

# High Tech - Low Tech Classrooms

Rewindable Learning & Interactive Notebooks



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# Interactive Notebooks

- \*Organized
- \*Personalized
- \*Interactive

“It’s a way of keeping track of our notes and homework, and it makes life easier when it comes to a test.”





# Organized

It's not just about  
organizing papers.

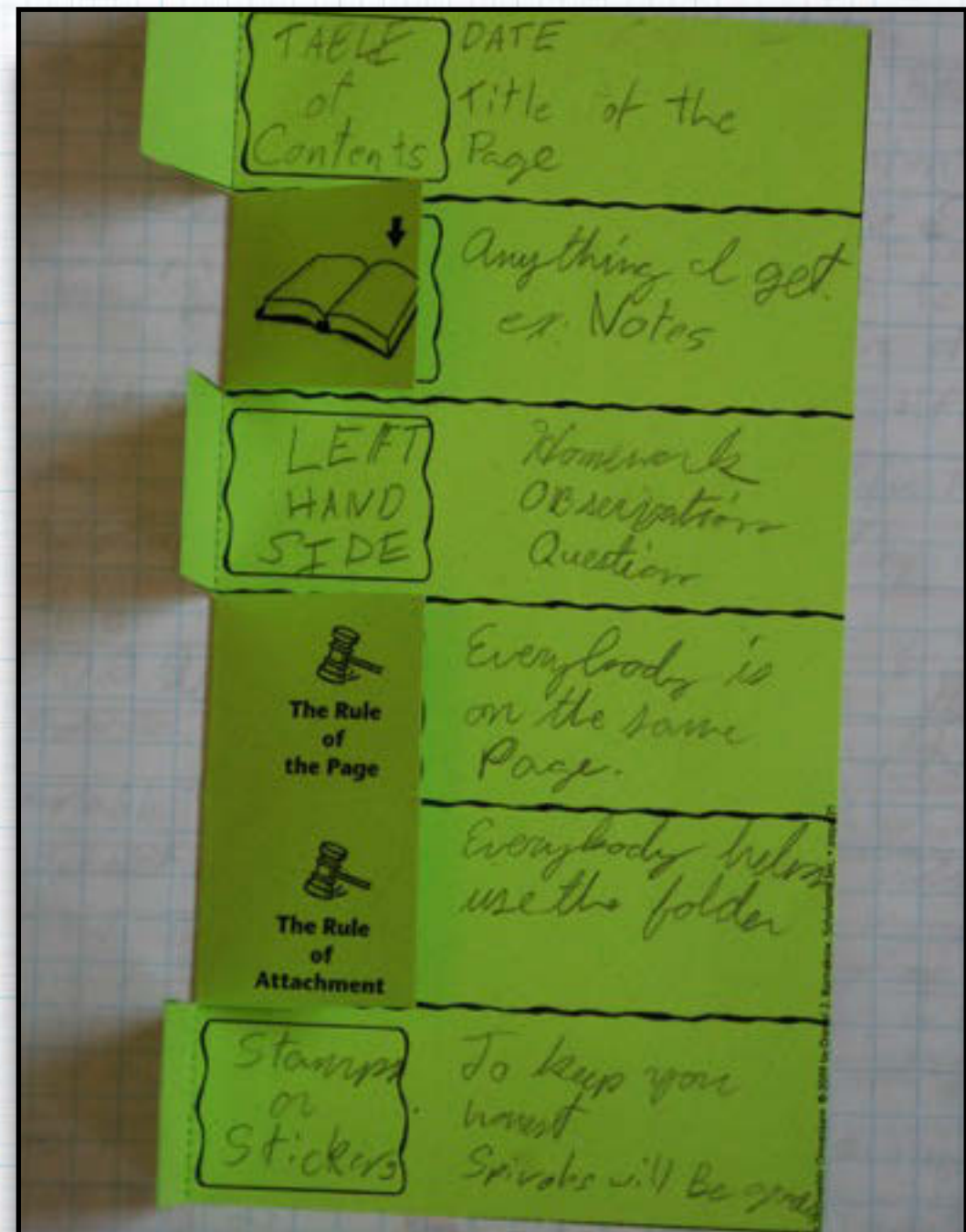
It's about organizing the  
learning process.





# Elements of The Spiral

- \* Table of Contents
- \* Right Hand Page
- \* Left Hand Page
- \* Rule of the Page
- \* Rule of the Attachment
- \* Stamps/Stickers





## Table of Contents

Date	Page Title	LHP	RHP	Page Title
	Interpreting graphs	0	1	Interpreting graphs
	Practice functions	2	3	Functions + Relations
	V.L.T. (notes)	4	5	Vertical Line test (notes)
	Writing functions	6	7	Independent / dependent variables
	Pg 249 #3-8 B-14	8	9	Writing functions from a table
	Discrete/continuous graph	10	11	Graphing functions
	Pg 275 #2, 6, 8, 9, 16, 18, 20, 22	12	13	Arithmetic Sequence
	Pg 266 #1-12	14	15	Scatter plots
	Pg 300 #2-5 9, 7, 11, 13, 15, 17	16	17	Linear functions
	Pg 306 #1-7	18	19	Using intercepts
	Slope and intercept	20	21	Using intercepts to graph a line
	Height data	22	23	Rate of change and slope
	Graphing horizontal/vertical lines	24	25	Slope of a line
	Rate of change	26	27	Half VUX chart
	Finding slope	28	29	The slope formula
	323 #8, 9 325 #3, 33	30	31	Finding slope from an Equation
	Pg 329 2-6 9, 13, 11	32	33	Direct Variation
	329 7, 8 330 15, 16, 21-27	34	35	Writing and solving Direct Variation Equations
	Pg 336 13-16	36	37	Using Linear Functions
	$y = mx + b$	38	39	Discovering the slope intercept form
	338 #8 and 10	40	41	Slope intercept form
	338 #24, 26, and 28	42	43	Slope intercept form
	Pg 345 #14 349 #5	44	45	Slope intercept form

## Table of Contents

Date	Page Title	LHP	RHP	Page Title
1/17	p. 594 #2-5	0	1	Identifying quadratics
2/17	p. 594 #16-21	2	3	parabolas / Domain
2/19	p. 594 #10-15	4	5	Direction of Parab
2/19	No homework	6	7	Finding zeros in quadratics
	Axis of symmetry for	8	9	Height of Arc
		10	11	Vertex
	More Vertex work	12	13	Graphing quad functions
	Graphing	14	15	Plot the y-int
	GM HW 62, 3	16	17	Transforming quad
	HW 633	18	19	Factoring Poly when
		20	21	factoring difference
	635 HW 1, 2, 5, 6	22	23	Factoring
	p. 639 #1-12	24	25	Square Root trick
	Review (finding 0)	26	27	more finding 0
	# pg 47 #1-10	28	29	Completing the $\sqrt{\phantom{x}}$
	Math 1-6 review	30	31	Factoring
	Review Study	32	33	Completing the $\sqrt{\phantom{x}}$
	pg 47 Homework	34	35	Quadratic formula
	quadratic form	36	37	Discriminate
	Practice B	38	39	Notes 10.1
	practice B histo	40	41	Histograms
	Book 10.1	42	43	Histograms
	Mean/Median/Mode	44	45	594-695



# Left Hand - Right Hand

## Discrete



graph is not connected.  
Only those specific points are  
in the data set.  
Use when given domain  
Used when counting # of  
TVs or # of cars

## Continuous

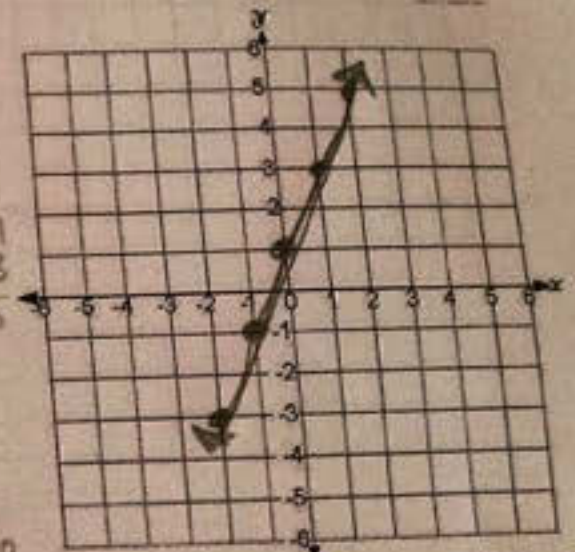


graph is connected any  
value between dots. Used  
when not given the domain.  
Use with measurements  
of rain or height

Graphing Functions  
Remember your PEMDAS rules.

$$y = 2x + 1$$

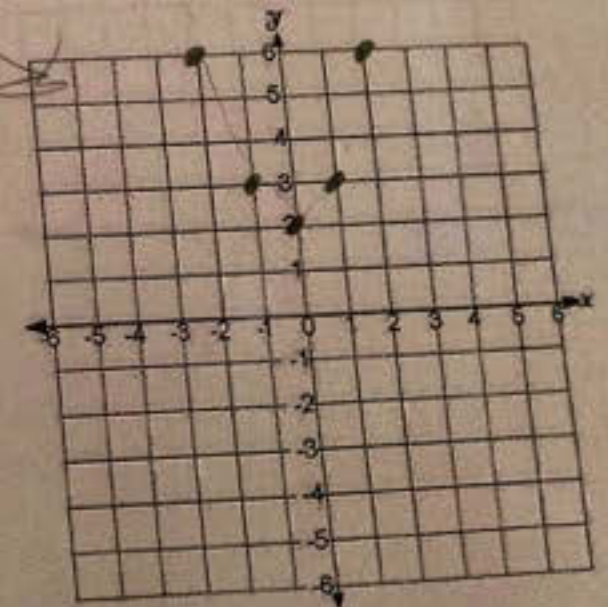
x	2x+1	y	(x,y)
-2	-3		-2, -3
-1	-1		-1, -1
0	1		0, 1
1	3		1, 3
2	5		2, 5



$$f(x) = x^2 + 2$$

$$D: \{-2, -1, 0, 1, 2\}$$

-2	6	-2, 6
-1	3	-1, 3
0	2	0, 2
1	3	1, 3
2	6	2, 6





# Left Hand - Right Hand

38

pg 206 #2, 3-6, 7-10

2. Let  $x = \text{temp}$   
 $10 \leq x \leq 95$

3.  $-3 < x+2 < 7$   
 $-3 < x+2$     $x+2 < 7$   
 $-2$     $-2$   
 $-5 < x$     $x < 5$   
 $-5 < x < 5$

4.  $5 \leq 4x+1 \leq 13$   
 $5 \leq 4x+1$     $4x+1 \leq 13$   
 $4 \leq 4x$     $4x \leq 12$   
 $1 \leq x$     $x \leq 3$   
 $1 \leq x \leq 3$

5.  $2 < x+2 < 5$   
 $2 < x+2$     $x+2 < 5$   
 $0 < x$     $x < 3$   
 $0 < x < 3$

$x-1 < -1$  OR  $x-5 > -1$   
 $x < 0$  OR  $x > 4$

6.  $11 < 2x+3 < 21$   
 $11 < 2x+3$     $2x+3 < 21$   
 $8 < 2x$     $2x < 18$   
 $4 < x$     $x < 9$   
 $4 < x < 9$

7.  $2x-6 < 6$  OR  $x+2 > 6$   
 $2x < 12$  OR  $x > 4$   
 $x < 6$  OR  $x > 4$

8.  $r-1 < 0$  OR  $r-1 > 4$   
 $r < 1$  OR  $r > 5$

9.  $n+2 < 3$  OR  $n+3 > 7$   
 $n < 1$  OR  $n > 4$

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## Compound Inequalities

When two or more simple inequalities are combined into one statement by the words AND or OR, the result is called a compound inequality.

