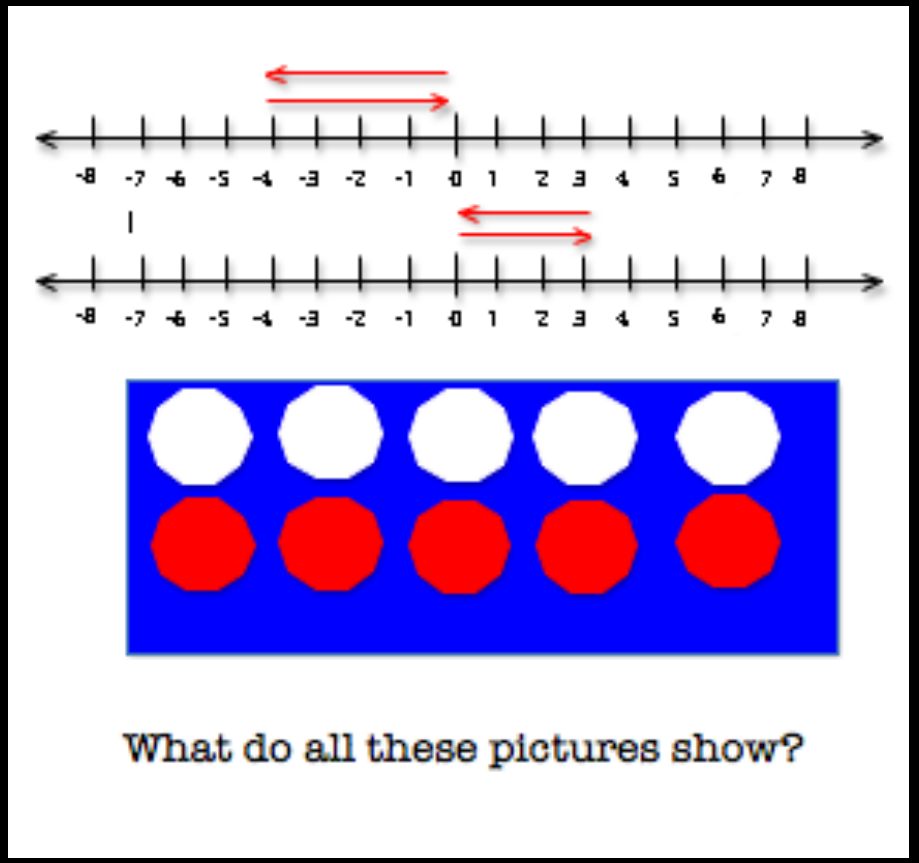
When does 12 - 8 tell you about the bugs?

QUESTIONS

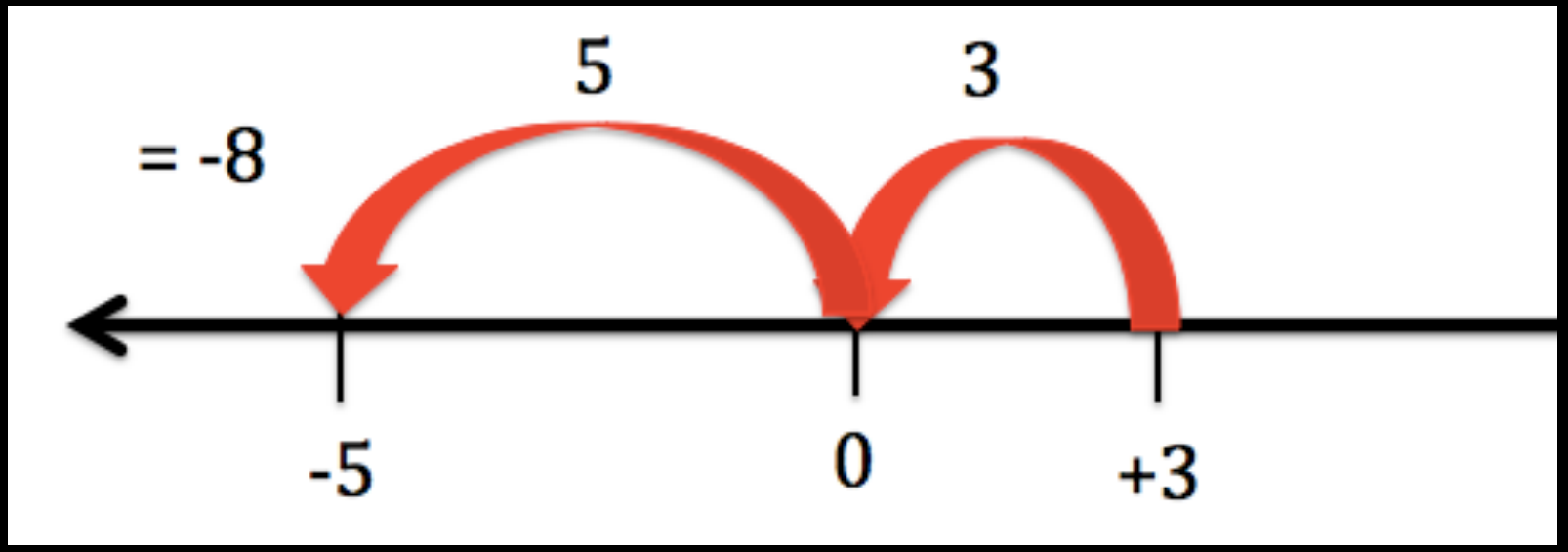
- Where do you see 12 in the picture?
- Where do you see 8?
- Why do you think a subtraction sentence was used?
- When you take 8 away from 12, you see the 8 items within the 12 items. Why does it makes sense to show all 8 + 12 (or 20) items to compare the ladybugs to the butterflies?

ZERO PRINCIPLE

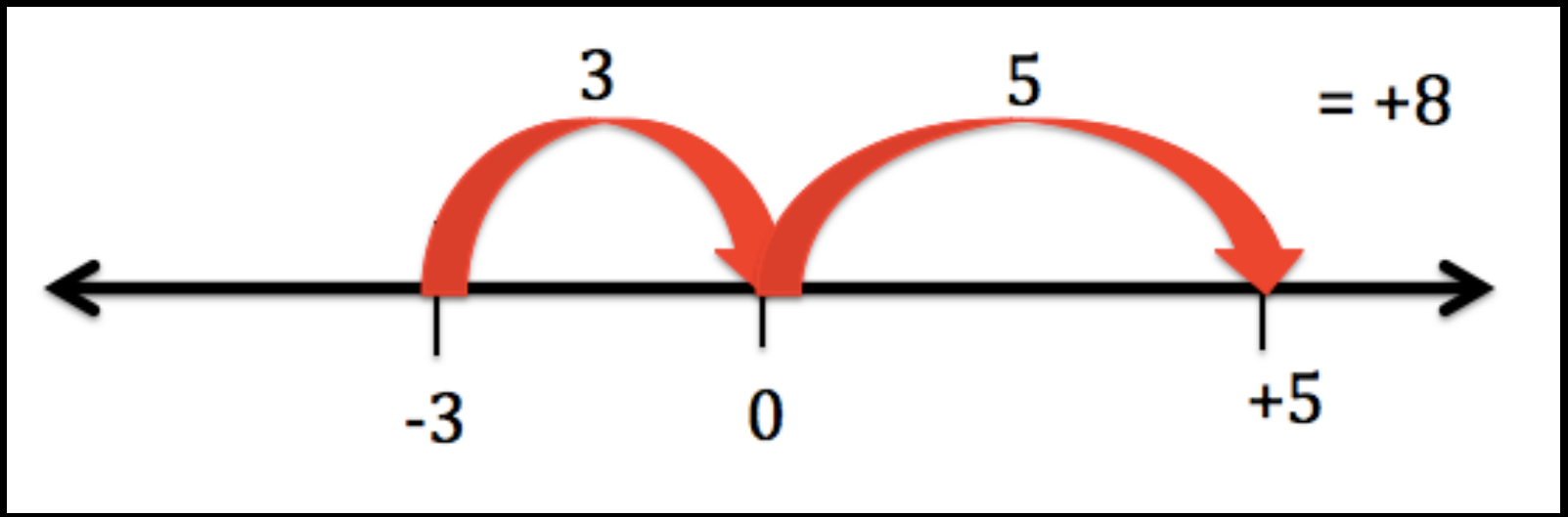
INTEGERS



- 5 – (+3)



5 – (-3)



INTEGERS

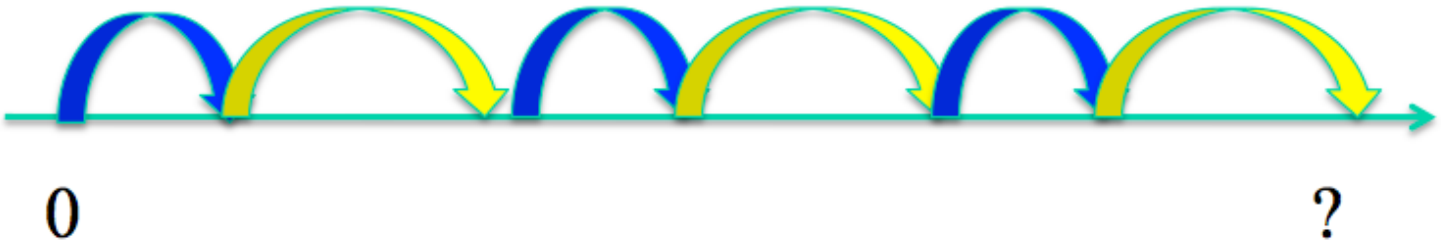
QUESTIONS

- Why would a multiplication sentence describe this picture?
- Why could you always write a division sentence if you could write a multiplication sentence?
- Why are there two possible division sentences? How are the sentences alike or different?
- Are there two possible multiplication sentences?

