

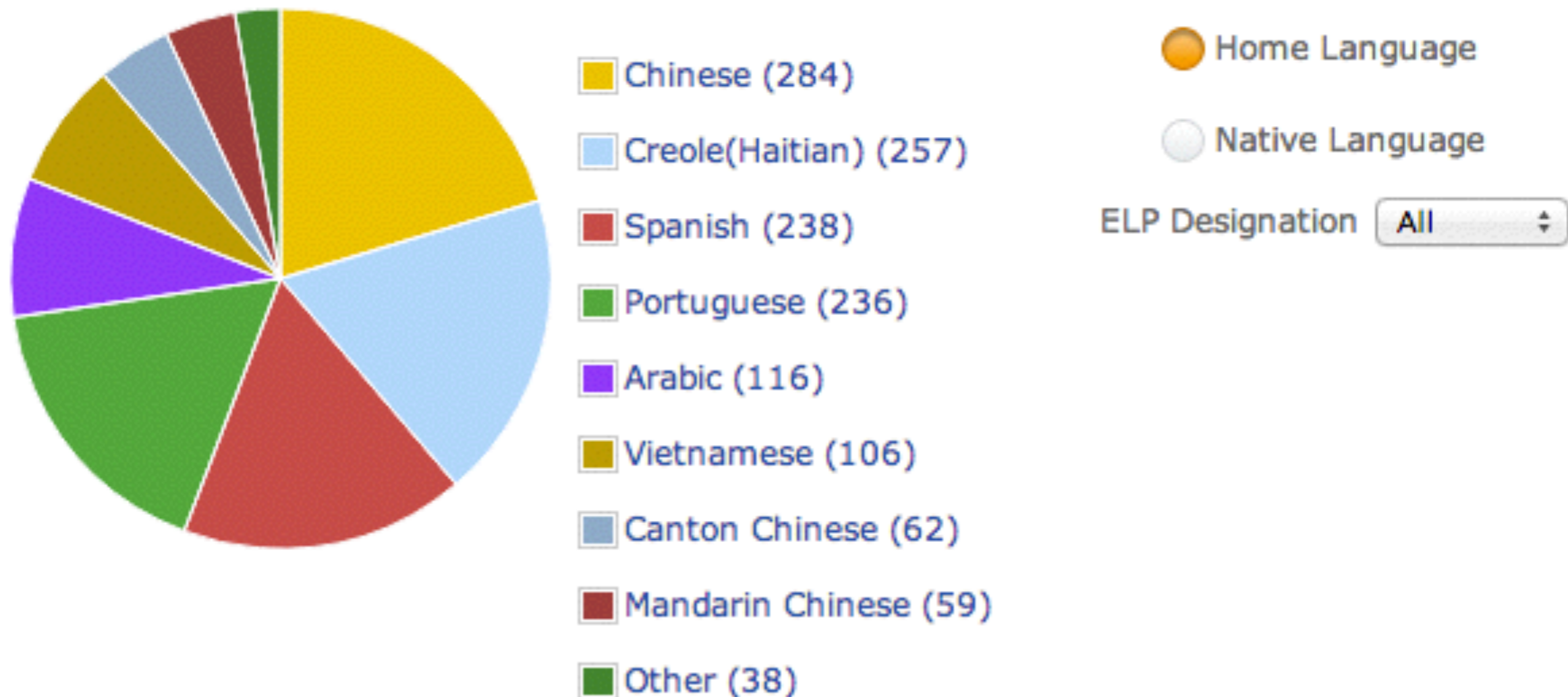
Perseverance in Math

Presenters: Vanessa James and Suzy Kaplan



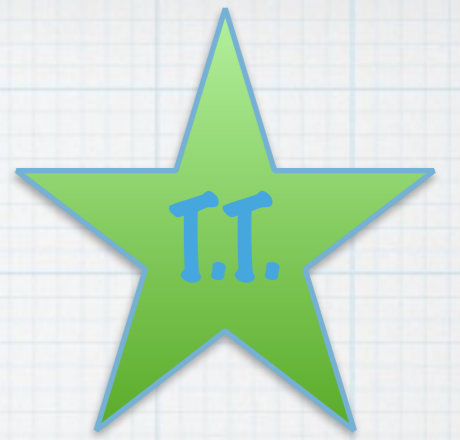
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Grades 2, 3, and k-3 SEI Support



Objectives

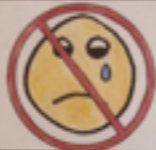
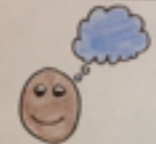

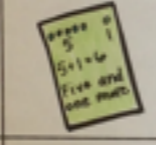
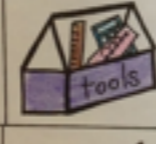
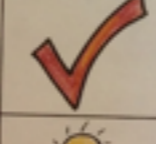
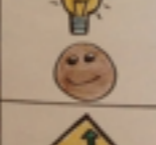
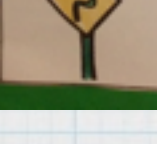
- * Provide examples on how to effectively meet content and language standards by providing ELLs the necessary strategies to persevere in math



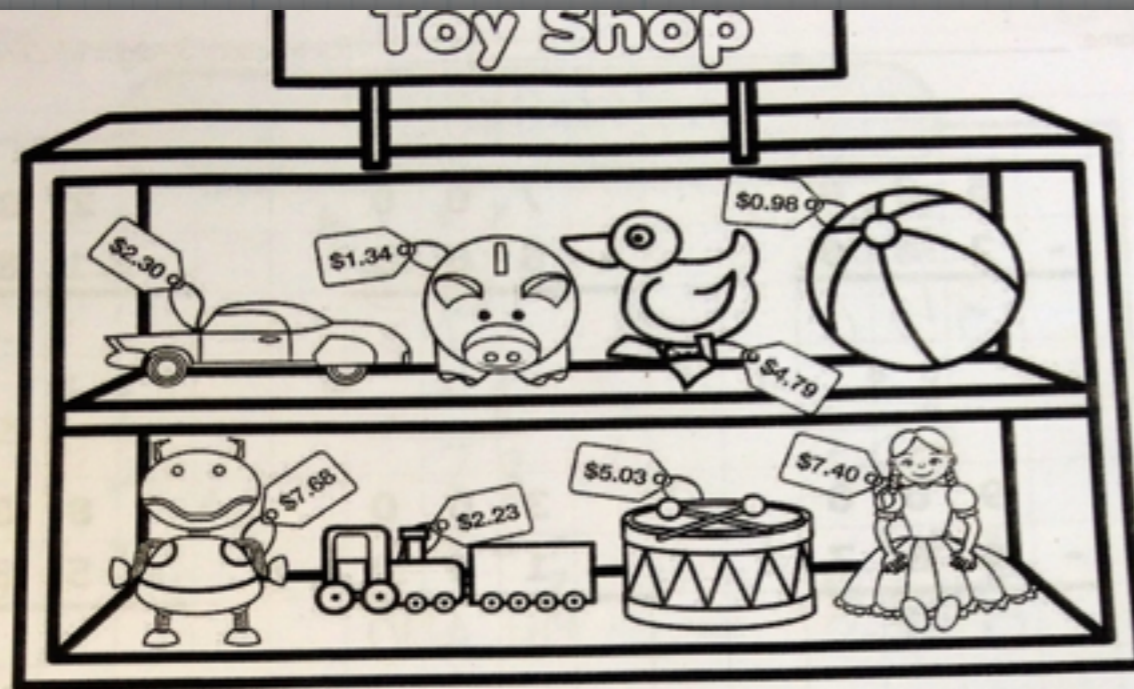
“What is perseverance?”