WORDS	ALGEBRA	GRAPH
All real numbers greater than 2 AND less than 6	$x > 2$ AND $x < 6$ $2 < x < 6$	
All real numbers greater than or equal to 2 AND less than or equal to 6	$x \geq 2$ AND $x \leq 6$ $2 \leq x \leq 6$	
All real numbers less than 2 OR greater than 6	$x < 2$ OR $x > 6$	
All real numbers less than or equal to 2 OR greater than or equal to 6	$x \leq 2$ OR $x \geq 6$	

## Intersections

A water analyst recommends that the pH level of swimming pool water be between 7.2 and 7.6 exclusive.

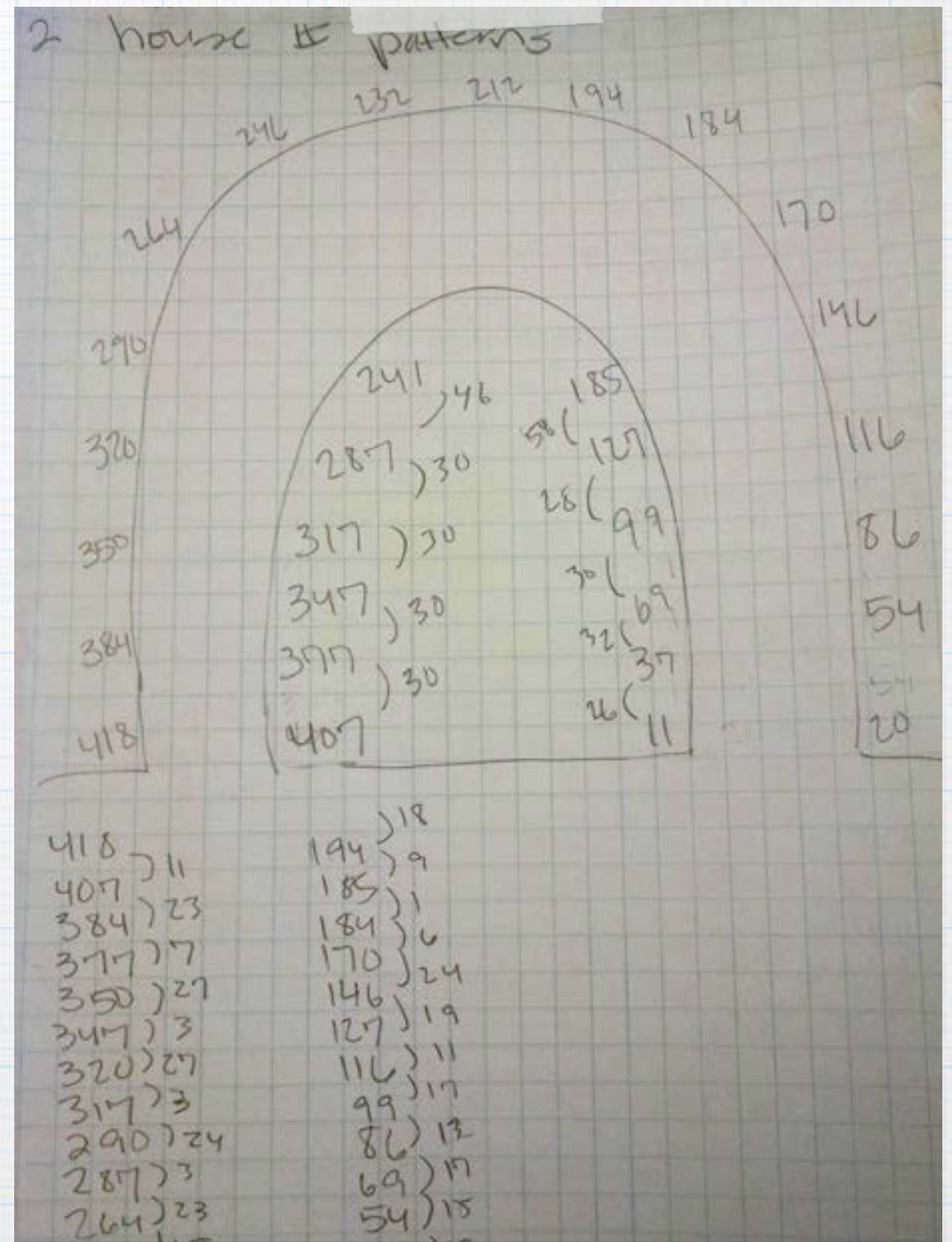
Write a compound inequality to show the pH levels that are within the recommended range. Graph the solutions.

Let  $p = \text{pH of the pool}$     $7.2 < x < 7.6$

Write the smaller number to the left. Put the variable in the center. Write the larger number to the right. Which signs are we using? What word in the problem gives you a hint whether it is "equal to?"

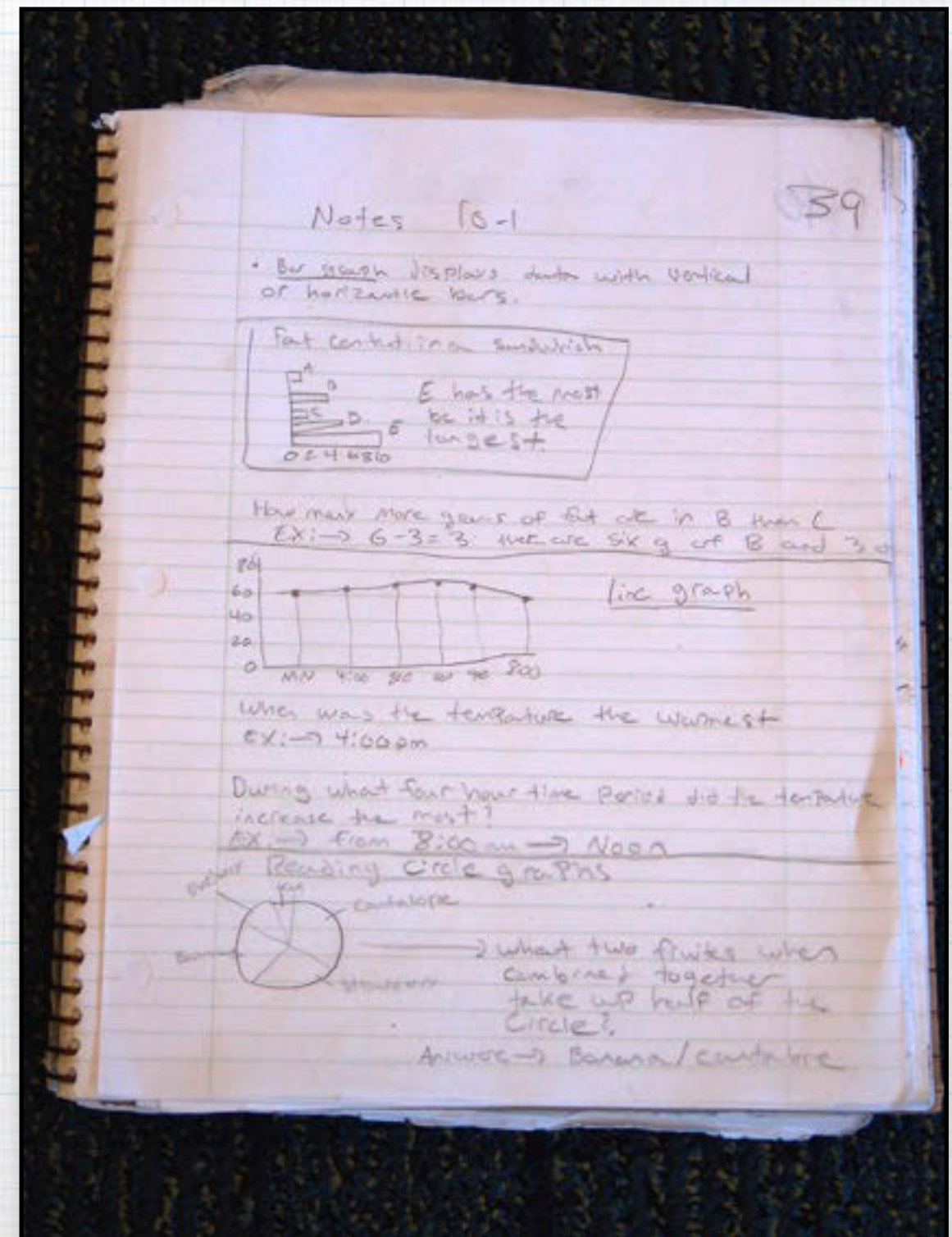
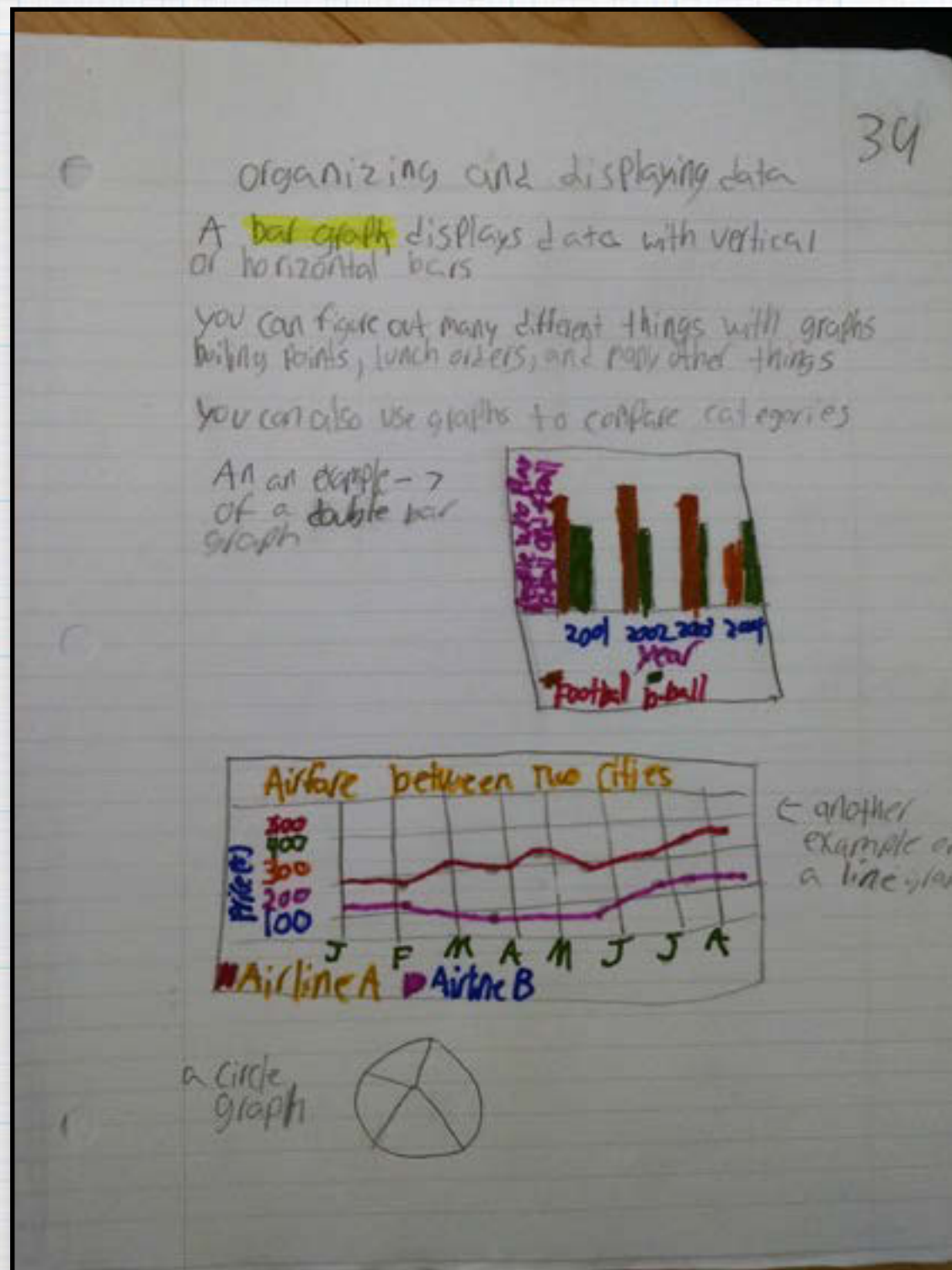


Do you see a  
pattern in your  
neighborhood?