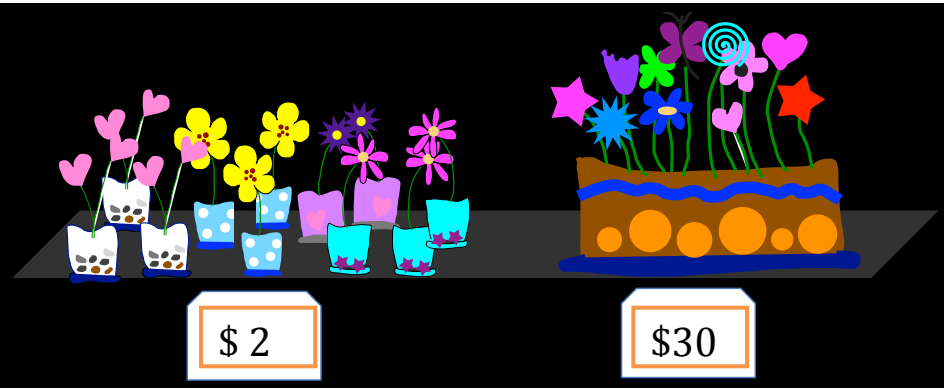
You know that the yellow arrow is a little longer than the blue one.

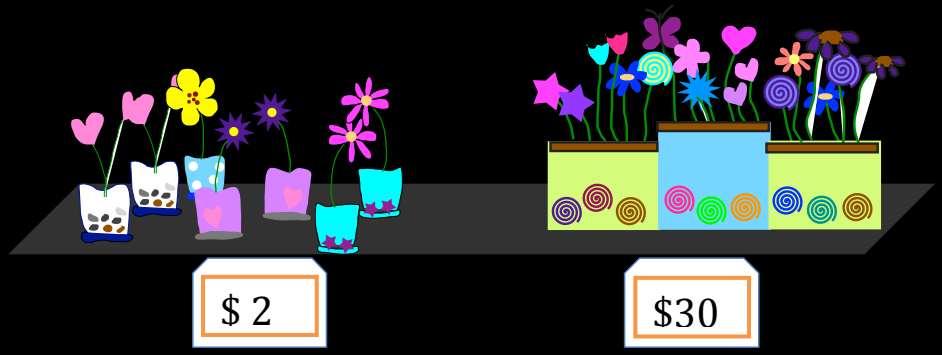
Both are whole number amounts.

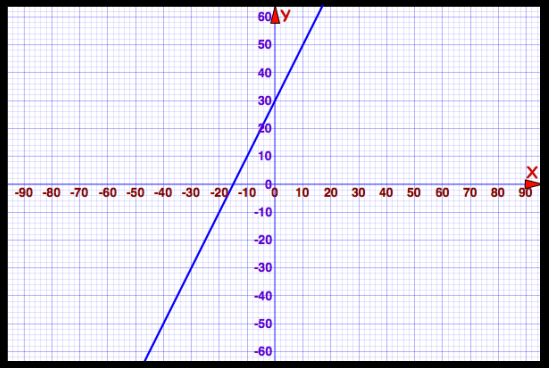
What could ? be? How do you know?



WHAT IS LINEAR?





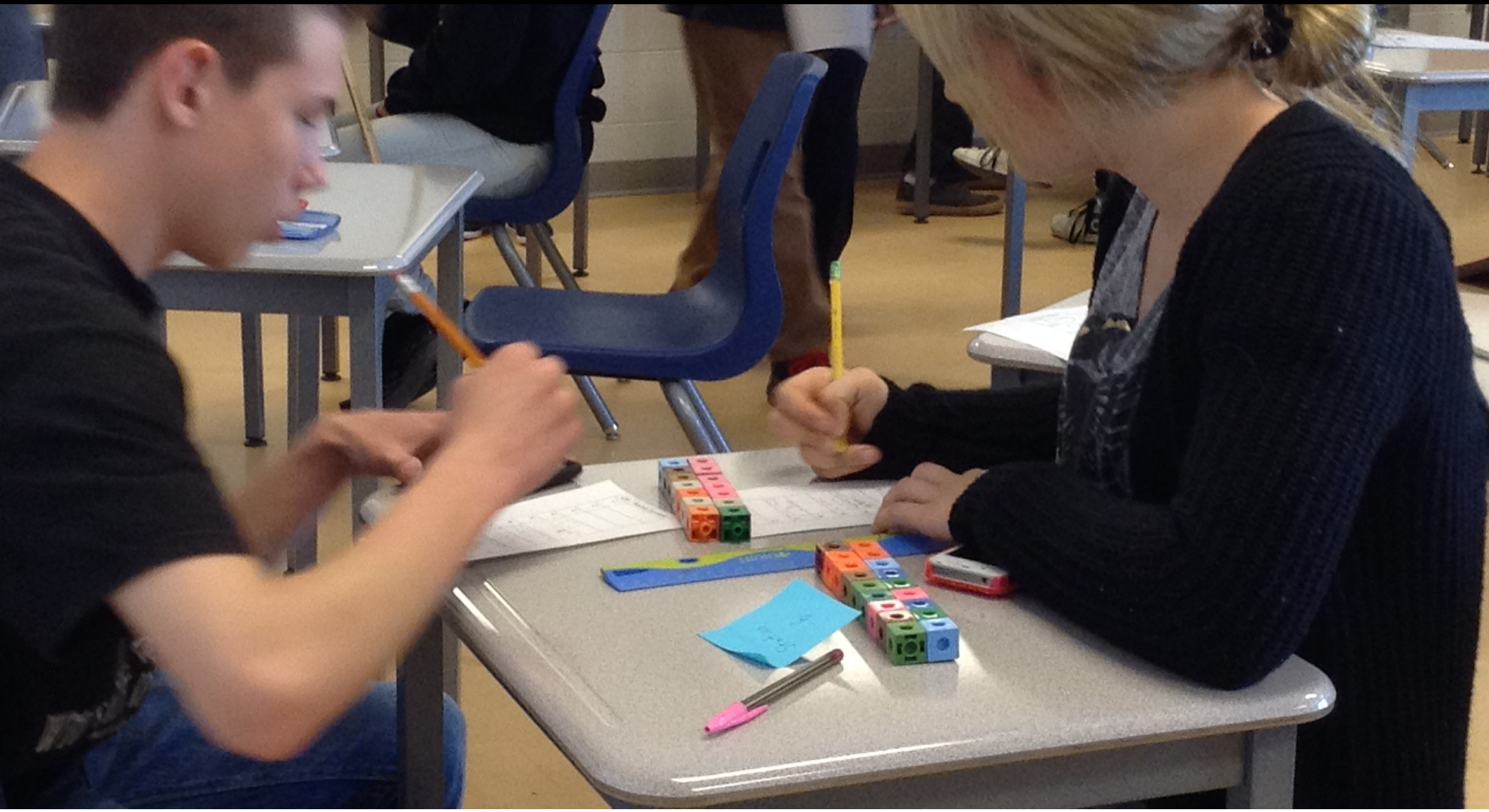


QUESTIONS

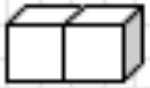
- How could you predict the cost of a purchase of one $30 item and a number of $2 items?
- What table of values would describe the situation in the picture?
- Why might the equation of the line be $y = 30 + 2x$, if x tells how many $2 plants are purchased?

