Hanover School Division

April 18th-20th, 2017

please be sure to complete your name tag

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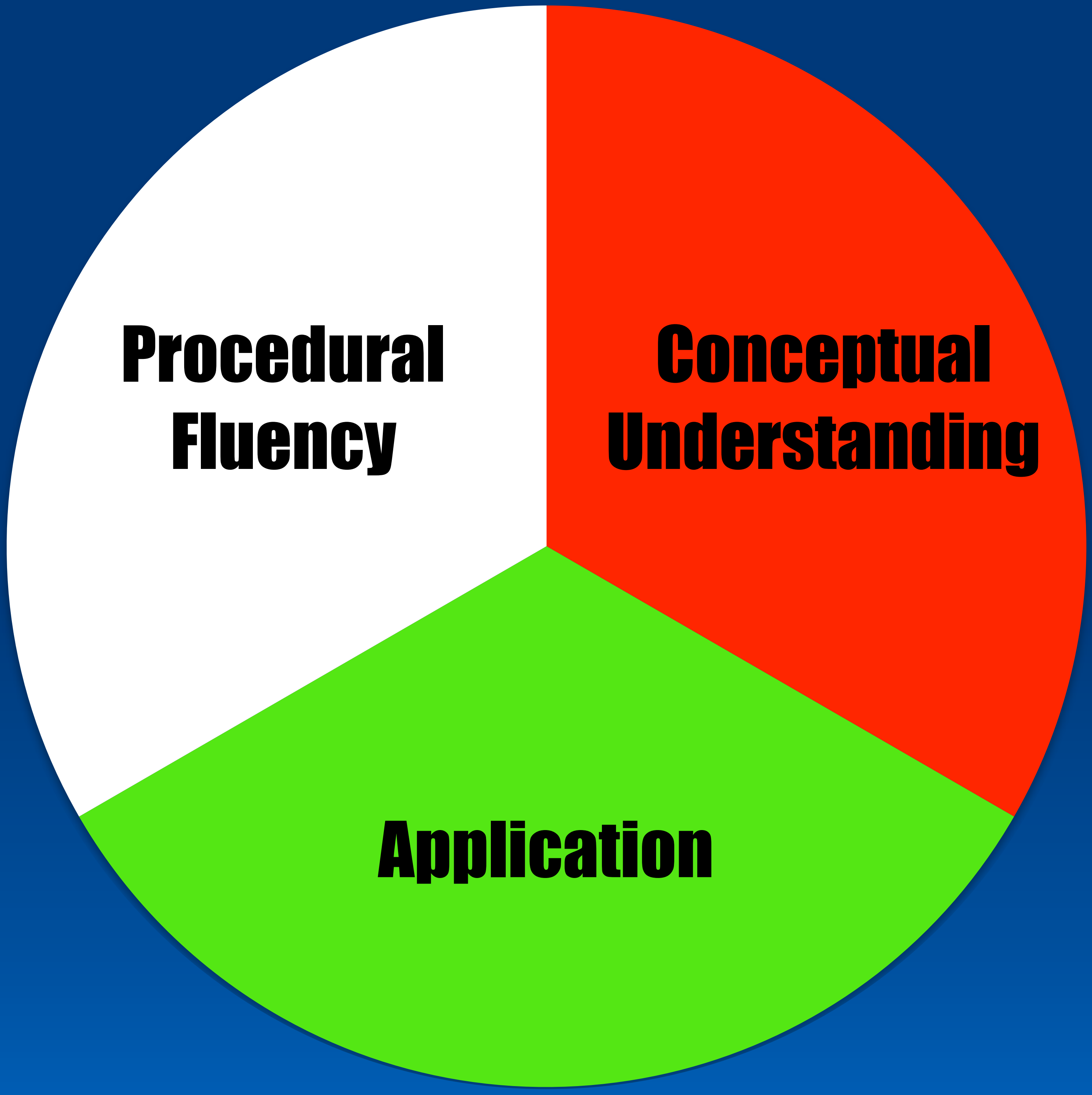
<u>Broken Squares</u>

- Designate shape keeper
- Share the shapes as evenly as possible between the group
- All the shapes will make 6 congruent squares with no shapes leftover
- Everyone is encouraged to **OFFER** a shape. No one may TAKE or SNATCH. You may RECEIVE a shape but only if it's OFFERED
- No "community square"
- NO TALKING