# "On The Same Page"





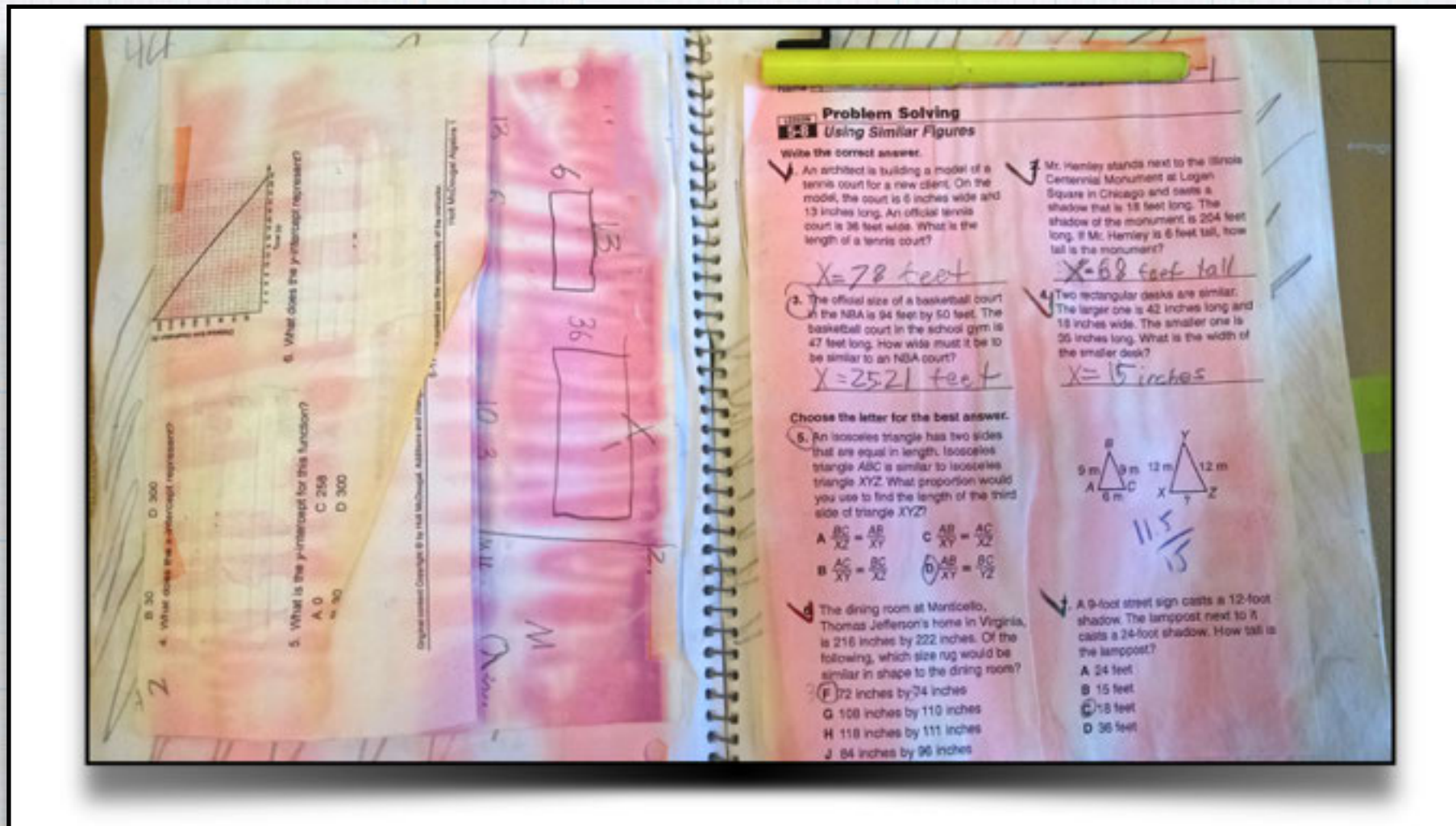
# Can I really be this organized?

- \* Do what you can
- \* Notebook does not need to look exactly like this!
- \* Glue, tape, hand write
- \* Enlist student feedback, modify what you're doing





# What if they ...



... run out of space on the page?  
... are on the wrong page?  
... forget their spiral?  
... (gasp) lose it?

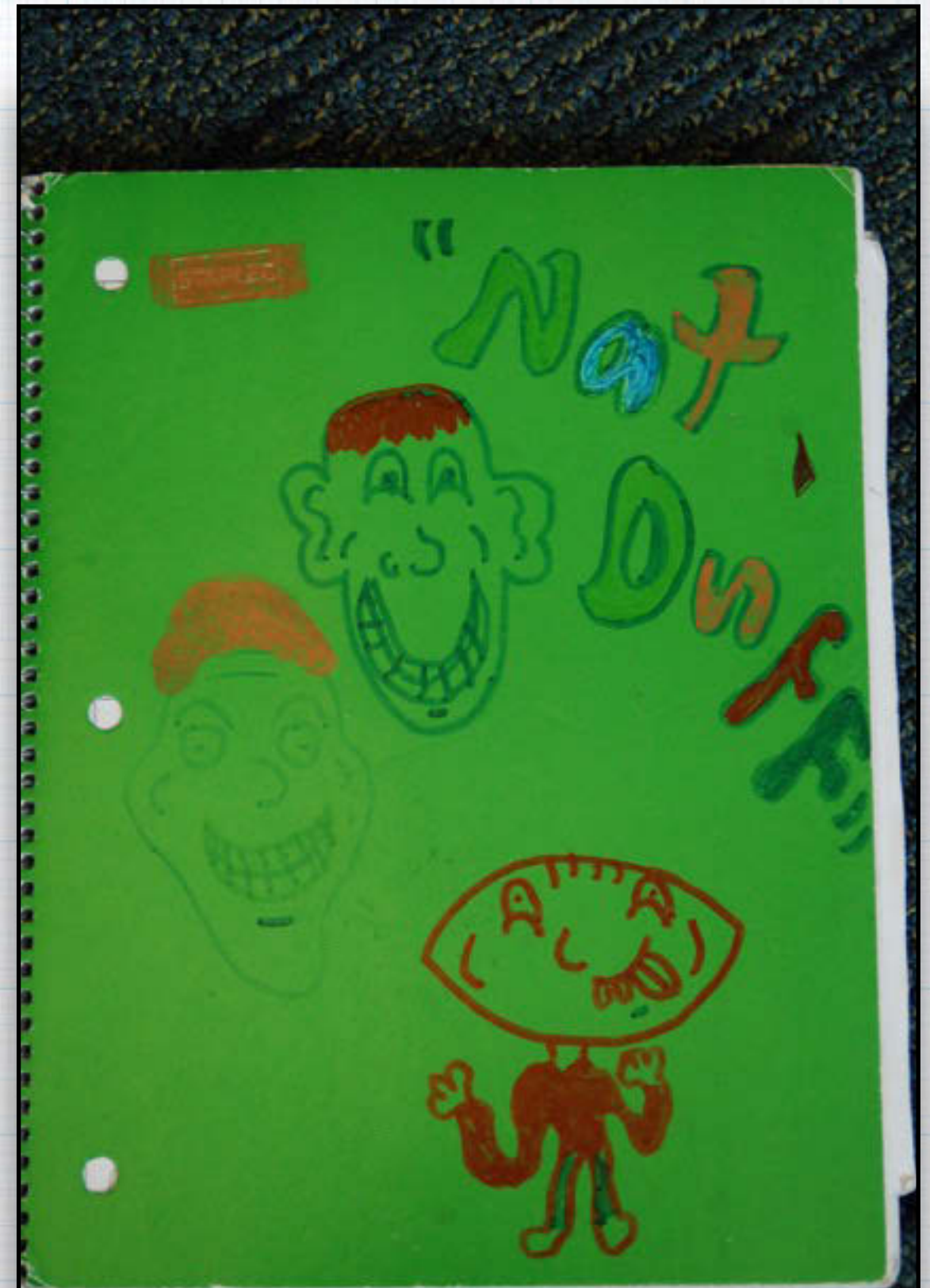
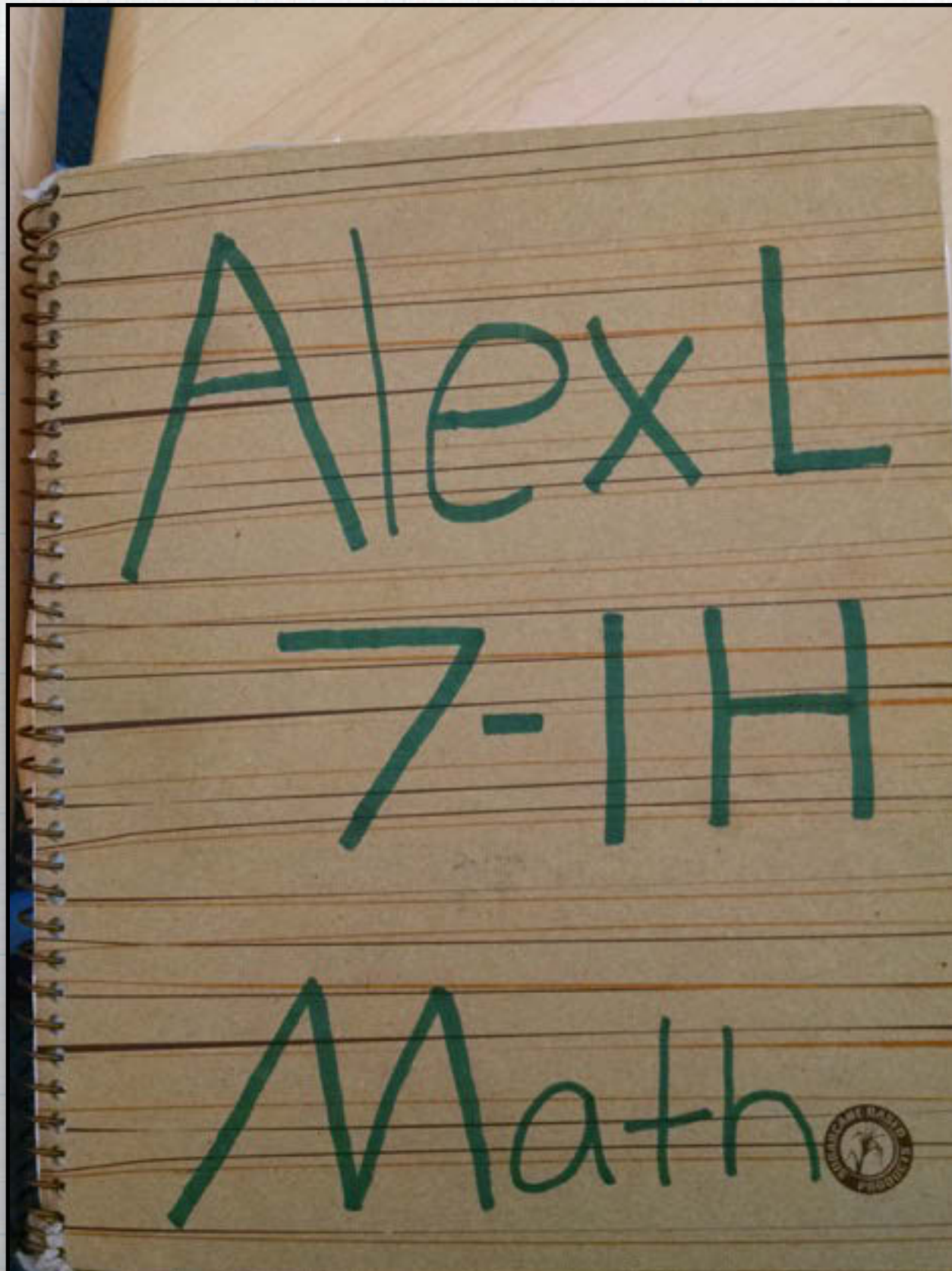