VISUAL APPROACHES IN THE

CLASSROOM

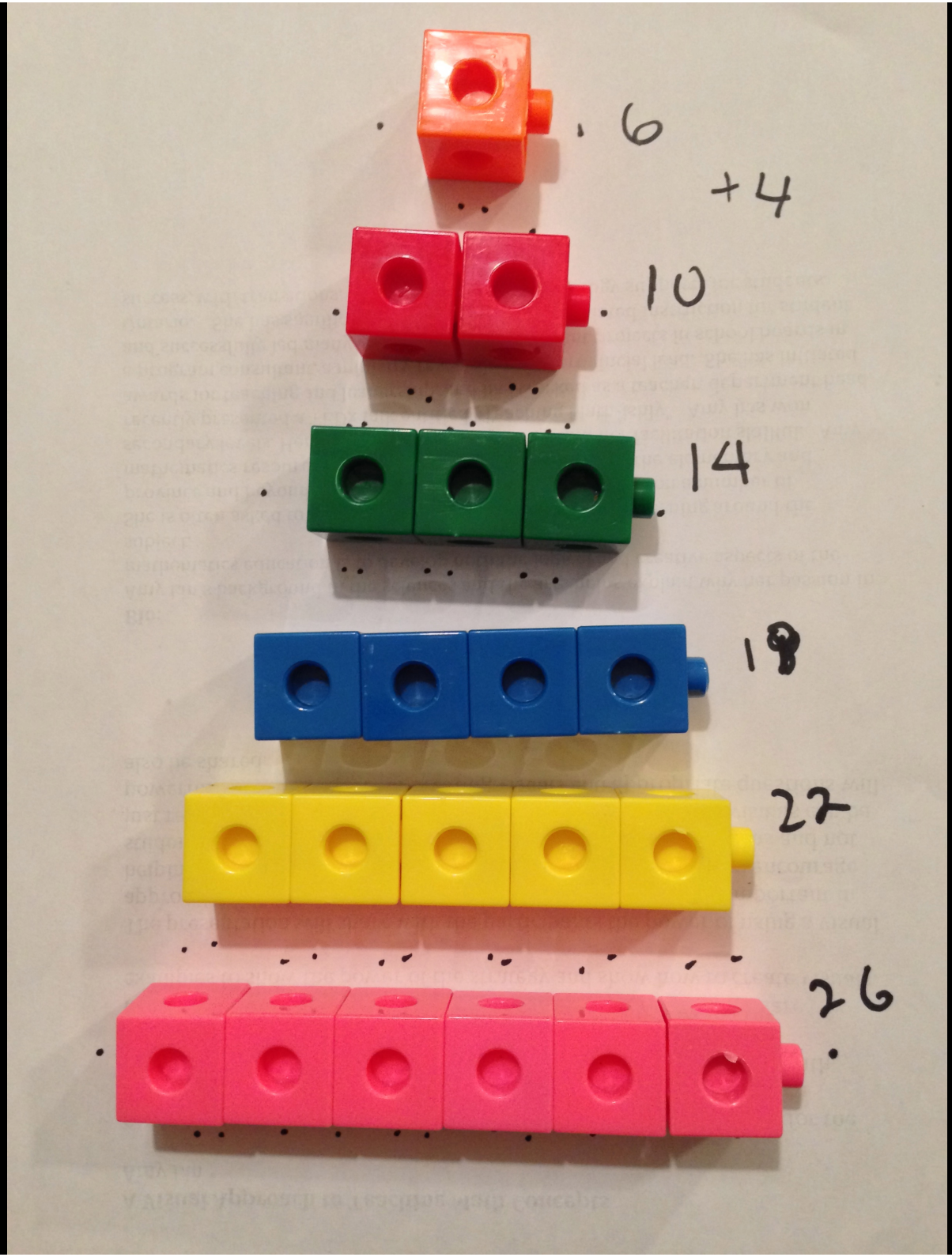


Describing Relationships

Shape	Number of Cubes	Surface Area	First Difference
	1	6	
	2	10	
	3		
	4		
	5		
	6		

WHAT IS THE SURFACE AREA OF A 100 CUBES?