“Perseverance is...”

Perseverance Needs to be Explicitly Taught!

Practice Standards	
1	 I can solve problems without giving up.
2	 I can think about numbers in many ways.
3	 I can explain my thinking and try to understand others.
4	 I can show my work in many ways.
5	 I can use math tools and tell why I chose them.
6	 I can work carefully and check my work.
7	 I can use what I know to solve new problems.
8	 I can discover and use shortcuts.

How do we identify the
degree of perseverance
amongst diverse
learners ?



1. How much would it cost to buy a robot and a piggy bank?

answer: 9.02

2. How much would it cost to buy a toy car and a plastic duck?

answer: 3.28

3. How much would it cost to buy two beach balls?

answer: 1.86

How much would it cost to buy a drum and a doll?

answer: 12.43

What evidence of perseverance is being demonstrated in this example?

Observable Evidence of Perseverance

- * Solved the problems correctly

The worksheet is titled "Toy Shop" and features a shelf with two rows of toys. Each toy has a price tag. The top row contains a toy car (\$2.30), a piggy bank (\$1.34), a duck (\$0.98), and a beach ball (\$4.79). The bottom row contains a robot (\$7.00), a train (\$2.23), a drum (\$5.03), and a doll (\$7.40).

Below the shelf are four math problems with handwritten answers:

- How much would it cost to buy a robot and a piggy bank? answer: 9.02
- How much would it cost to buy a toy car and a plastic duck? answer: 3.28
- How much would it cost to buy two beach balls? answer: 1.80
- How much would it cost to buy a drum and a doll? answer: 12.43

What evidence of perseverance is being demonstrated in this example?



2. Emily has 6 erasers. Angela has twice as many as Emily. Deliah has 1 less than Angela. How many erasers in all?

Emily Angela Deliah

Answer: There are 29 erasers in all.

✓- ✓ ✓+

Explanation

I wrote Emily and put 6 erasers and Angela has twice as many so it's gonna be $6 \times 2 = 12$ or $6 \times 2 = 12$ and Deliah has 11 because $12 - 1 = 11$ so $11 + 12 + 6 = 29$. So they have 29 erasers.

✓- ✓ ✓+

Observable Evidence of Perseverance

- * Solution is correct AND
- * Underlines the question
- * Shows a clear strategy for solving the problem
- * Gives a clear explanation on how they solved the problem

2. Emily has 6 erasers. Angela has twice as many as Emily. Deliah has 1 less than Angela. How many erasers in all?

Emily: 6 erasers
Angela: 12 erasers
Deliah: 11 erasers

Answer: There are 29 erasers in all.

✓- ✓ **✓+**

Explanation

I wrote Emily and put 6 erasers and Angela has twice as many so it's gonna be $6 \times 2 = 12$ or $6 \times 2 = 12$ and Deliah has 11 because $12 - 1 = 11$ so $11 + 12 + 6 = 29$. So they have 29 erasers.

✓- ✓ **✓+**

What evidence of perseverance is being demonstrated in this example?

T.T.

Sharing Pumpkin Seeds

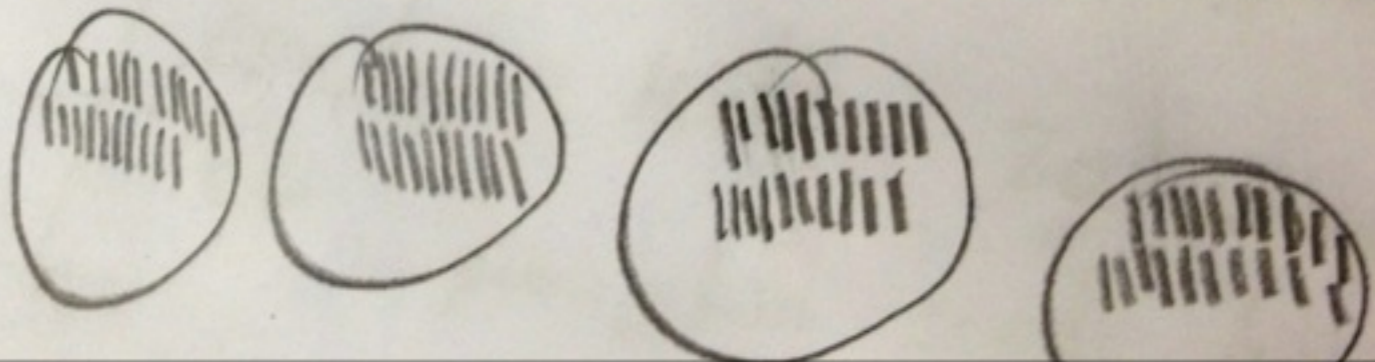
Ben and his 3 friends toasted 80 pumpkin seeds from their pumpkin. How many seeds will each child get if they share the pumpkin seeds fairly? Clearly explain your thinking using words, numbers, and/or pictures.



4 0 | 20 | 20 | 20 | 20
ben 1 2 3

Each Person will get 20 because there is 80 seed and $80 - 20 - 20 - 20 - 20 = 0$
seeds Ben 1 2 3

$$20 \times 4 = 80$$
$$4 \times 20 = 80$$



Sharing Pumpkin Seeds


Ben and his 3 friends toasted 80 pumpkin seeds from their pumpkin. How many seeds will each child get if they share the pumpkin seeds fairly? Clearly explain your thinking using words, numbers, and/or pictures.