- Zach -  
grade 8





# Personalization

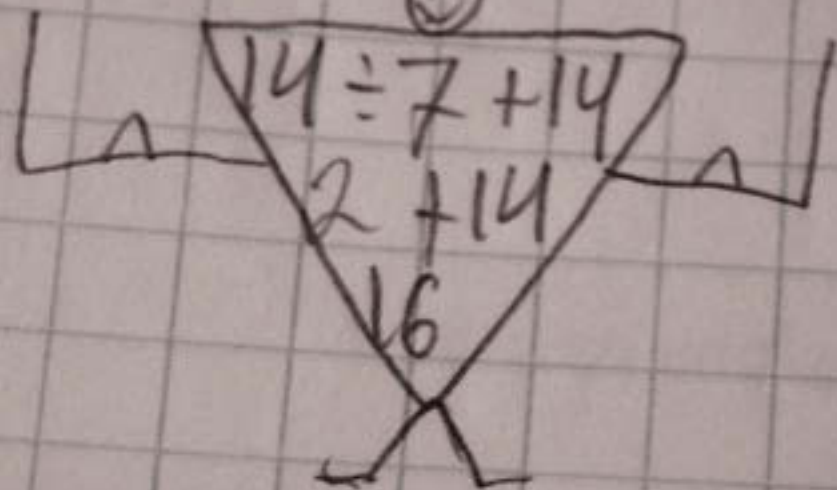




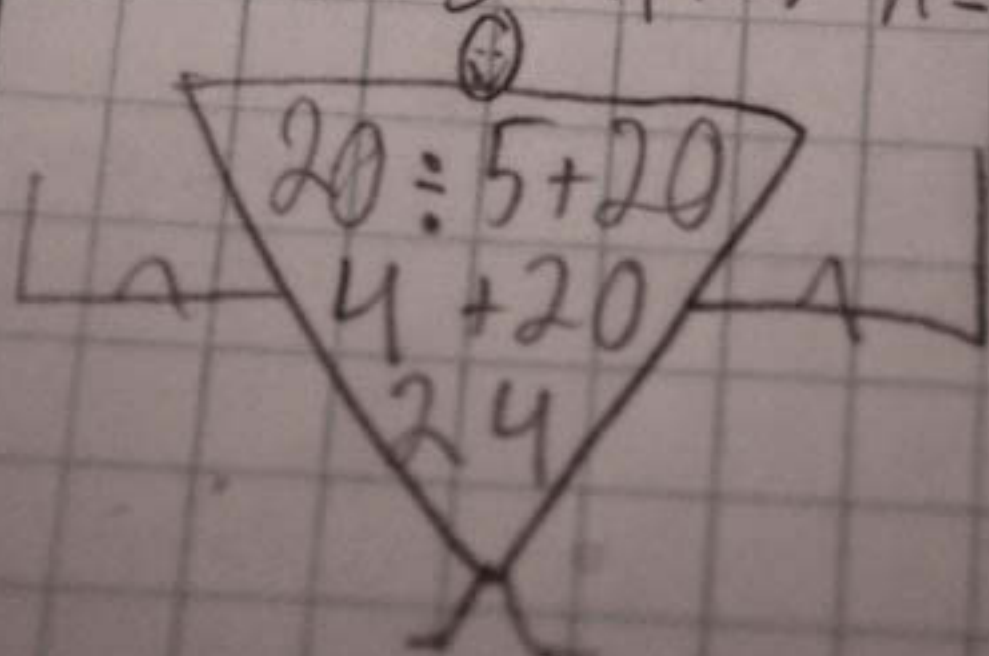
$$10(2) - 9$$

$$20 - 9 = 11$$

14.  $p \div 7 + p$  for  $p = 14$



15.  $n \div 5 + n$  for  $n = 20$



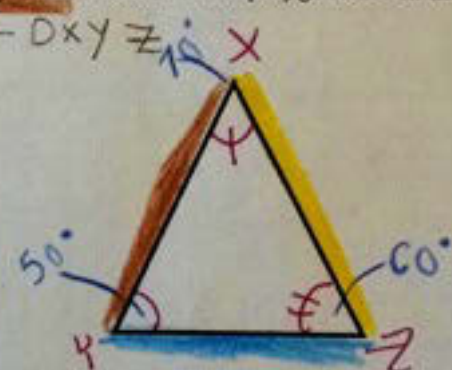
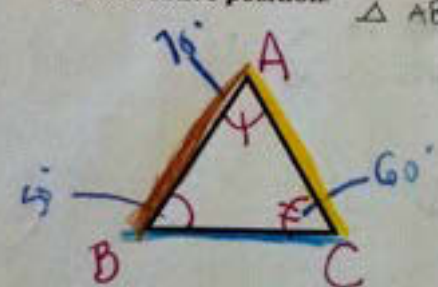
Similar Figures and Proportions

Similar figures have the same shape but not necessarily the same Size.

The symbol  $\sim$  means "similar to."

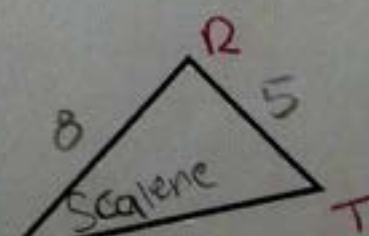
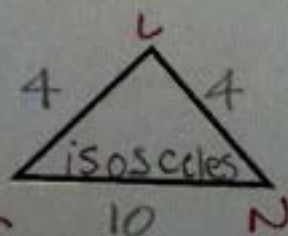
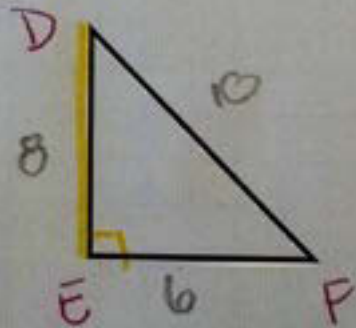
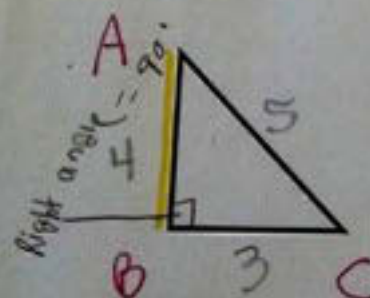
Corresponding angles and corresponding sides of two or more polygons are in the same relative position.

$$\triangle ABC \sim \triangle XYZ$$



Tell whether the triangles are similar.

$$\triangle ABC \sim \triangle DEF$$





# Is this only doodling?

Adding and subtracting with unlike denominators.

1st - Is the smaller denominator a factor of the larger denominator? (can it go into the larger number)

If yes, the greater denominator is the new denominator.

$\frac{1}{2} = \frac{4}{8}$   
 $\frac{1}{4} = \frac{2}{8}$   
 $\frac{1}{2} + \frac{1}{4} = \frac{4}{8} + \frac{2}{8} = \frac{6}{8} = \frac{3}{4}$

$\frac{1}{12} = \frac{1}{12}$   
 $\frac{2}{3} = \frac{8}{12}$   
 $\frac{1}{12} + \frac{2}{3} = \frac{1}{12} + \frac{8}{12} = \frac{9}{12} = \frac{3}{4}$

$\frac{2}{5} = \frac{4}{10}$   
 $\frac{3}{10} = \frac{3}{10}$   
 $\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10} = \frac{7}{10}$

**1-9 Simplifying Expressions**

Definitions

**Term**  
Part/s of a variable expression  
It can be a number, variable, or product of each.  
Terms are separated by addition (+) or subtraction (-) signs.

How many terms are in the following expressions?

$x + 3$  (2)       $2 + 4x + y$  (3)       $\frac{3-7}{x}$  (2)

$2x - 9$  (2)       $y$  (1)

Coefficient  
A number in front of the variable.

Identify the coefficient.

$5x$        $-100d$        $9z$   
 $12y$        $4h$        $1x$

When you don't see a number in front of a variable, it's an implied 1. A variable is a symbol or letter or some letters.

**Like Terms**  
"Like terms" are terms that have the same variable and are raised to the same power (exponent).  
Coefficients do not matter!