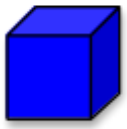
VISUALISE
4N + 2

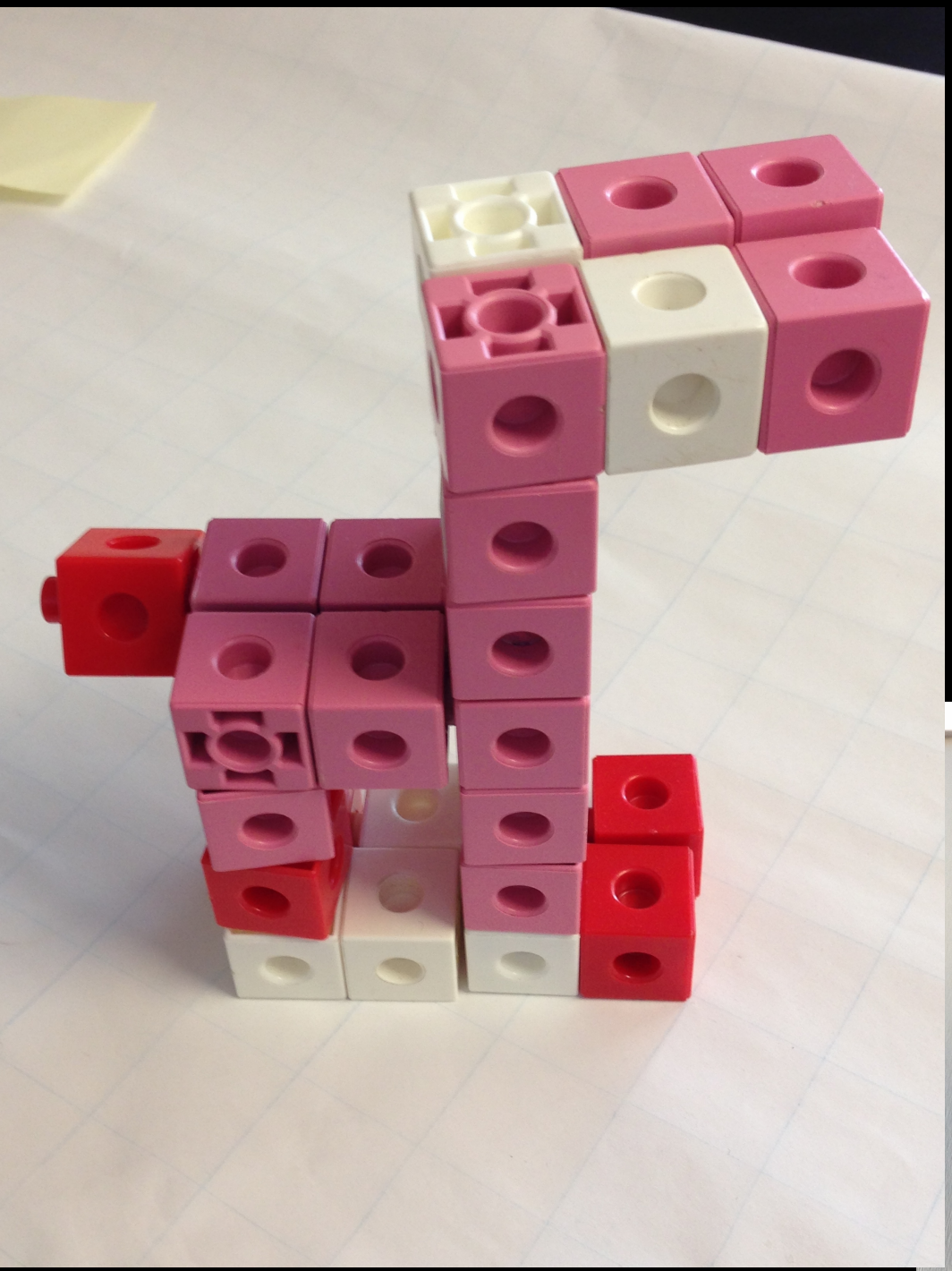


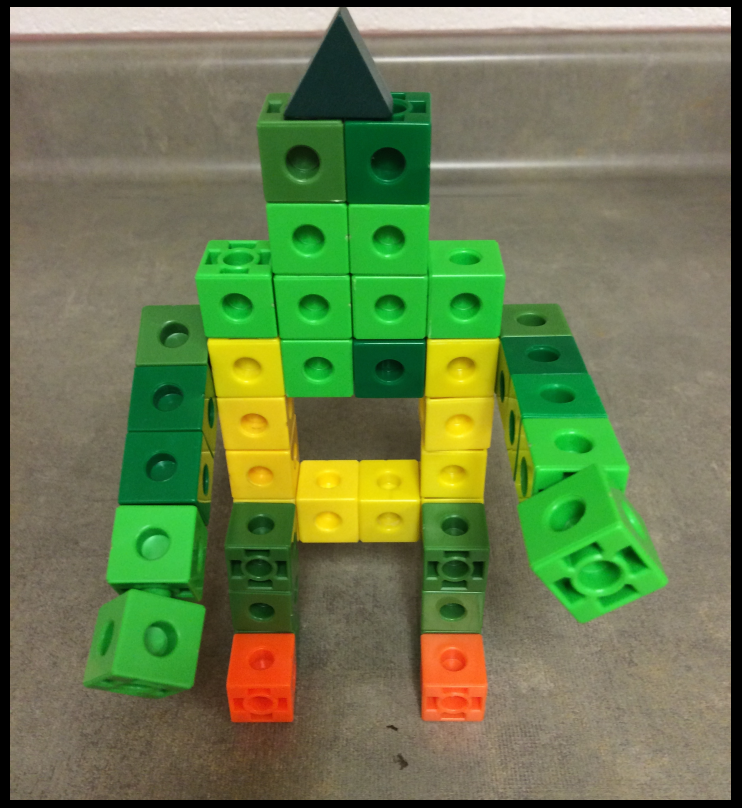
Ratios

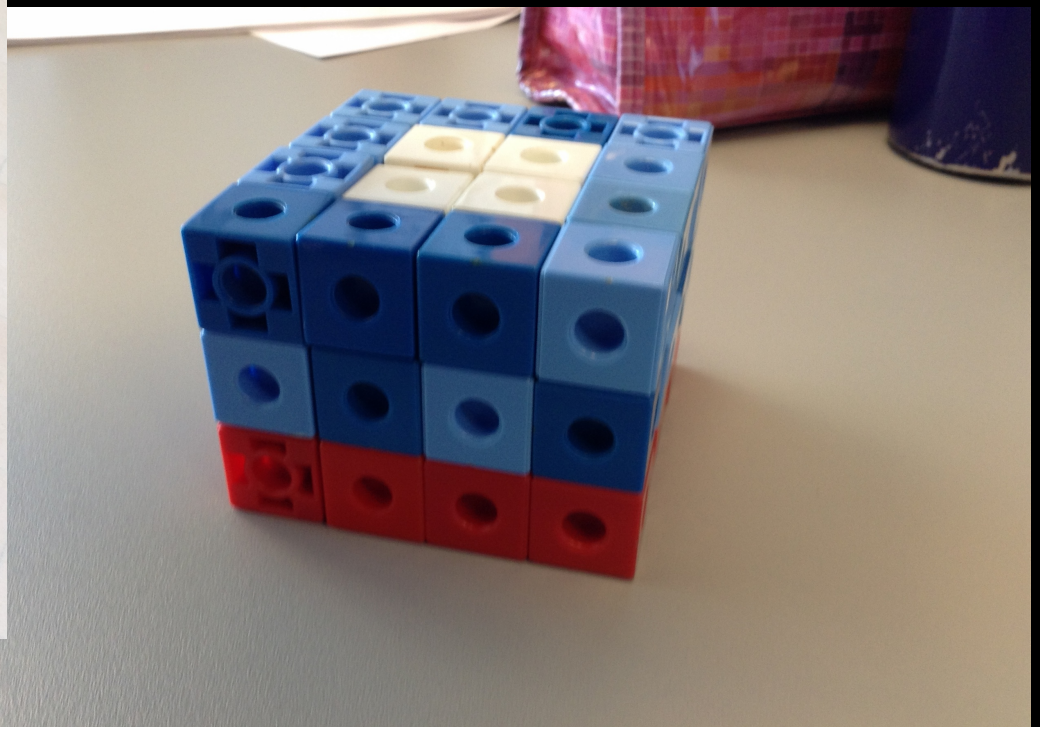
Using linking cubes…build a structure where the following are true:

There are twice as many cubes of colour 1 as colour 2.

There are 1/3 as many cubes of colour 3 as colour 1. For example, there are twice as many red cubes  as blue cubes  and there are a third as many yellow cubes  as red cubes. 







ICE CREAM VIDEO

WHAT IS THE DIAMETER OF THE ICE CREAM PUDDLE?

→ in order to find the diameter, you need to know the radius
$= r2$

Scoops of icecream : 3 scoops

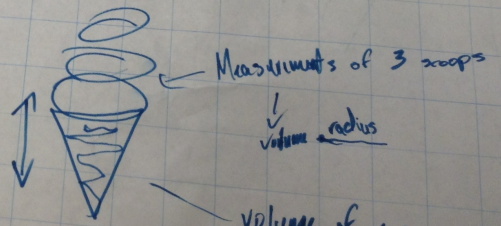
Questions:

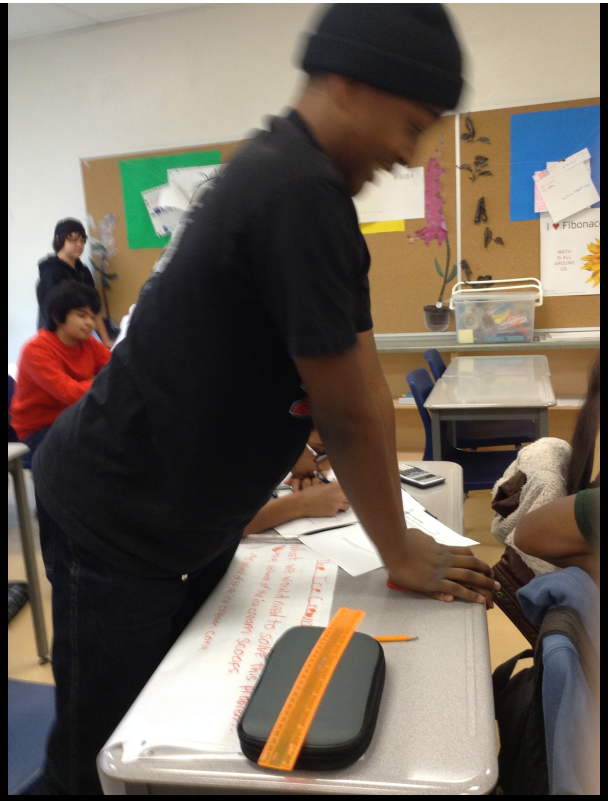
① What was the radius of all 3 scoops?

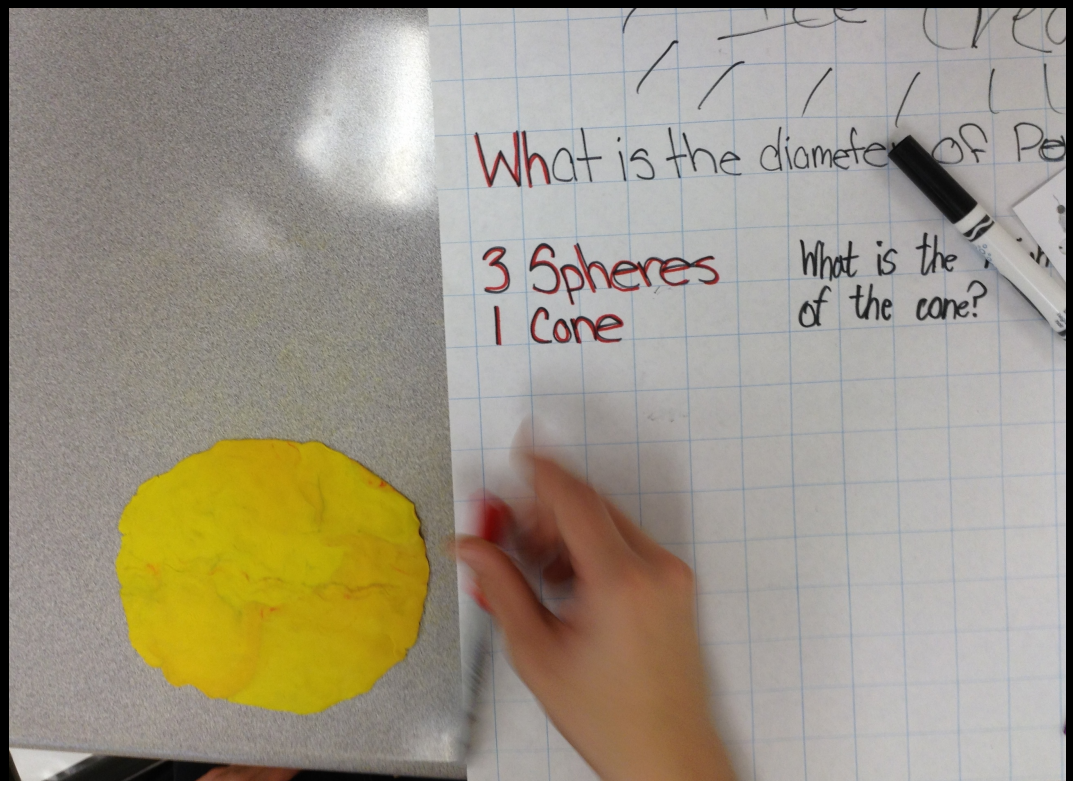
② How big was the ice-cream puddle?

↗

we knew how big
ice-cream puddle
we can figure
the radius to
mine the
eter.