4	0	80	0
	20	20	20
ben		1	2 3

$20 \times 4 = 80$
 $4 \overline{) 80} = 20$

Each Person will get 20 because there is 80 seed and $80 - 20 - 20 - 20 - 20 = 0$

seeds ben 1 2 3



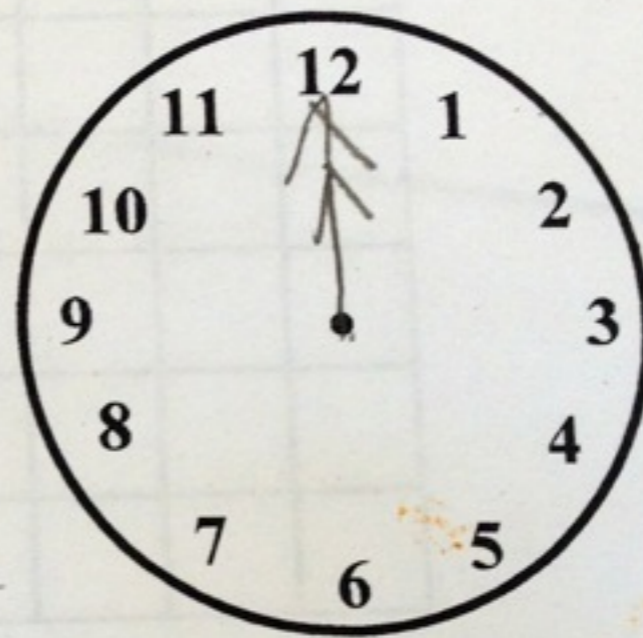
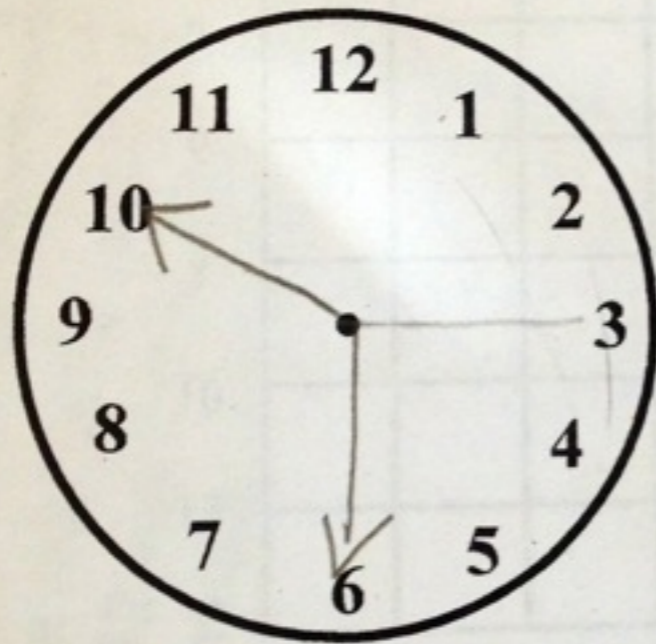


Observable Evidence of Perseverance

- * underlines important information in the problem
- * shows work
- * student explains their thinking
- * demonstrates several ways to solve the problem
- * student checks their work carefully

Road Blocks for ELLs

2. The New Year's Eve party started at half past 10 and went until midnight. How long did the party last? Draw the hands on the clocks below to help you find the answer.



2. The temperature at 8:00 a.m. was 68°F . If the temperature rose 2° each hour, what was the temperature at 11:00 a.m.?

“Ms. Kaplan what does the temperature, rose, 2 zero each hour mean?”

Strategies To Help ELLs Persevere

WIDA Interactive Scaffold: Explicitly Teaching Strategies to increase Math Perseverance

Gradual Release

* I Do. You watch

- Teacher models how to analyze question, identify strategy, solve the problem, write explanation

* I Do. You help.

- Teacher practices strategies for analyzing the question with students
- Teacher and students discuss strategies that could be used to solve the problem
- Teacher supports students with writing an explanation on how to solve the problem

◆ You do. I help.




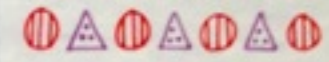
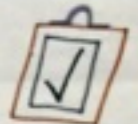
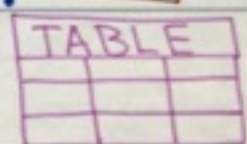
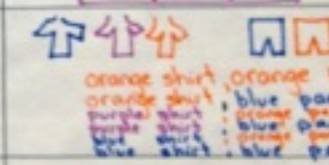
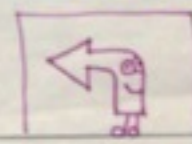
- Students practice math problems, teacher identifies strategy to use to solve the problem

* You do. I watch.

- Students identify which problem solving strategy and operation works best for them to solve the problem on their own
- Students write explanation on how they solved the problem

Meta-cognitive Problem-Solving Tools

- * Create anchor charts and model how to refer to them when solving math word problems
- * Include visuals in anchor chart

<u>Problem Solving Strategies</u>	
Use logical reasoning	
Act it out	
Draw a picture	
Look for a pattern	
Guess and check	? 
Make a table	
Make an organized list	
Work backwards	
Write a number sentence	$7 \times 8 = 5$

Problem-Solving tools



Giving students operational clue words can help give them the tools they need to solve word problems