$5x$  (blue circle)       $6$  (red circle)       $3y$  (green circle)       $1y$  (green circle)       $x^2$  (black box)  
 $7x$  (blue circle)       $12$  (red circle)       $8y^2$        $3x^2$  (black box)  
 $3x^2$  (black box)       $0$  (red circle)       $5xy$        $2x^3$        $1,000$  (red circle)       $y^2$  (green circle)



**Color tells the brain:  
“pay attention!”**

**Creating visual images  
=  
Higher order thinking skills**

**Increase in visual  
learners in past 10 years**



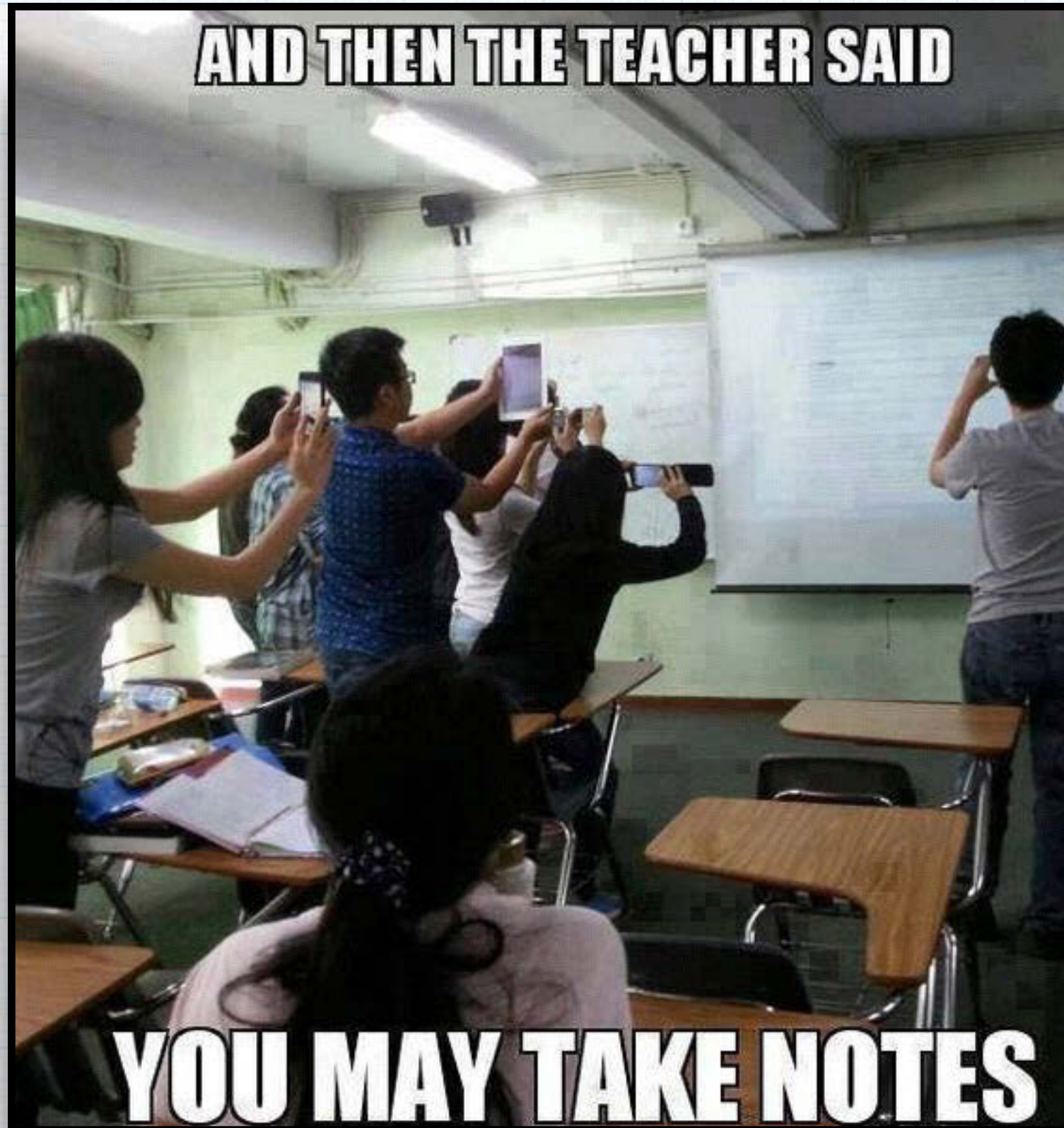




- Evan -  
grade 6



# Interactive?



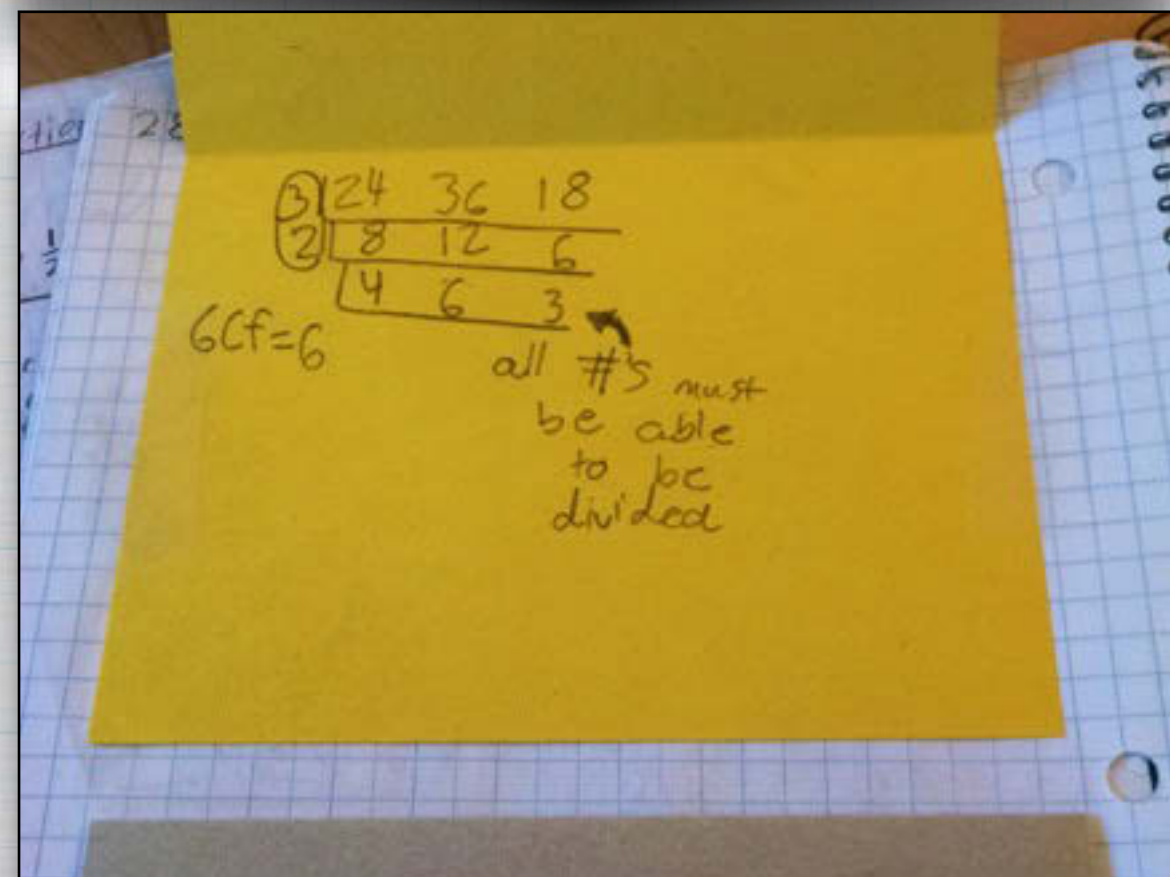
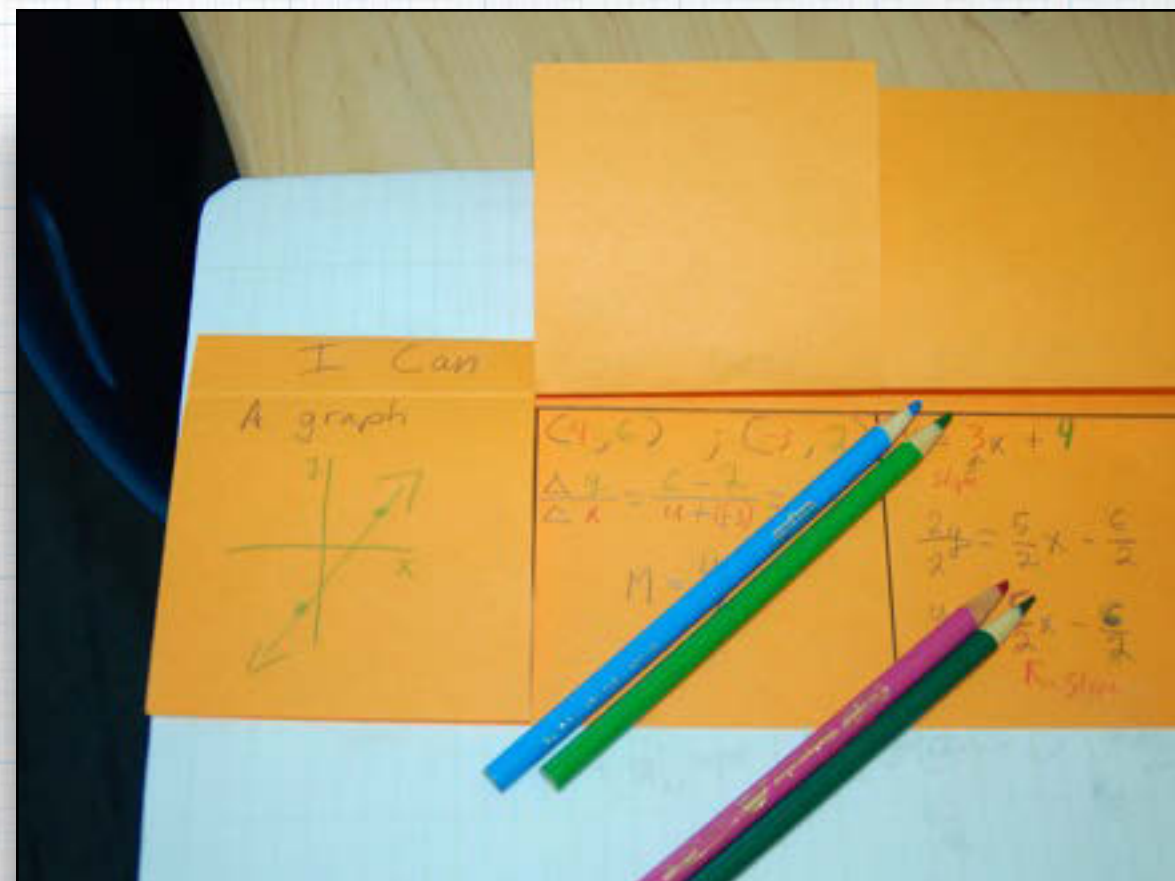
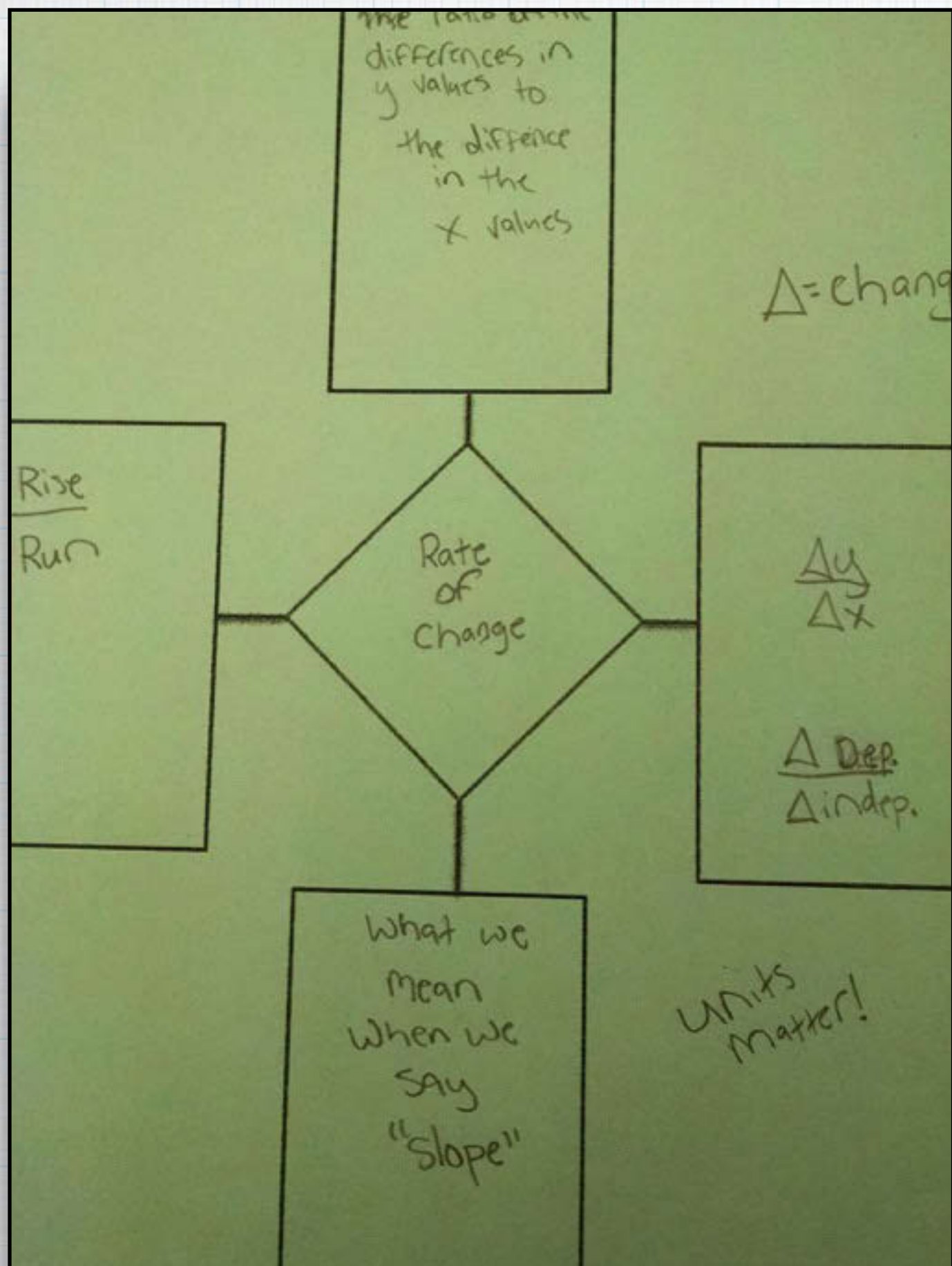