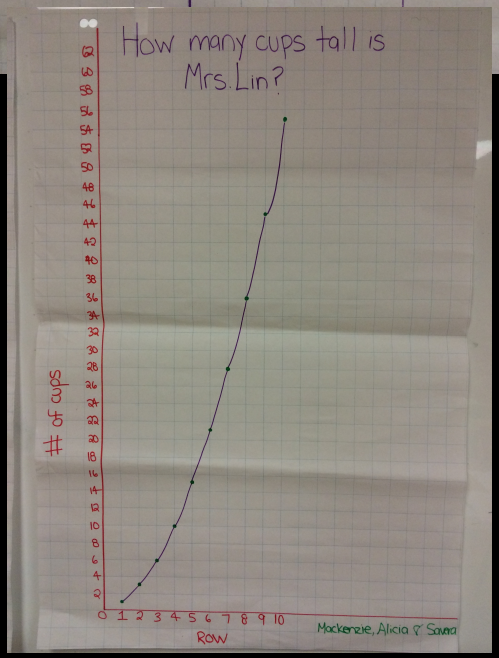


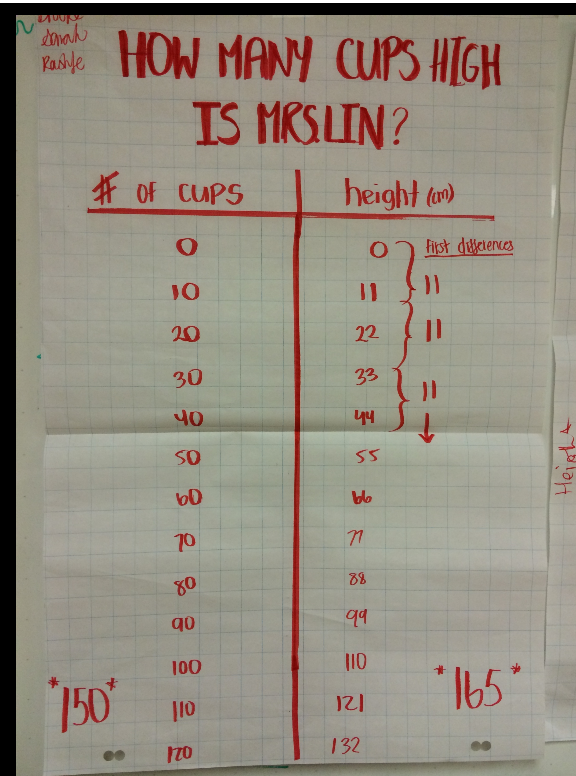
STACKING CUPS

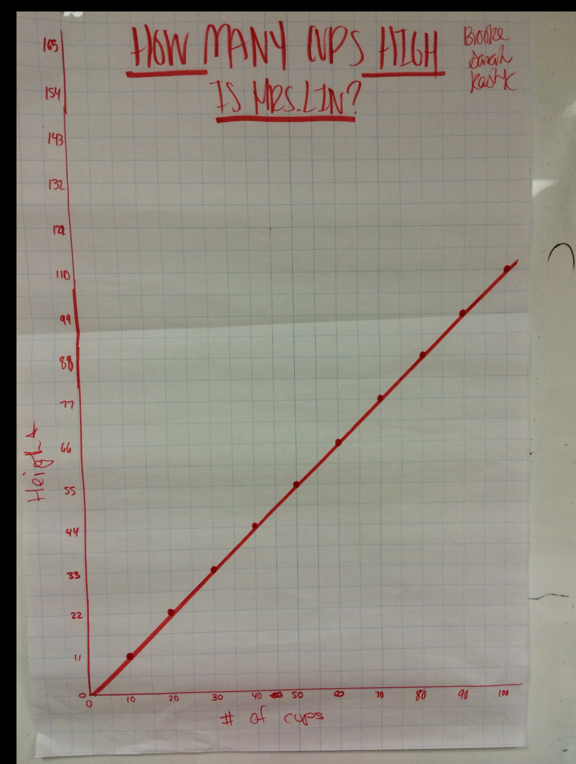
Mackenzie, Alicia & Savera

Table of Values

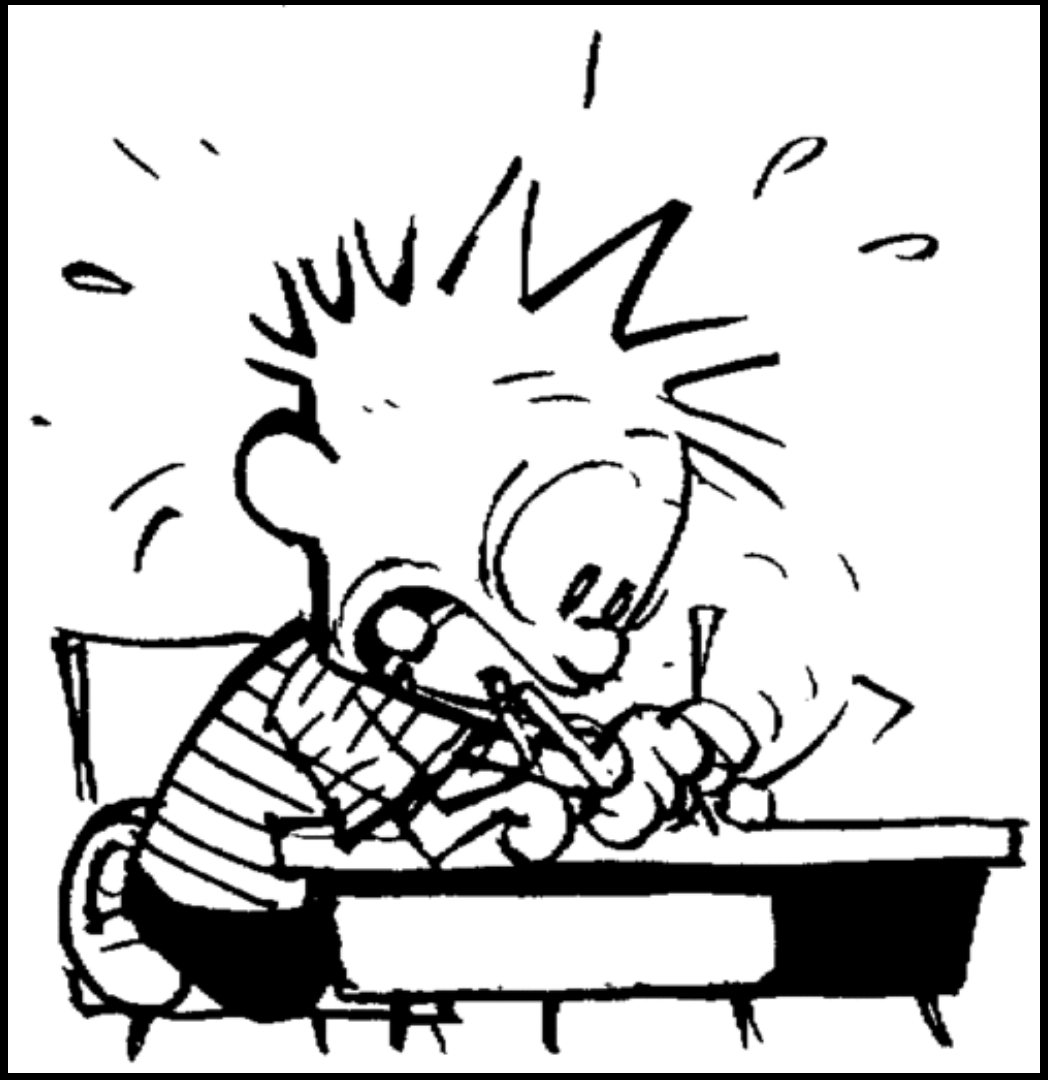
# of cups	height	Row
1	11cm	1
3	22cm	2
6	33cm	3
10	44cm	4
15	55cm	5
21	66cm	6
28	77cm	7
36	88cm	8
45	99cm	9
55	110cm	10