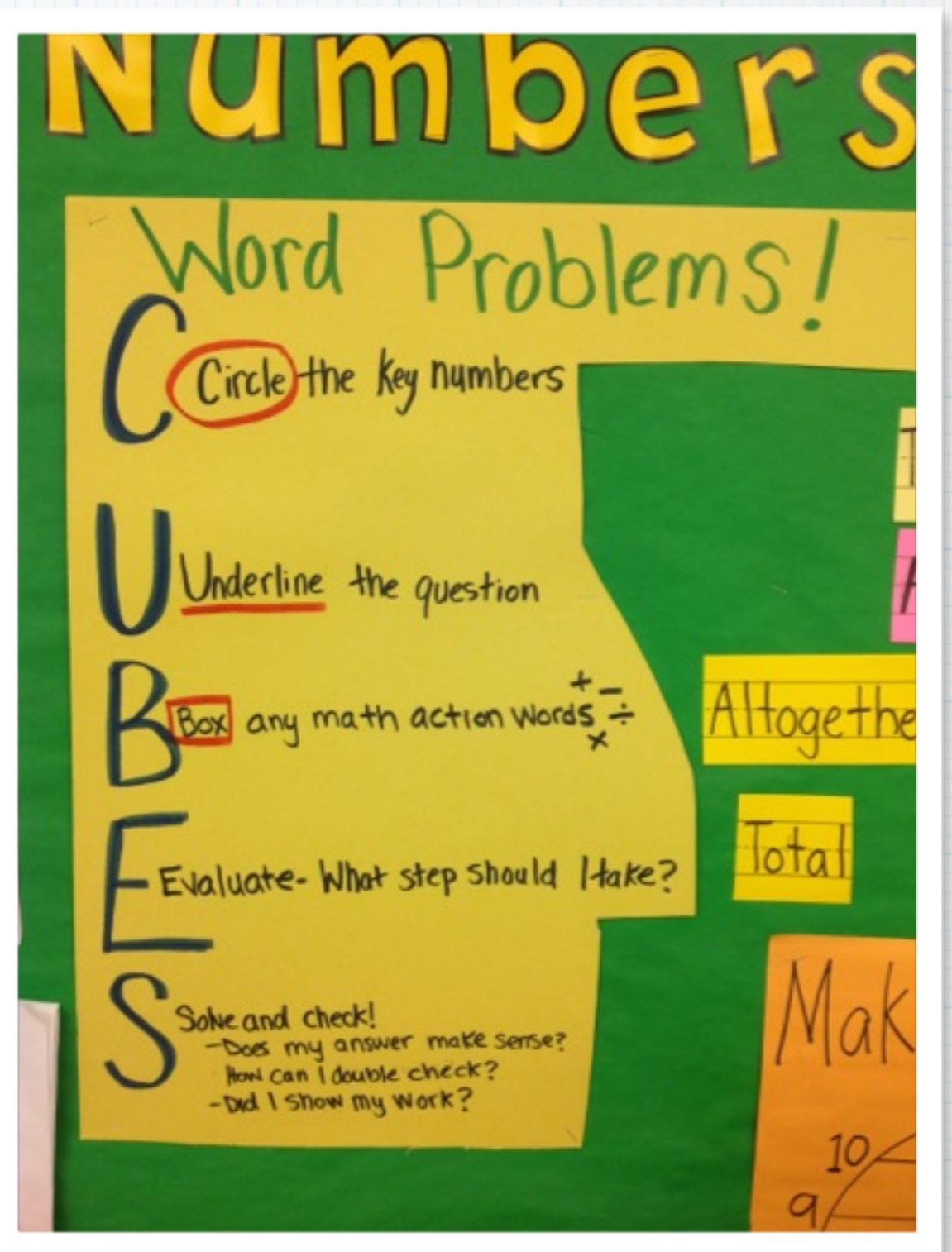
Problems with Relying solely Clue Words

Ms. Kaplan has 22 students in her classroom which is 5 less than Ms. James. How many students does Ms. James have?

CUBES

* Strategy for analyzing the word problem

- **(C)**ircle the important numbers
- **(U)**nderline the question
- **(B)**ox operational words
- **(E)**valuate- what do we do next?
- **(S)**olve and check

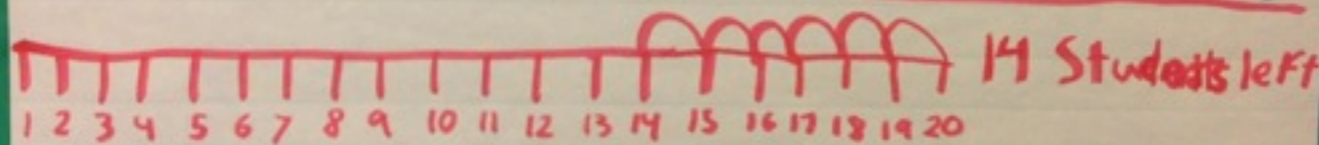


CUBES

I Do

Word Problems!

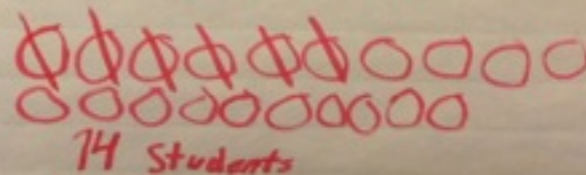
This morning, 20 students arrived to Ms. Weinberg's classroom. 6 students went home after lunch. How many students were left at the end of the day?



Strategies

- number line
- number sentence
- drawing

$$20 - 6 = 14 \text{ students}$$



take away

left

Fewer

Difference

Any had 3 pencils then had a pencil who had the most pencils?
18 students where in class 11 students where Ms James class who has students?
Ms James has power

CUBES

We DO



You Do

Dominic took 23 books from the library on Monday. On Tuesday he got 18 more. Then on Wednesday he returned all books. How many books did he still have?

TEENS: ~~11~~
ONES: ~~0000~~

ANSWER: 20

~~23~~
~~18~~
~~41~~

Dominic has 20 books

Use CUBES to solve and check your answer: SHOW YOUR WORK!

Ms. Weinberg brought a lot of fruit to school one day. She brought 36 apples and 28 oranges. How much fruit did she bring altogether?

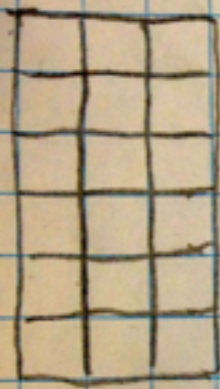
$$\begin{array}{r}
 36 \\
 + 28 \\
 \hline
 64
 \end{array}$$

First I drew the +. Then I put 3 tens and 6 ones and 2 tens and 8 ones. Then I counted the ones altogether and it was more than 9, it was 14. So I took 10 ones and replaced it with 1 ten. Now I add so we have 4 ones and 6 tens.

THE END

Students write their own math word problems

② 6 by 3



① This 6 by 3 array has 18 square units.