# Interactive!

$75\% = \frac{75}{100} = \frac{3}{4}$ $8\% = \frac{8}{100}$ $0.6\% = \frac{0.6}{100}$	<p>Rewrite the % over 100.</p> <p>Simplify.</p>	Percent to Decimal
$\frac{1}{5} = \frac{2}{10} = .2 = 20\%$ $\frac{7}{100} = 7\%$ $\frac{1}{3} = .33 = 33.3\%$	<p>Look for equal fractions (/10, /100)</p> <p>Convert fraction to a decimal. Move the decimal point 2 places to the right.</p> <p>Tack on a % sign.</p>	Decimal to Percent
$0.61 = \frac{61}{100}$ $0.3 = \frac{3}{10}$ $0.05 = \frac{5}{100} = \frac{1}{20}$ $1.7 = 1\frac{7}{10}$	<p>Write the number over 100 if there's an integer in the 100ths place.</p> <p>Write the number over 10 if in 10<sup>th</sup> place.</p> <p>Simplify.</p>	Fraction to Decimal

$y = \#$ $\rightarrow$ $x = \#$ $\downarrow$	H	O	Y
The line will be vertical	V		
Vertical lines have undefined slope	U		
The line will cross the x-axis	X		









- Will -  
grade 7





**“Rudderless”**

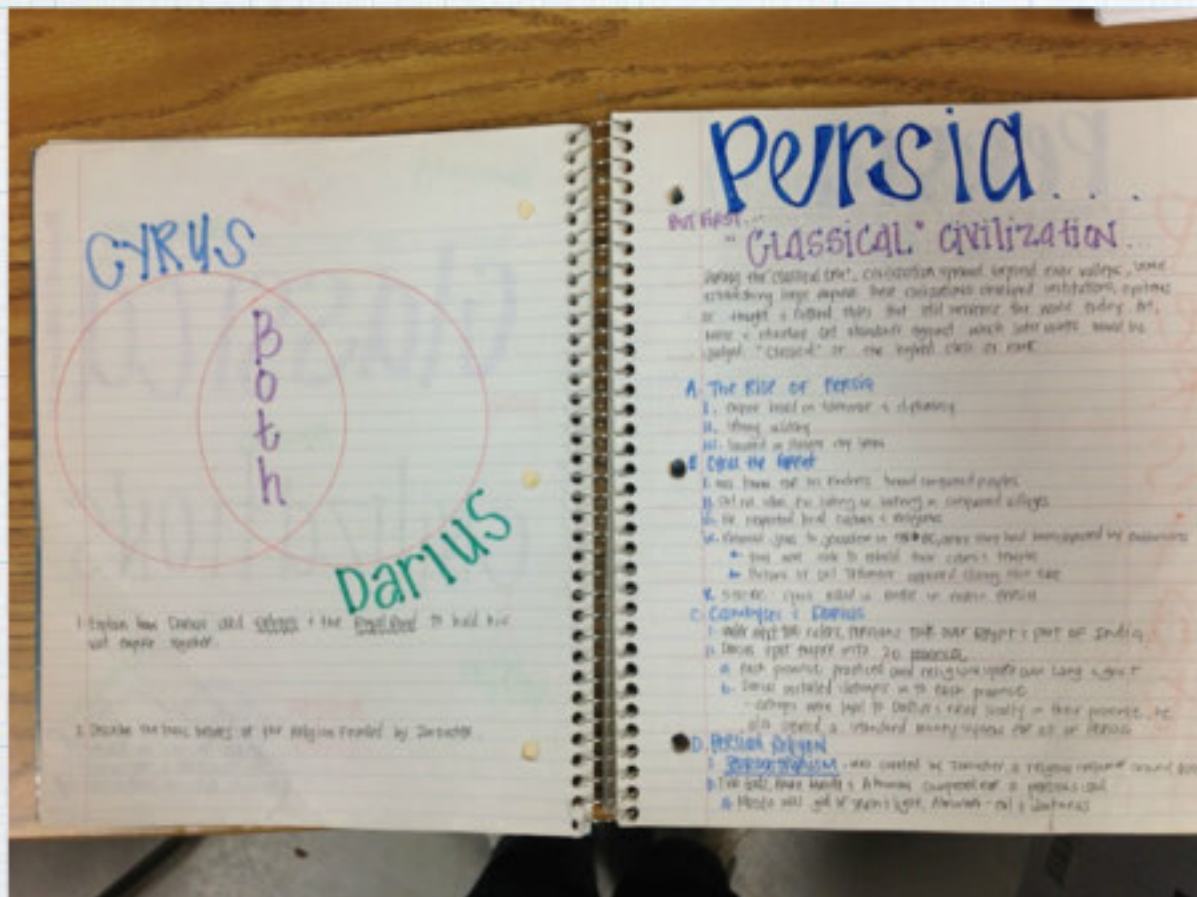
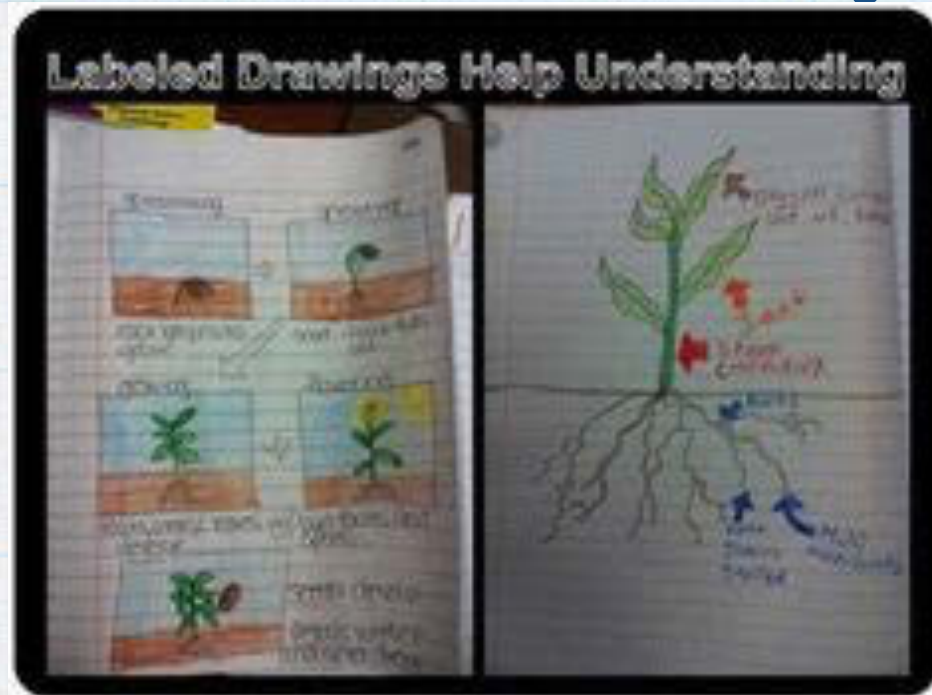


# Spirals are...

“handmade textbooks and organizational tools for mathematics.”

“personal lightweight textbooks that you make in your own words.”

“notebooks where everything is in one place and there aren't any papers that are just stuffed in your backpack or locker.”





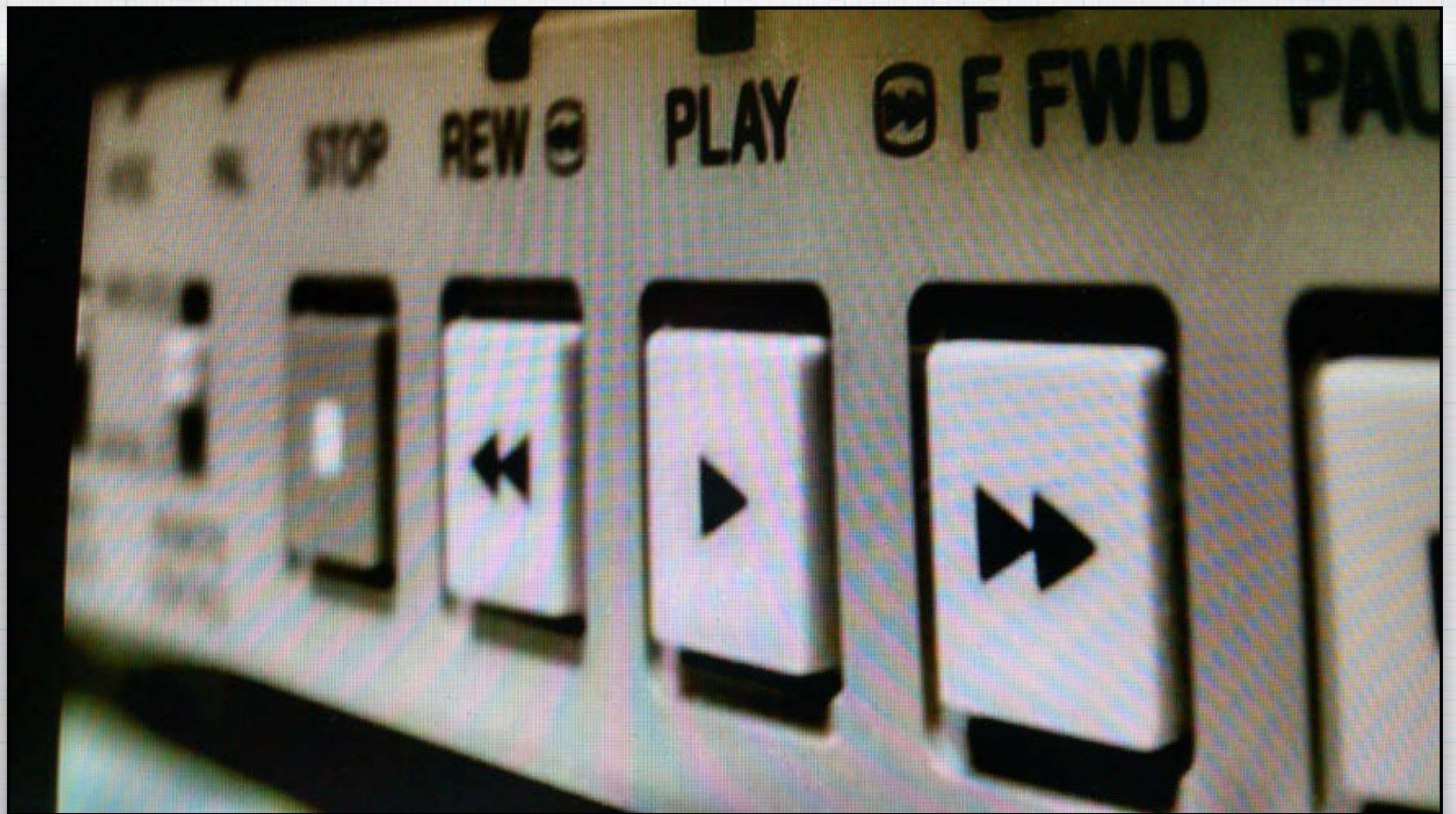
# How do I get started?