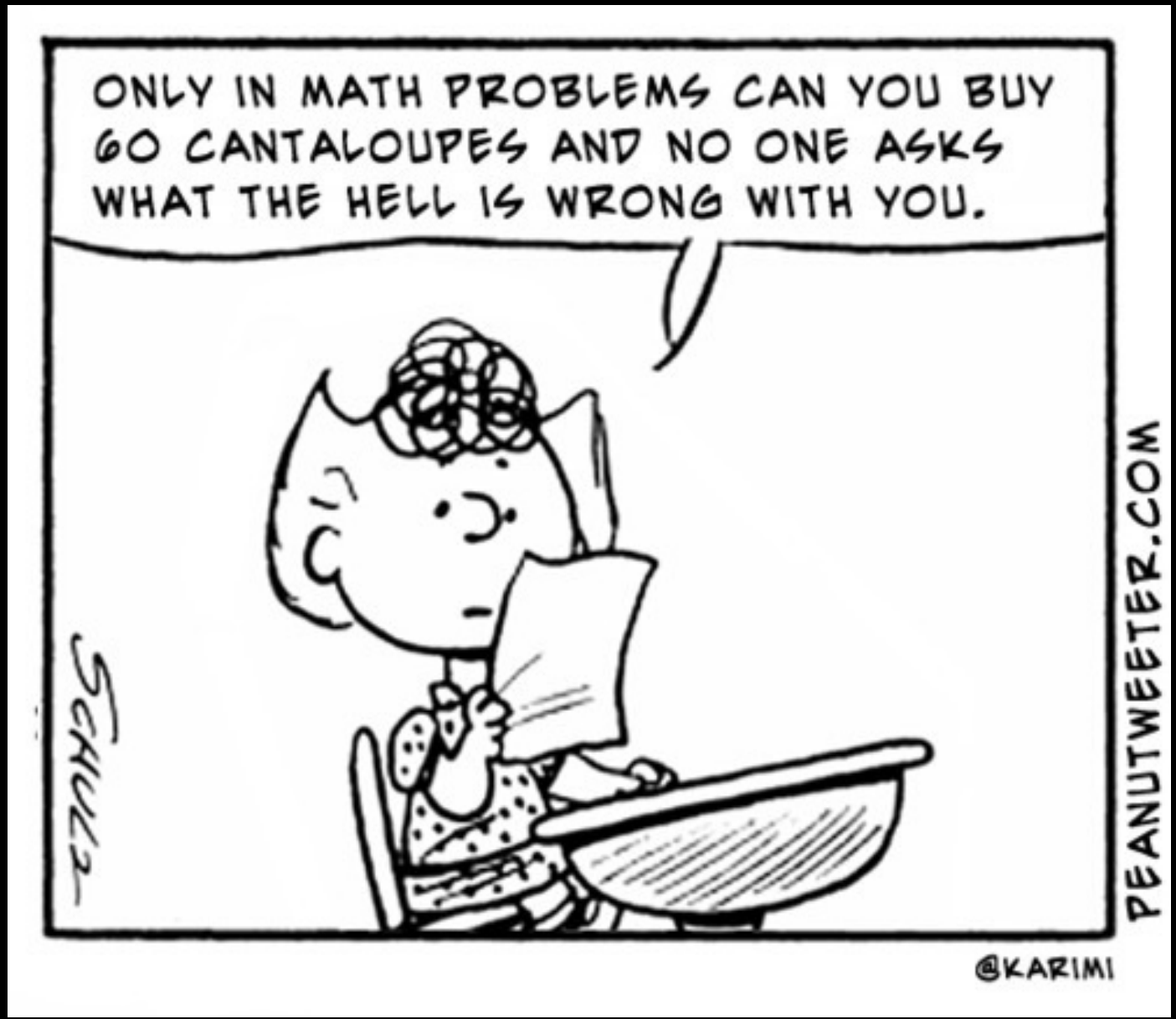

HOW MANY CUPS HIGH IS MRS.LIN?
# of cups
height (cm)
0 0
10 11
20 22
30 33
40 44
50 55
60 66
70 77
80 88
90 99
100 110
110 121
120 132
First differences
11
11
11
150
165


HOW MANY CUPS HIGH IS MRS.LIN?
Height
# of cups

WHAT IF THEY ARE STRUGGLING WITH LEARNING THE MATH CONCEPTS?



CONTEXT?


ONLY IN MATH PROBLEMS CAN YOU BUY 60 CANTALOUPES AND NO ONE ASKS WHAT THE HELL IS WRONG WITH YOU.
SCHULZ
PEANUTWEETER.COM
@KARIMI

ONTARIO MINISTRY OF EDUCATION

MATHGAINS

WWW.EDUGAINS.CA/NEWSITE/MATH/

GAP CLOSING

Number Sense

Grade 6
Facilitator's Guide

RESEARCH REPORT

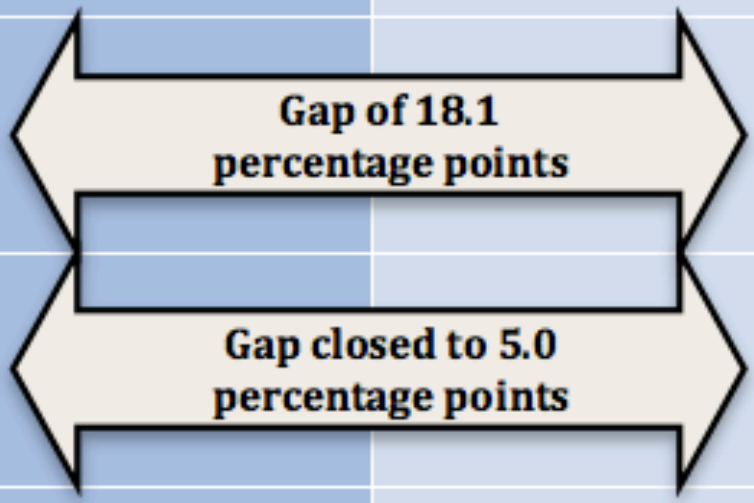
GAP CLOSING RESULTS

	Non-Gap Closing Students		Gap Closing Students	Gap Closing Males		Gap Closing Females
Pre %	57.2	Gap of 20.0	37.2	40.0	Gap of 5.2	34.8
Post %	58.6	Gap of 2.2	56.4	57.0	Gap of 0.8	56.2
% Growth	**1.4**		**19.2**	**16.8**		**21.3**

RESEARCH REPORT

GRADE 9 ALGEBRA

	Algebra	
	Non Gap Closing	**Gap Closing**
Average Pre-Test Score	**73.0%**	**54.9%**
Average Post-Test Score	**72.2%**	**67.2%**
Percentage Point Change	**-0.8**	**+12.3**



RESEARCH REPORT

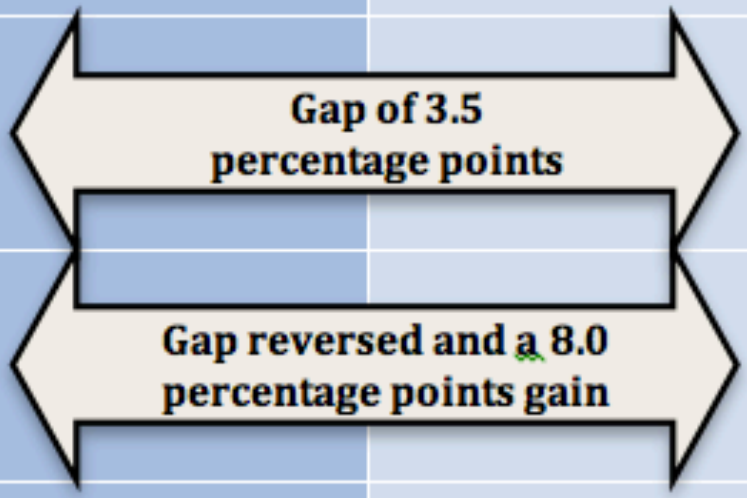
NUMBER SENSE

	Number Sense	
	Non Gap Closing	**Gap Closing**
Average Pre-Test Score	**66.0%**	**57.3%**
	Gap of 8.7 percentage points	
Average Post-Test Score	**67.3%**	**65.9%**
	Gap closed to1.4 percentage points	
Percentage Point Change	**+1.3**	**+8.6**

RESEARCH REPORT

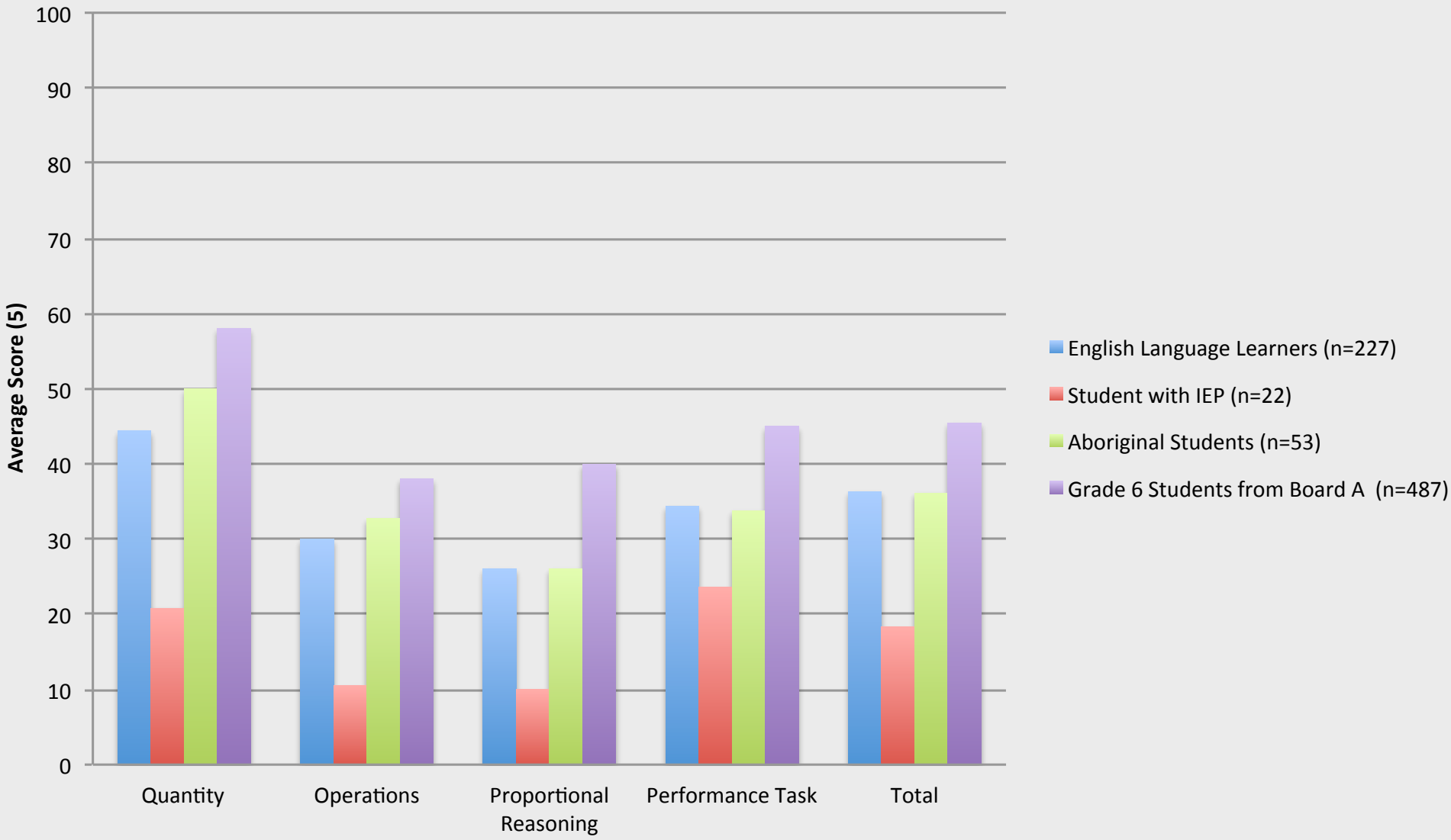
MEASUREMENT

	Measurement	
	Non Gap Closing	**Gap Closing**
Average Pre-Test Score	**30.0%**	**26.5%**
Average Post-Test Score	**39.5%**	**47.5%**
Percentage Point Change	**+9.5**	**+21.0**