② $6 \times 3 = 18$

↑ Factors ↑ Factors ↑ Product

③

$$18 \div 6 = 3$$
$$18 \div 3 = 6$$

↑ ↑ ↑
dividend divisor quotient

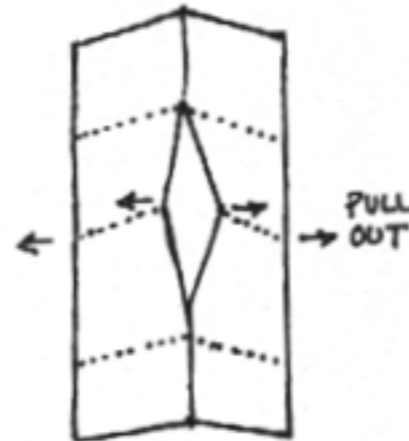
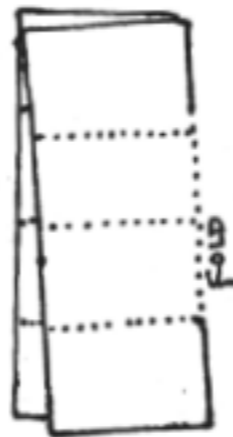
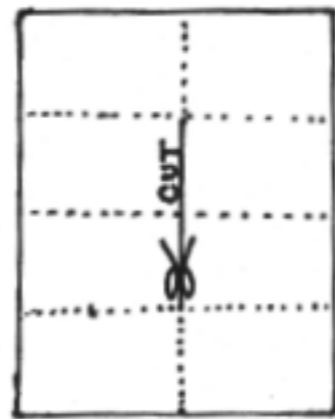
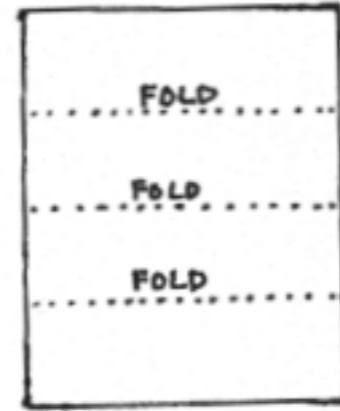
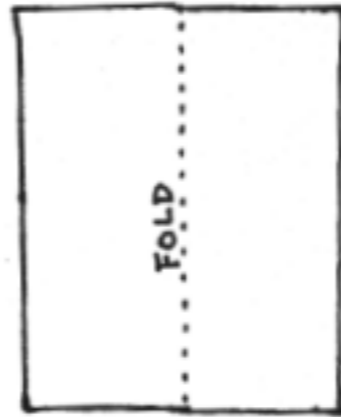
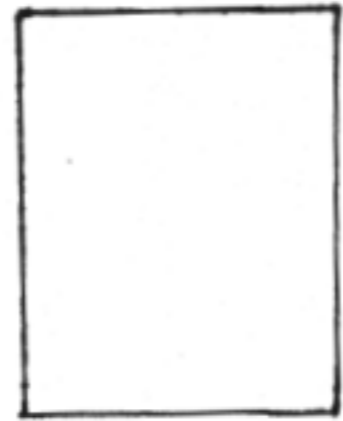
$$\begin{array}{r} 6 \\ 3 \overline{) 18} \end{array}$$

② Stacy has 6 ~~is~~ cookies and each cookie has 3 chocolate chips on it. How many chocolate chips do Stacy have in all?

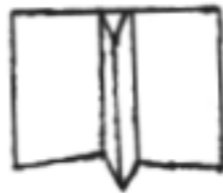
Scaffolding techniques for ELLs

_____ (Name) has _____ cookies. Each
cookie has _____ chocolate chips. How
many chocolate chips does _____
(Name) have in all?

Magic Foldable Book



CREASE



FOLD



FOLD

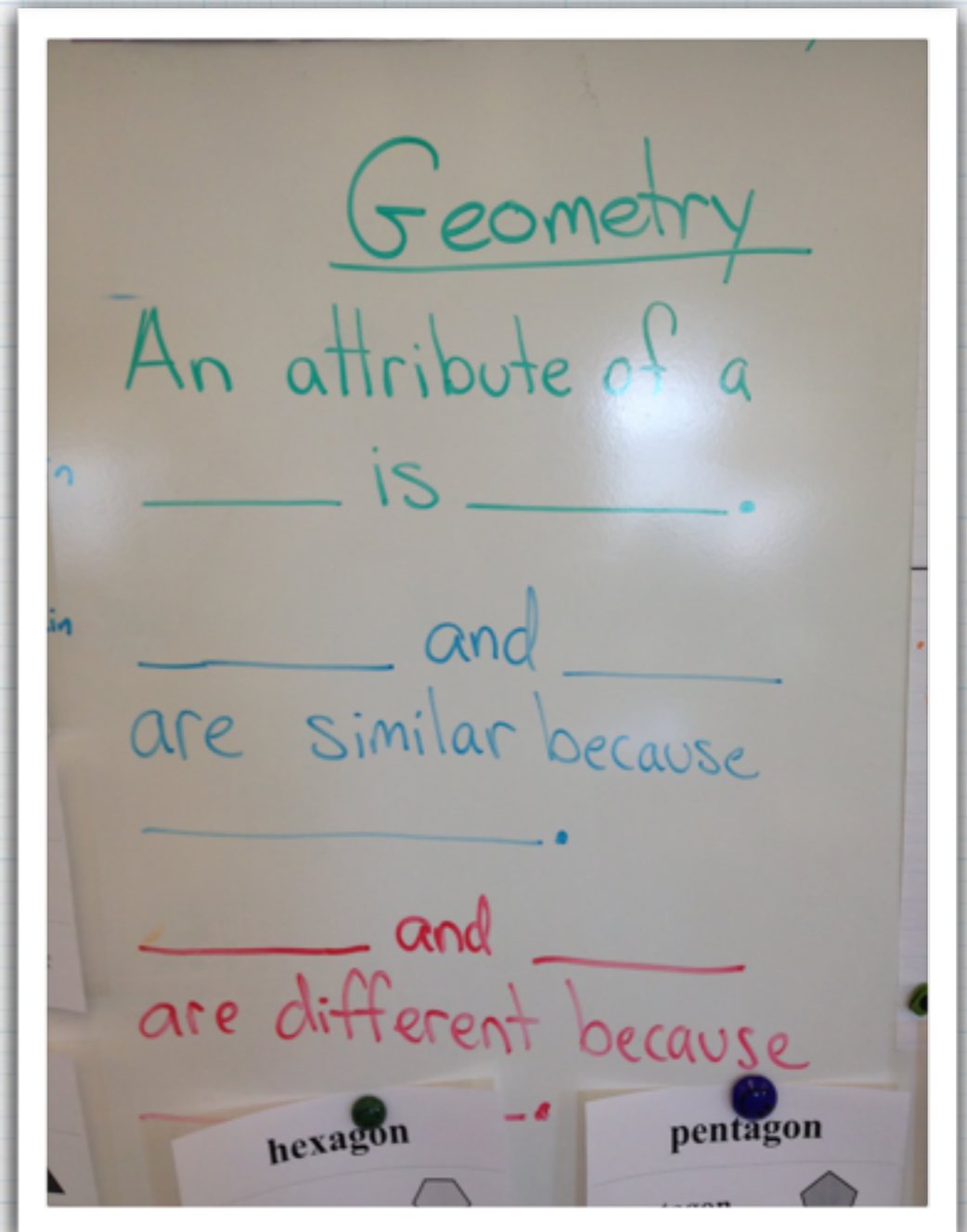
Guiding Questions

- * What is the question asking?
- * What information is given to help solve the problem?
- * What strategy will help you solve the problem?
- * How can you check your answer?
- * Can you explain the steps you took to find the answer?