- \* Spiral notebooks
- \* Tape or glue
- \* Scissors
- \* Storage bins



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welcome-to-the-math-magicians/](http://mathmagicians.vanessweb.com/2016/04/05/welcome-to-the-math-magicians/)

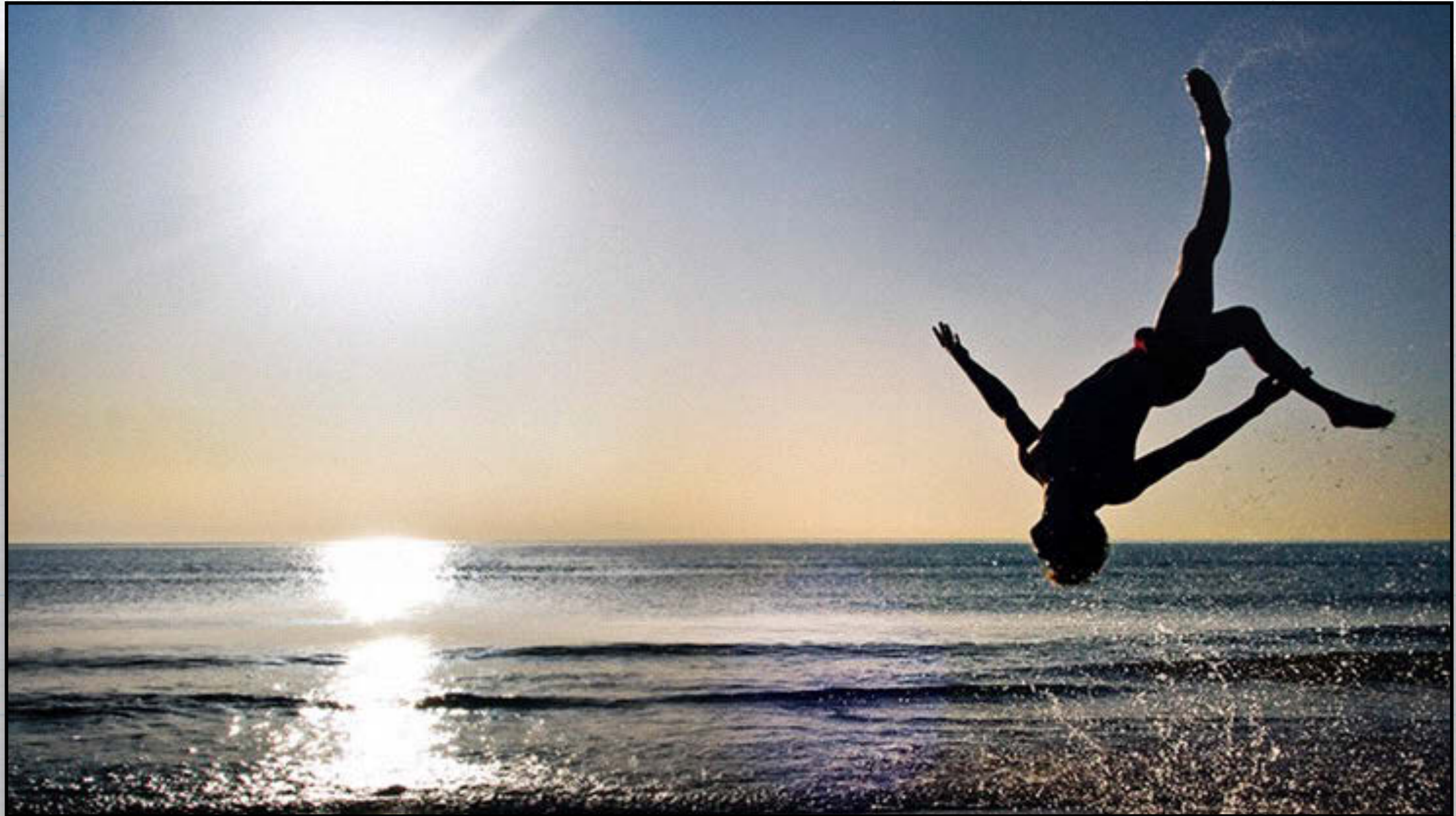




# Rewindable Lessons

or how students can maximize their learning





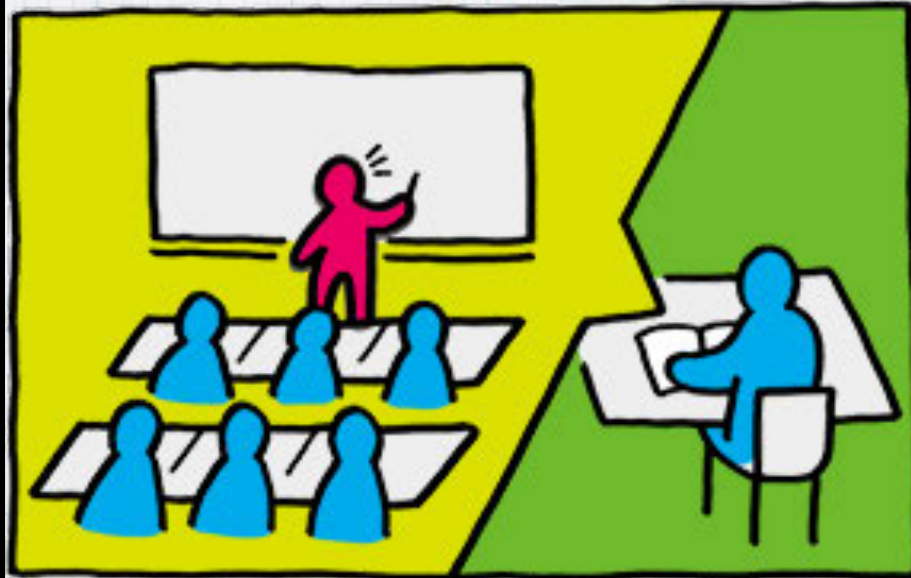
# What is rewindable learning?

also known as “flipped lessons”



## The **Traditional** Model

Knowledge **Acquisition**



Knowledge **Construction**

## The **Flipped** Model

Knowledge **Acquisition**



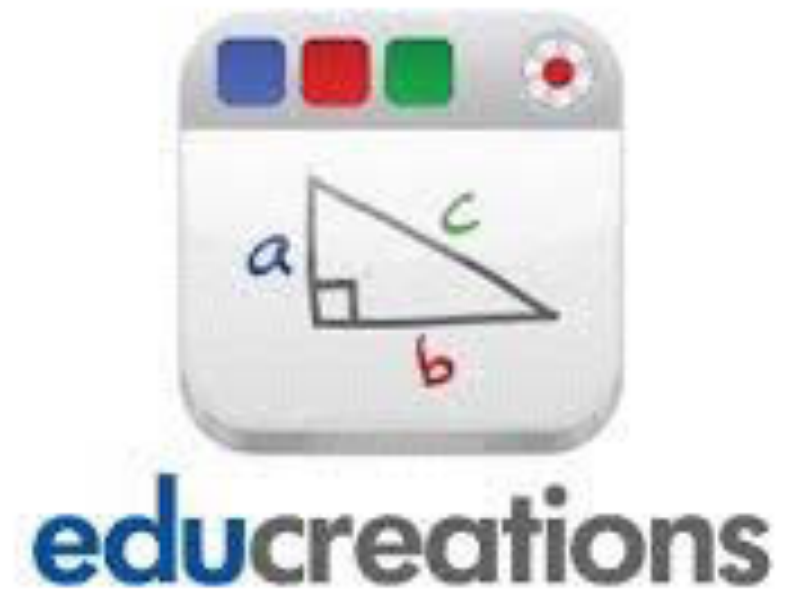
Knowledge **Construction**

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# Flipped learning - flipped classroom

Jon Bergmann  
Aaron Sams  
2007







# Getting Started ...

- \* Start small
- \* Simple concepts











04:38

Preview



Crop Video

Add Question

00:14

# Why did PlayPosit choose a dachshund as their logo?

A. Same reason as everybody else - their adorable dimensions.

Correct!

B. Because their team lacks artistic design

Now that is just mean

C. Because their CEO is a dachshund

Close, but not quite

D. Because dachshund is impossible to spell

Nope, we're nicer than that

01:54

What animal were dachshunds supposed to chase after?

A. Fox

B. Badger

C. Squirrel

03:03

What is the dachshund's most important feature?

A. Nose

B. Legs

C. Paws

D. Courage



Q 01	Q 02	Q 03		%
A	B	A	😊	
A	B	D	😊	
A	B	A	😊	
A	B	A	😊	
A	B	D	😊	
A	B	C	😊	
A	B	D	😊	

How did we do?