PRE-TEST RESULTS

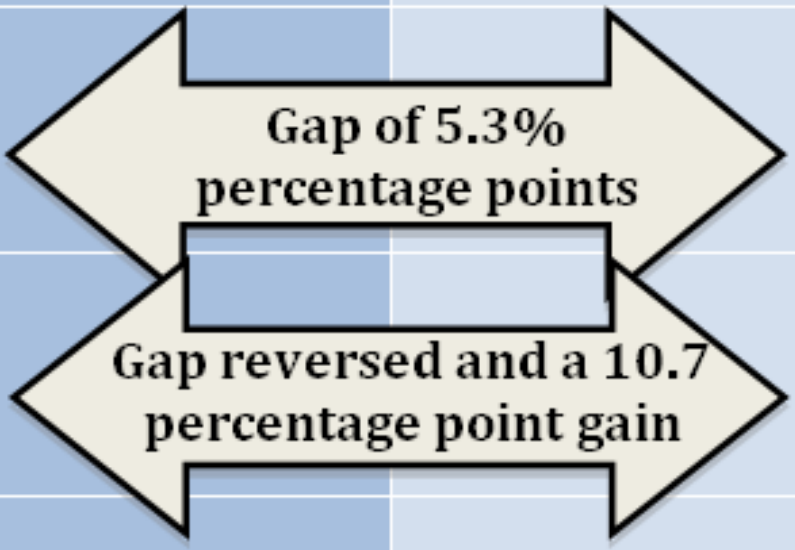
EQUITY PROJECT



RESEARCH REPORT

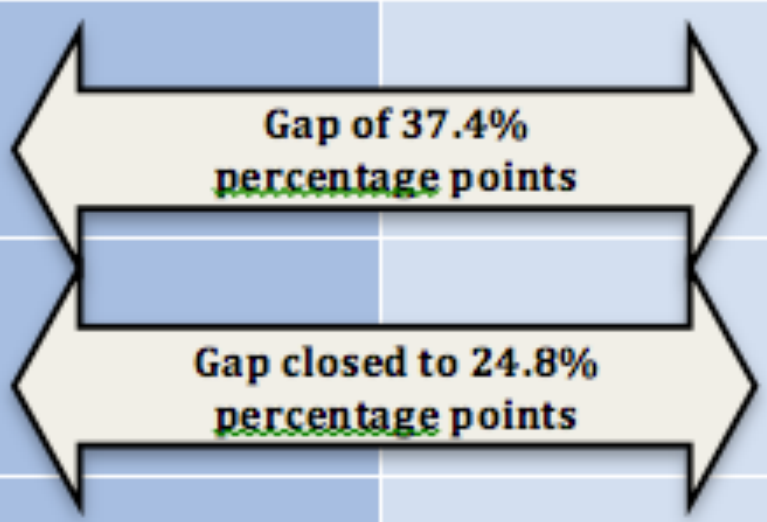
ENGLISH LANGUAGE LEARNERS

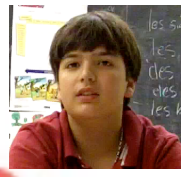
	Grade 6 Students	
Students in the same classes	**No Gap Closing with Non-ELL N=36**	**Gap Closing with ELL N=51**
Average Pre-Test Score	**42.2%**	**36.9%**
Average Post-Test Score	**41.1%**	**51.8%**
Percentage Point Change	**-1.2**	**+15.5**



STUDENTS WITH LD'S

	Students with IEP's	
	Non Gap Closing n = 26	Gap Closing n = 22
Average Pre-Test Score	55.2%	17.8%
Average Post-Test Score	57.1%	32.3%
Percentage Point Change	+1.9	+14.2





Red = Students with IEP with Gap Closing
Blue = Students without IEP and without Gap Closing
Grey = Students without IEP with Gap Closing

ABRAHAM

"I think it's really good for students to use Gap Closing in math because it helps you a lot… because of the Think Sheet and also the different kinds of math problems that you get to work on. It makes math easier."

Abraham's Math Teacher

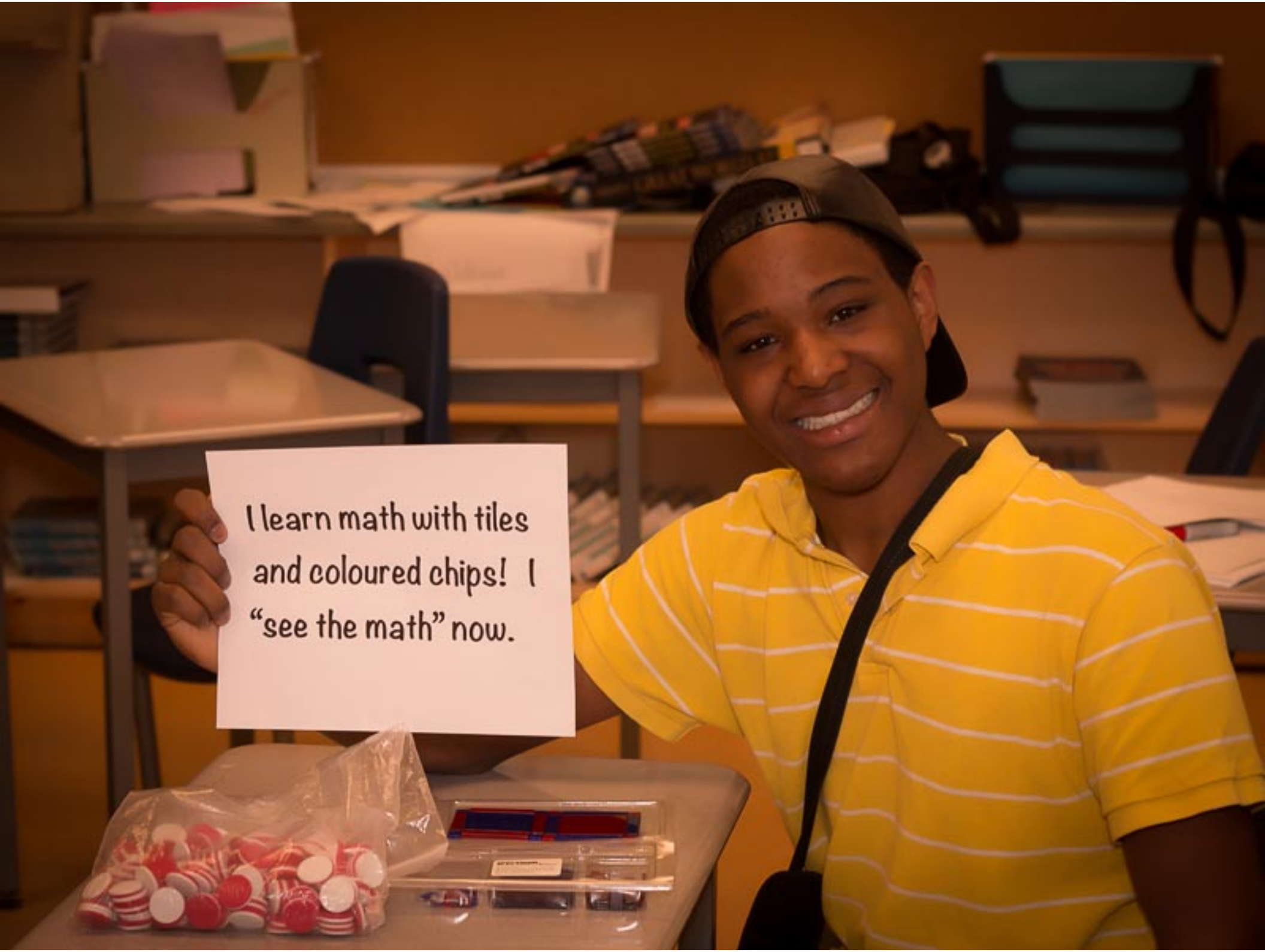
"I can see it working because the kids in my class really do have gaps and if you can address those specific gaps than we are not wasting time anymore."
"In my HSP (self-contained LD class), I have primary and juniors so it's like all the grades and then they are working at different grade levels as well. I used the think sheets – they were more direct and that was when they really started to get it and enjoy it. They were getting it as a group and then being able to do it on their own."