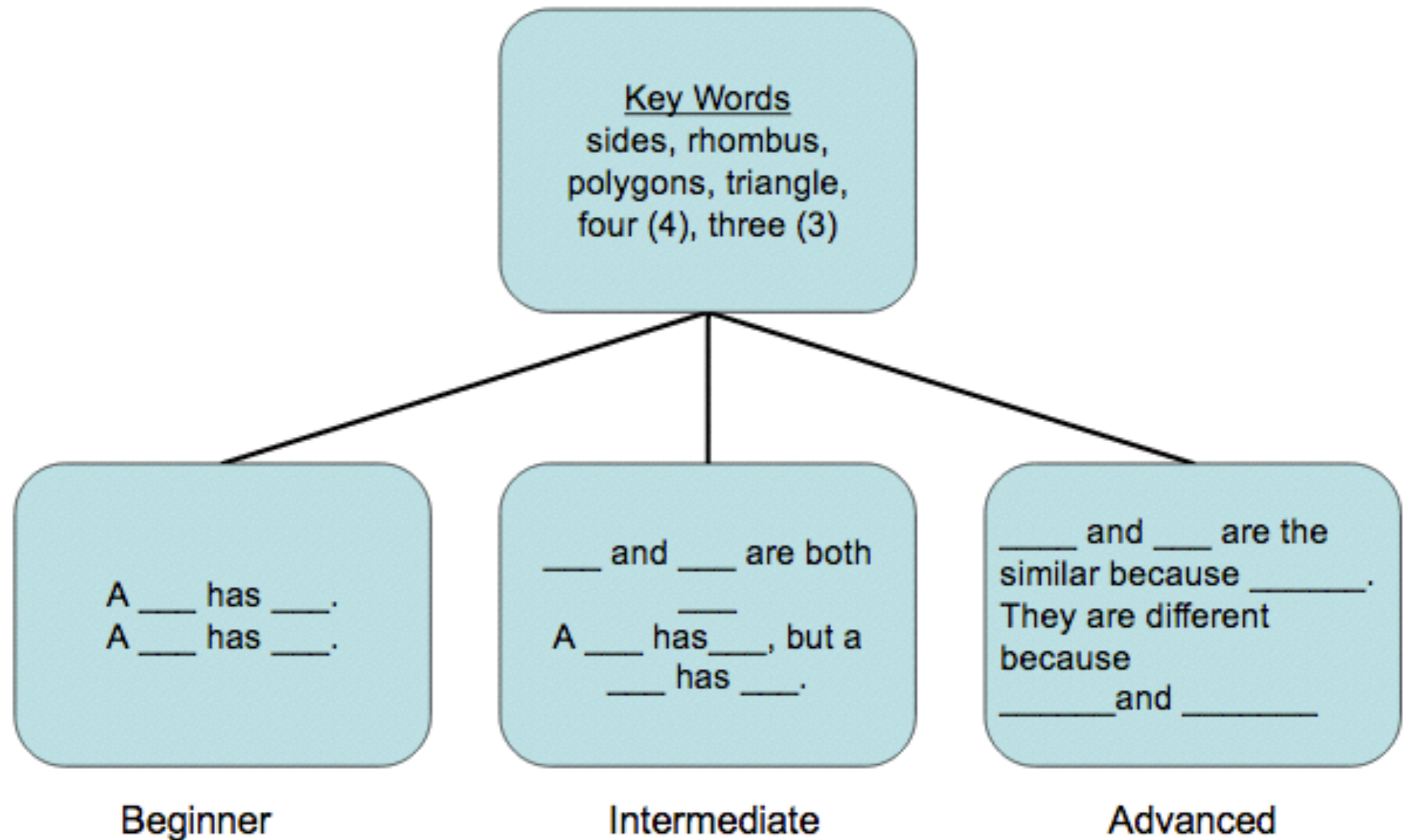
Developing Academic Language

Sentence Frames

- I Do: Model sentence frames
- We Do: Practice together
- You Do: Turn and Talk using sentence frames
- Journal Writing