at-a-glance results



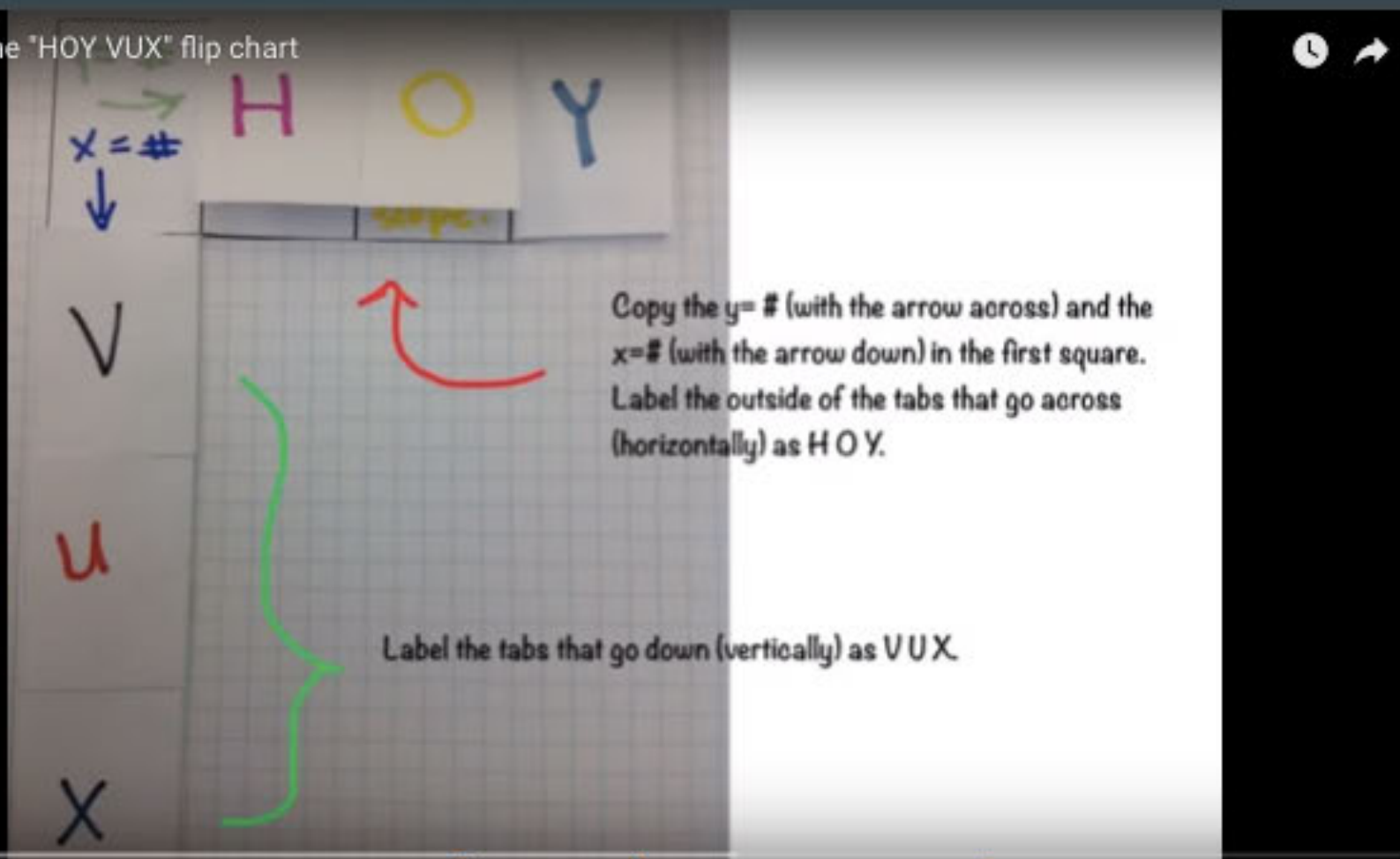


# Setting up the HOY VUX flip chart

SWBAT organize their HOY VUX chart

Lesson Analytics

Setting up the "HOY VUX" flip chart



01:03

What does the O stand for in 'HOY?'

- A. origin
- B. zero
- C. off the graph

01:19

What does the 'V' stand for in 'VUX?'

- A. vertical
- B. vertigo
- C. very hard to find

01:54

The line for  $x = 2$  will be ...

- A. horizontal
- $x = 2$  is a VUX rule, and all VUX lines must be vertical (for the V)
- B. vertical
- Yes, because the V in VUX stands for vertical line.
- C. there is no line because this is not linear.
- We are working on linear functions!

0:05

02:36

Preview

Crop Video

Finish Build

Add Question



B	A	A	
B	A	B	
B	C	B	
B	C	B	
B			
B	A	B	
B	C	B	
B	A	B	
B	C	B	

# How did we do?

at-a-glance results



# Online!



There is no Internet connection

Your computer is offline.

Try:

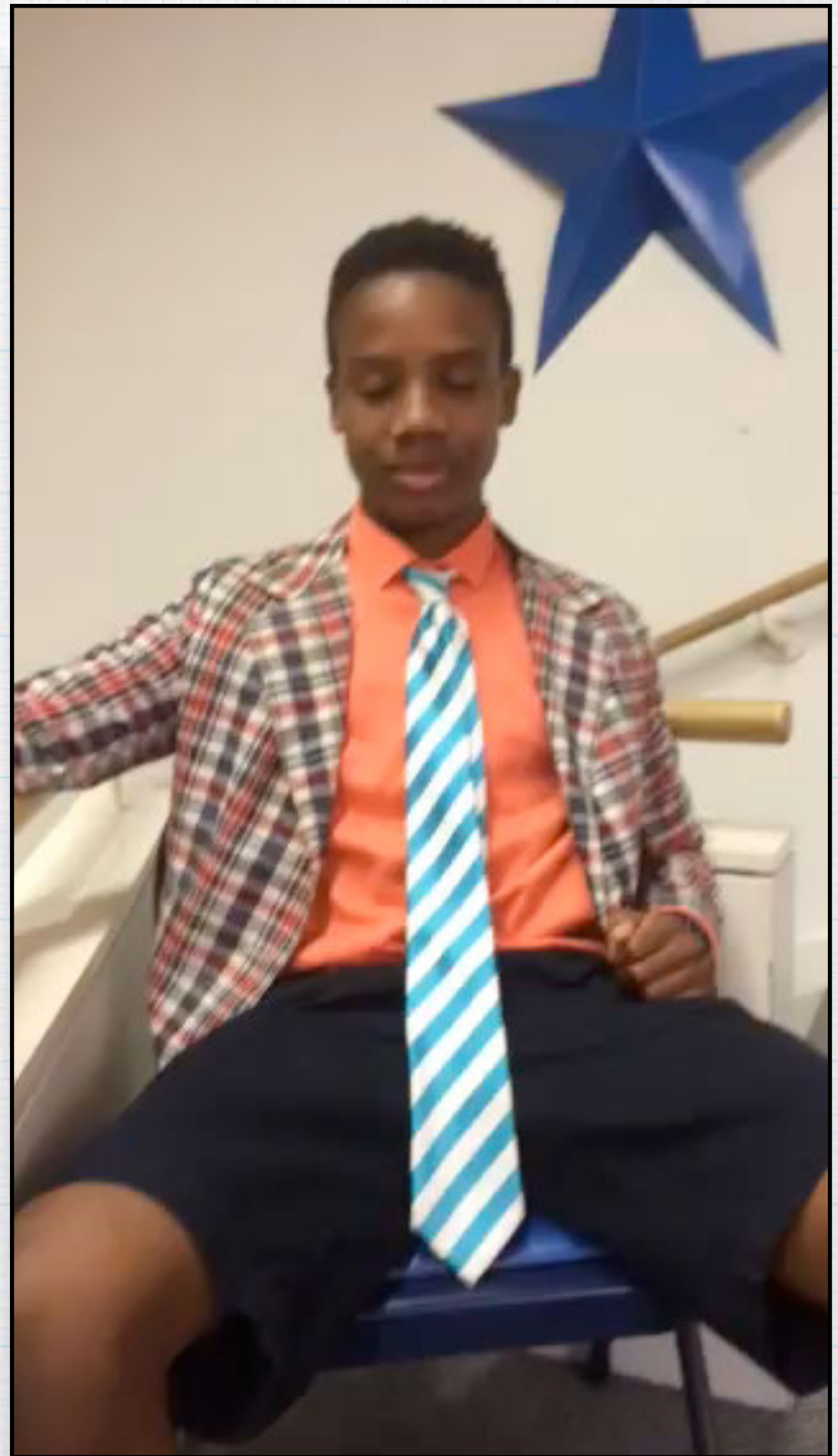
- Checking the network cable or router
- Resetting the modem or router
- Reconnecting to Wi-Fi

DNS\_PROBE\_FINISHED\_NO\_INTERNET

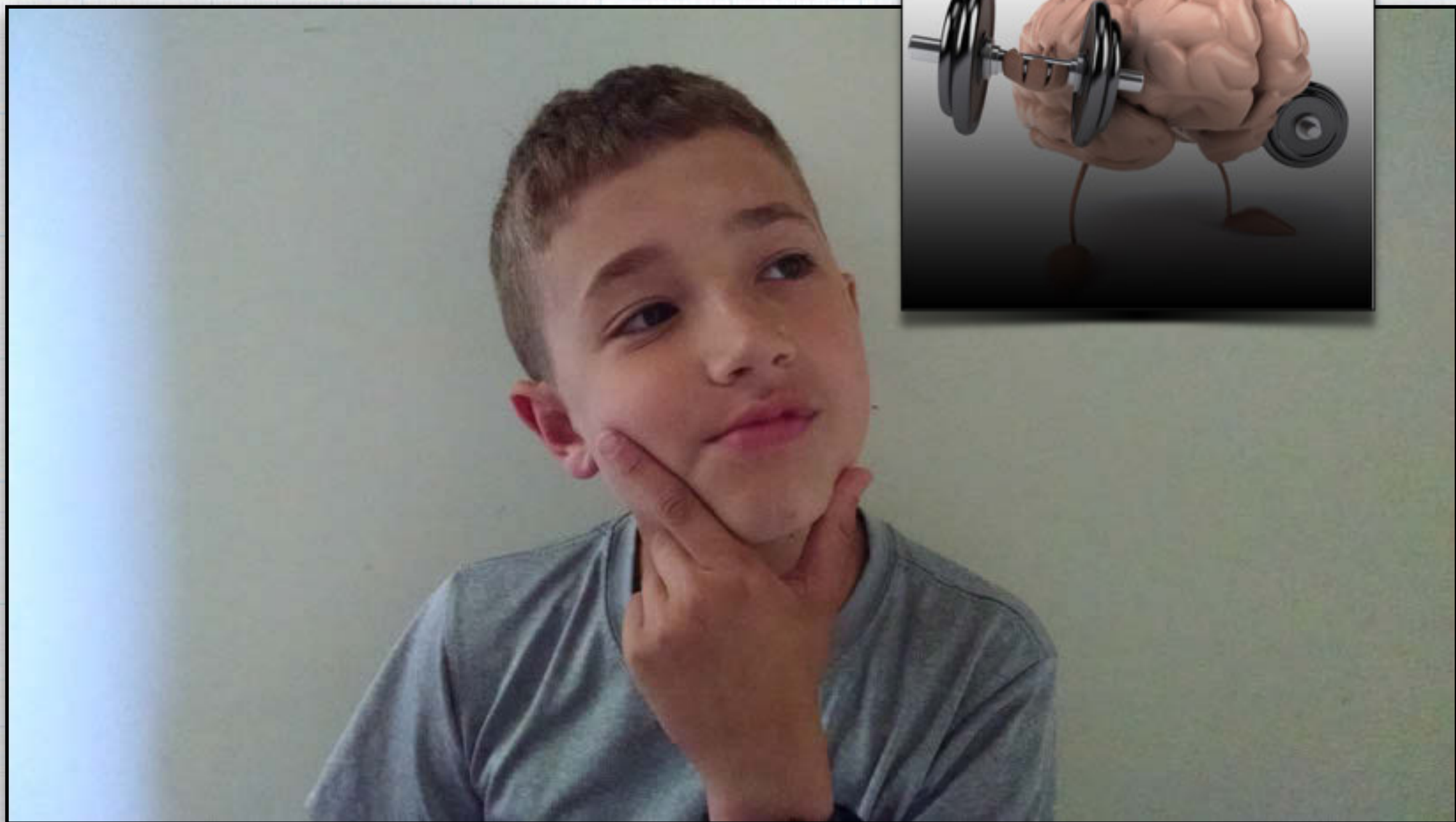
# Now what?



- Kobe -  
grade 7







# Questions? Observations?

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2016/04/05/welcome-to-the-math-magicians/](http://mathmagicians.vanessweb.com/2016/04/05/welcome-to-the-math-magicians/)