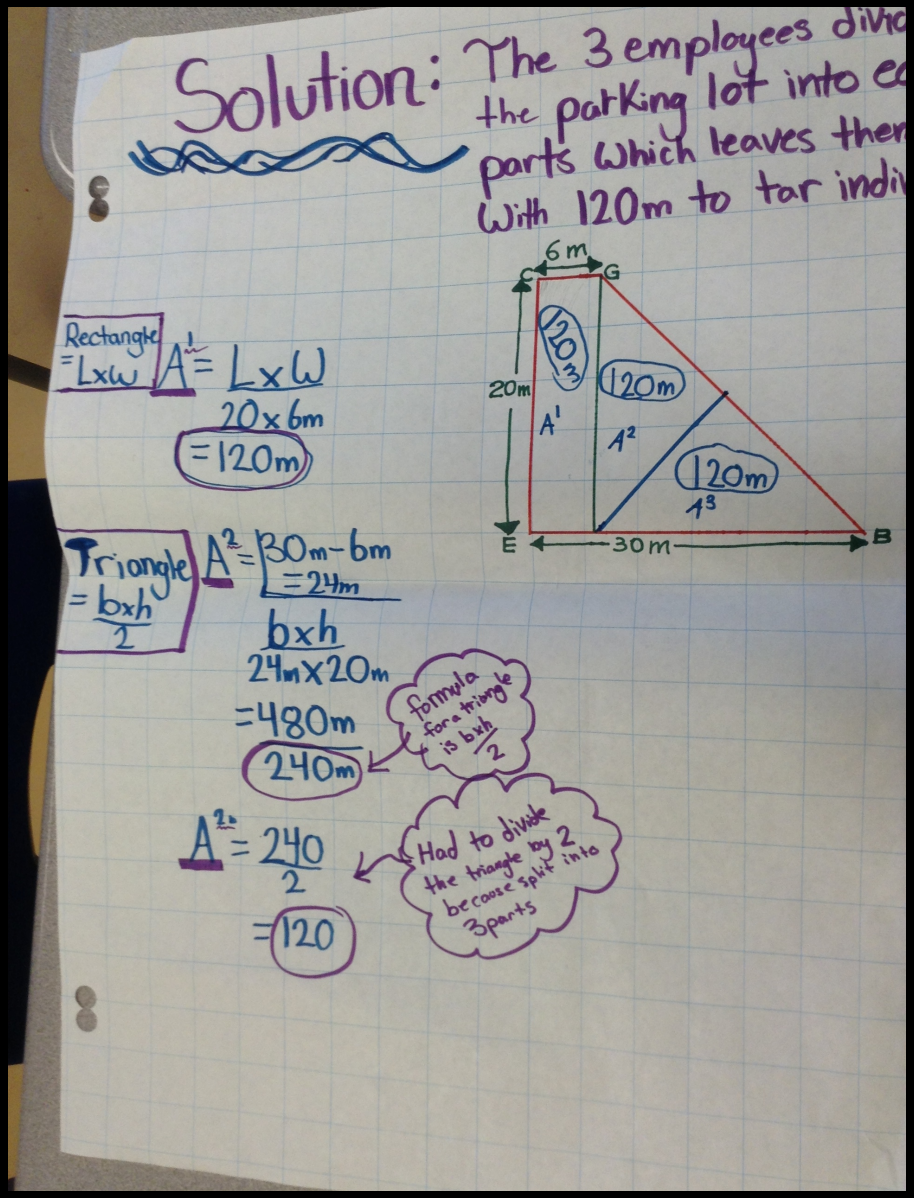
Completed 3 Modules (Fractions, Multiplying/Dividing) in a Guided Small Group

Pre-Test Total (%)	Post-Test Total (%)	Percentage Point Gain
9.8	43.9	+34.1

VISUAL REPRESENTATIONS

REPRESENTATIONS

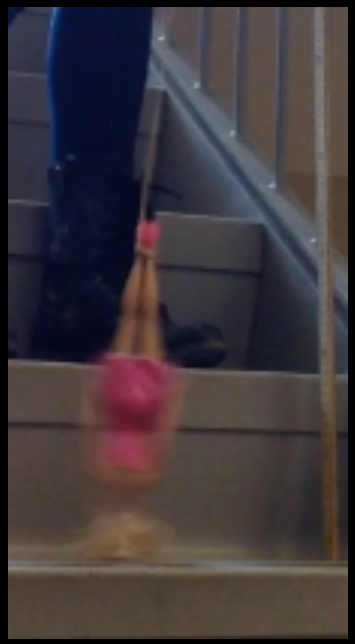

I learn math with tiles
and coloured chips! I
"see the math" now.

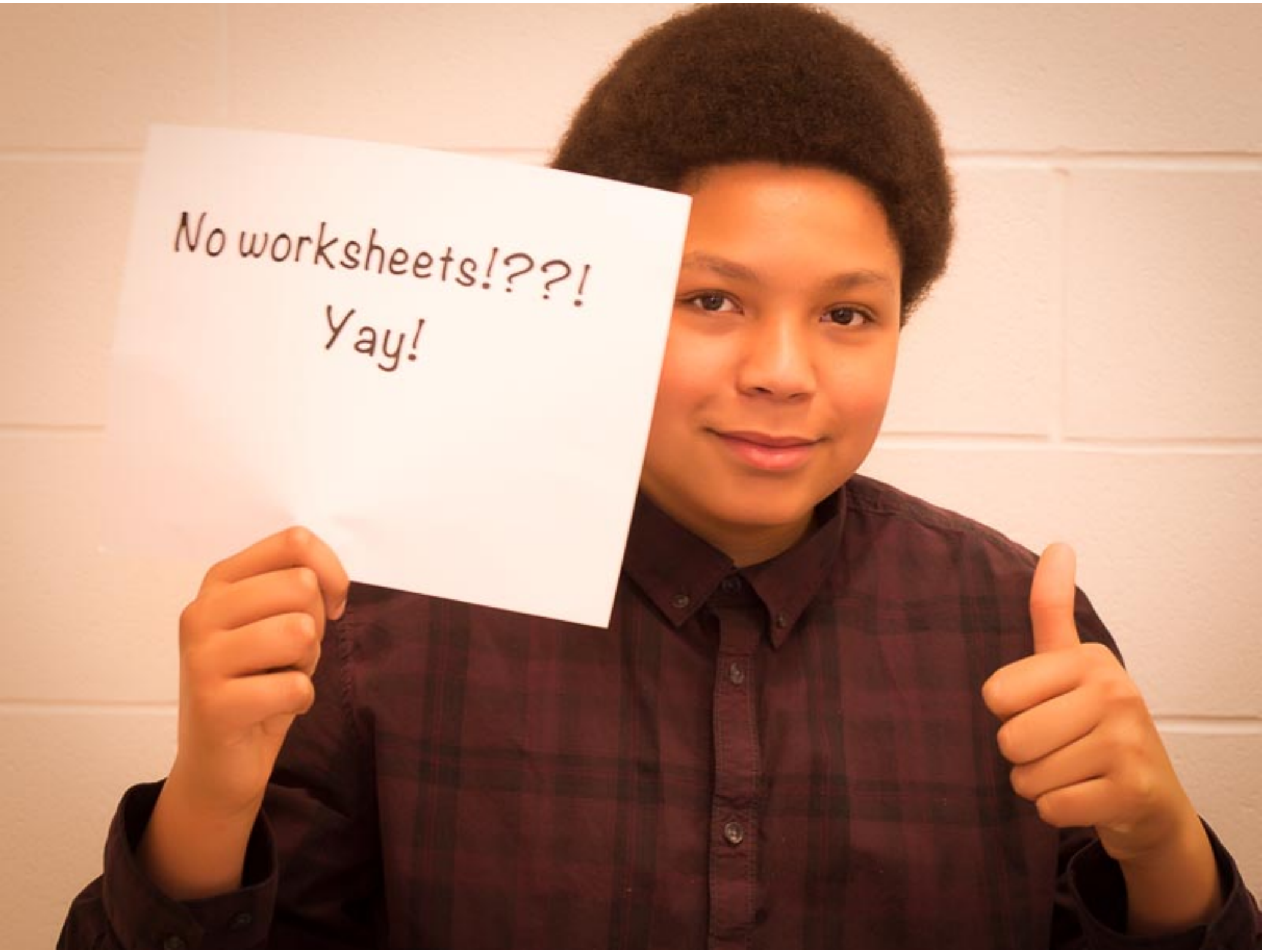

Solution: The 3 employees divi
the parking lot into e
parts which leaves ther
With 120m to tar indi
Rectangle
=LxW
A¹= LxW
20x6m
=120m
Triangle
=bxh/2
A²=30m-6m
=24m
bxh
24mx20m
=480m
240m
A²= 240/2
=120
formula for a triangle is bxh/2
Had to divide the triangle by 2 because split into 3parts
6m
C
G
120m
20m
A¹
1²
120m
1³
E
30m
B

AUTISM SPECTRUM DISORDER

Imagery is a powerful force for perception and understanding. Being able to "see" something mentally is a common metaphor for understanding it.

Visualisation plays a vital role in teaching and learning mathematics. It provides the opportunities for high levels of communication and a focus on important mathematical concepts.




No worksheets!??!
Yay!

AMY LIN

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