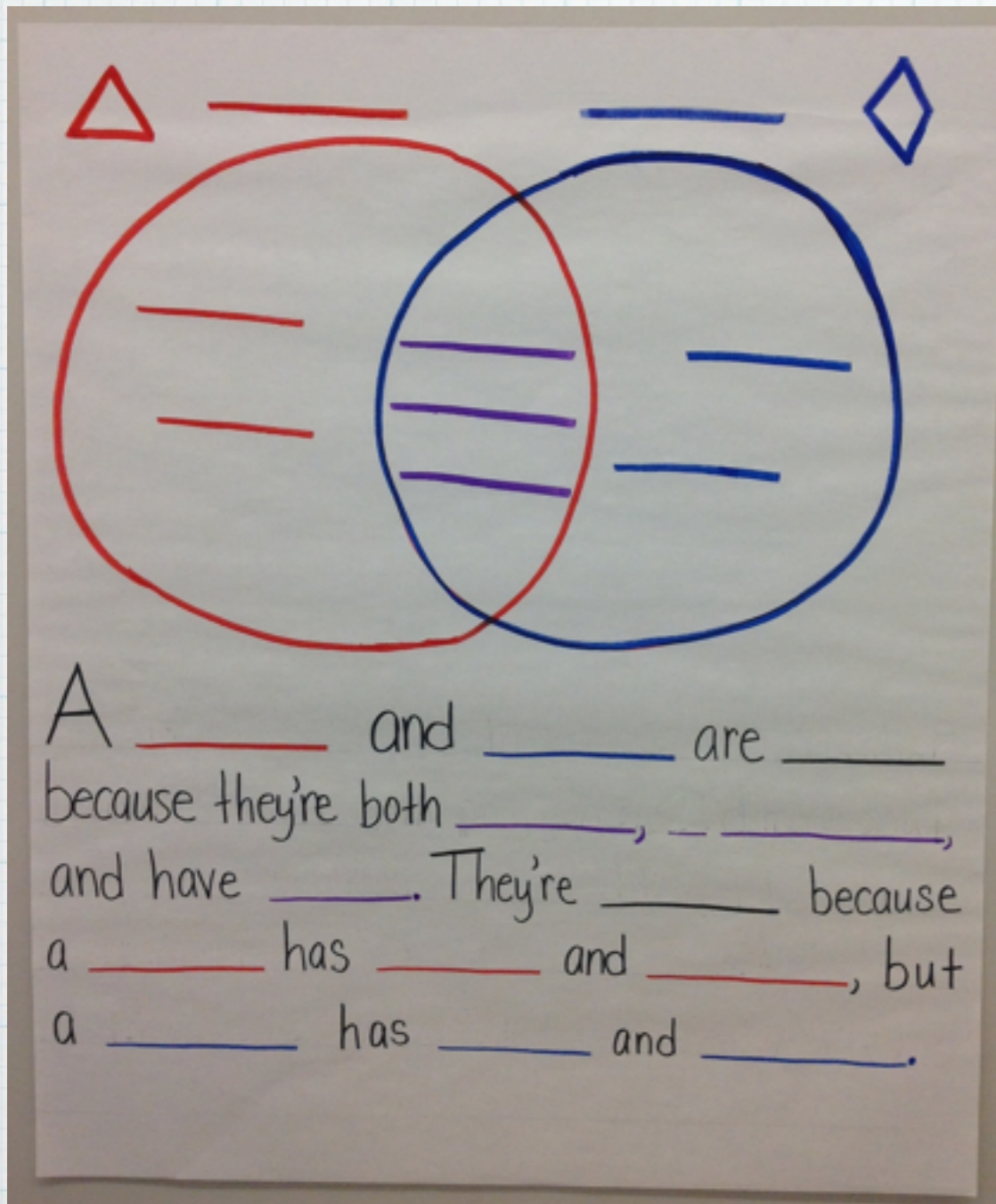
Language Functions & Sentence Frames



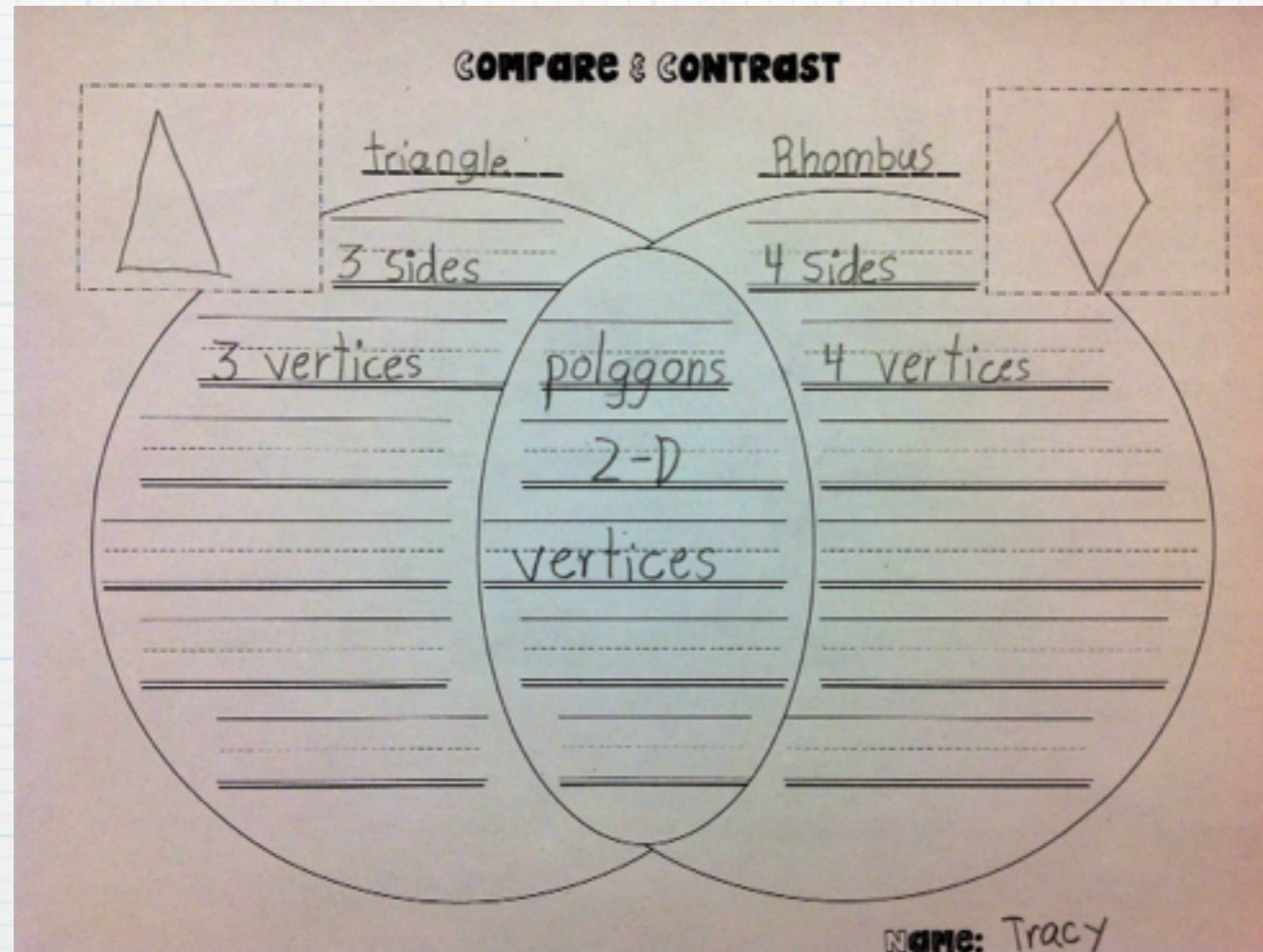
Graphic Organizers

Using graphic organizers help students organize information

Sentence frames help students organize the format of their writing



Writing in Math

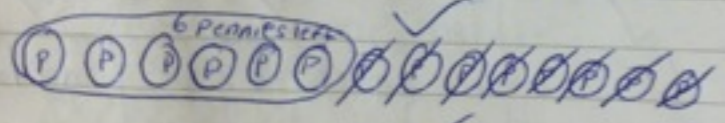
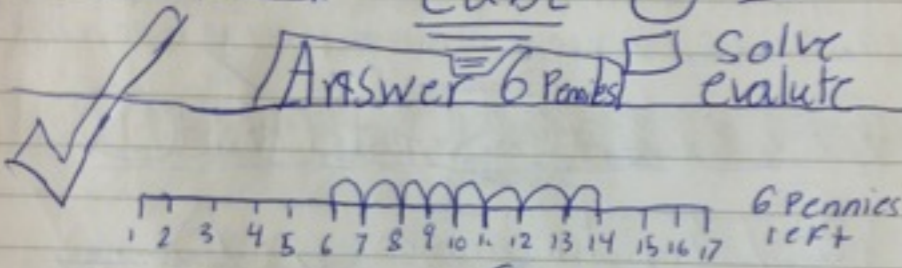


The triangle and Rhombus^r are the same because they are polggons, they both have vertices and are both 2-D. ✓+

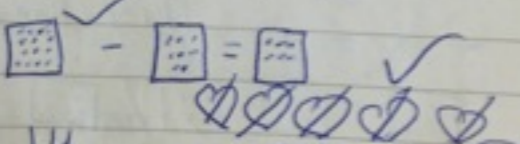
Journals

cube $\square - \square$ 10/17/13
 Solve evaluate
 Mohammed come to school with 14 pennies, 8 pennies fell out of his pocket. How many pennies does he have left? Cube $\square - \square$

Answer 6 Pennies \square Solve evaluate



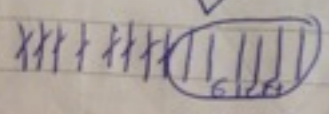
$14 - 8 = 6$ or
 $14 - 6 = 8$



14 pennies
 subtract 8 pennies
 equal 6 pennies. 14

3	6
6 + 6 = 12	
3 + 6 = 9	
6 + 3 = 9	
3 + 3 = 6	

fact family



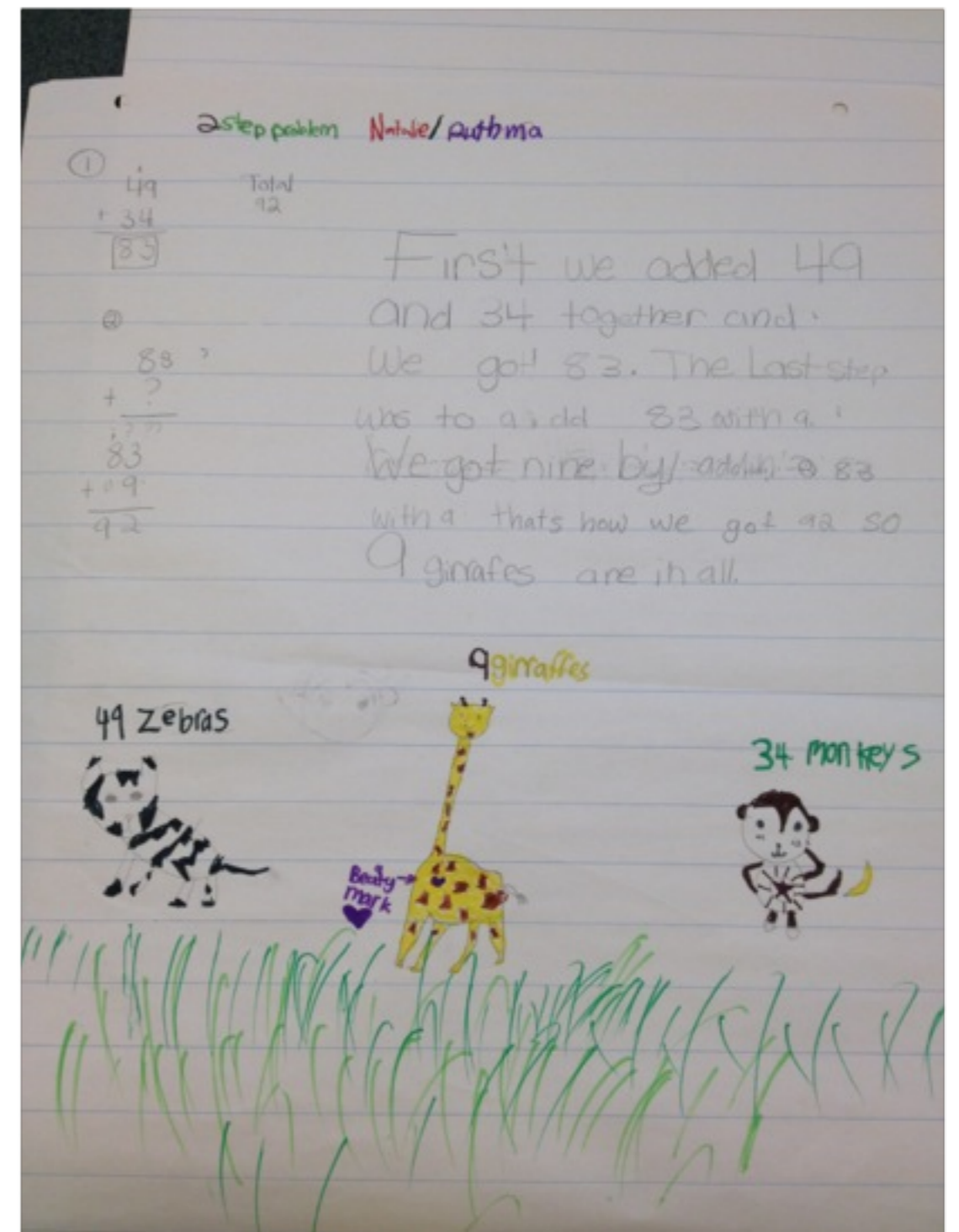
6 Pennies left
 $14 - 8 = 6$

mines - Subtraction mines -
 - 6 Pennies left -

Math journals provide students the opportunity to experiment with, and apply various strategies to show their understanding.

Group/ Partner Work

- * Students practice academic language
- * Heterogeneous grouping
- * Each group member has a job: Reporter, Problem Solver, Recorder, Time Keeper



Musical Math

There are 18 desks in a classroom. If the teacher puts 6 desks in each row, how many rows are there?



Questions?

Resource Page

Links:

<http://teachelemmath.weebly.com/english-language-learners.html>

<http://www.corestandards.org/Math/>

http://www.literacycoachingonline.org/briefs/reading_coach_for_math.pdf

www.malden.wikispaces.com