Today’s Goals:

- **Understand the implementation of a 3-act task and how they can be used as a formative assessment.**
- **Explore the vertical progression of key mathematical ideas before, during, and after the grade level we teach.**
- **Value the importance of properly closing a lesson**


Procedural
Fluency
Conceptual
Understanding
Application


NEXT TIME YOU RE AFRAID
TO SHARE IDEAS
REMEMBER SOMEONE
ONCE SAID IN A MEETING
LETS MAKE A FILM WITH A
TORNADO FULL OF SHARKS

Dan Meyer :

“Be Less Helpful”

Demetrius has 17 Skittles which is 12 fewer than Alicia.

How many Skittles does Alicia have?

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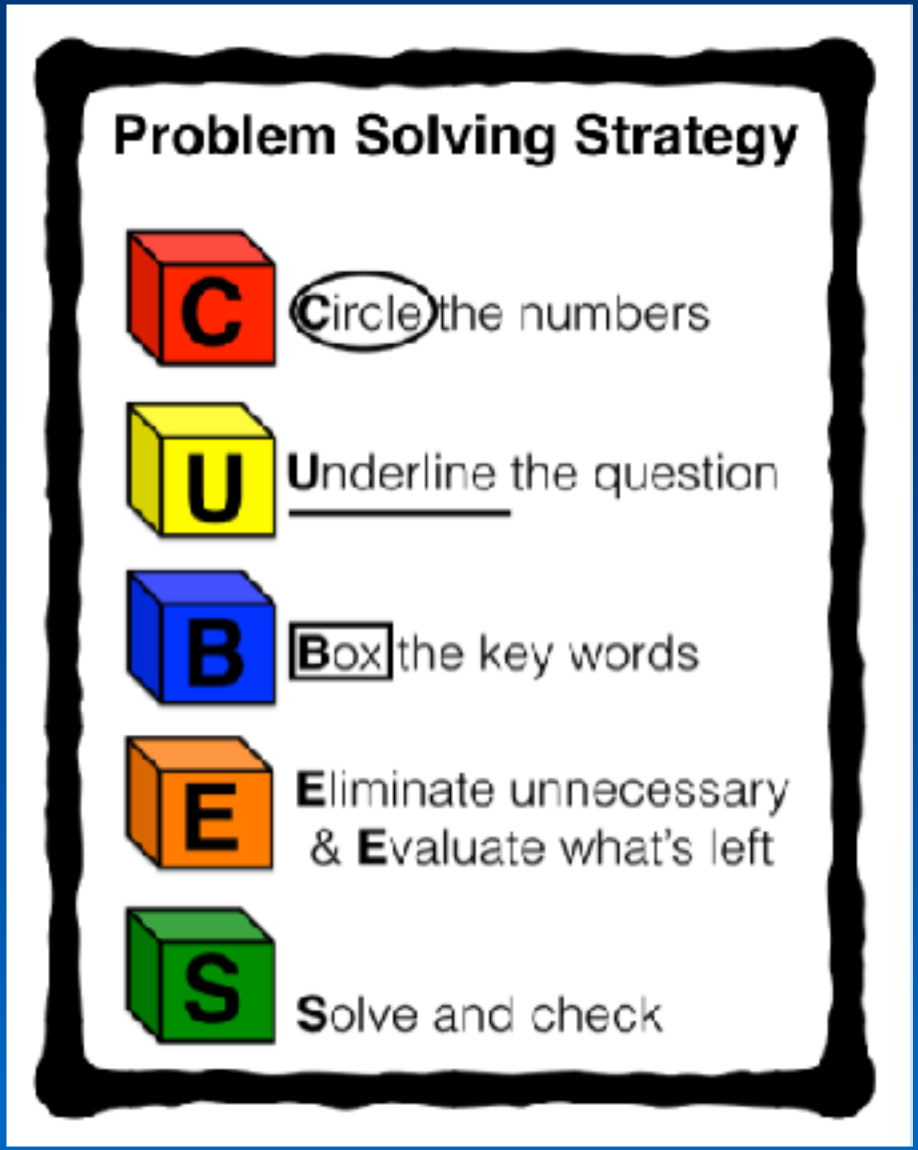
How many Skittles does Alicia have?



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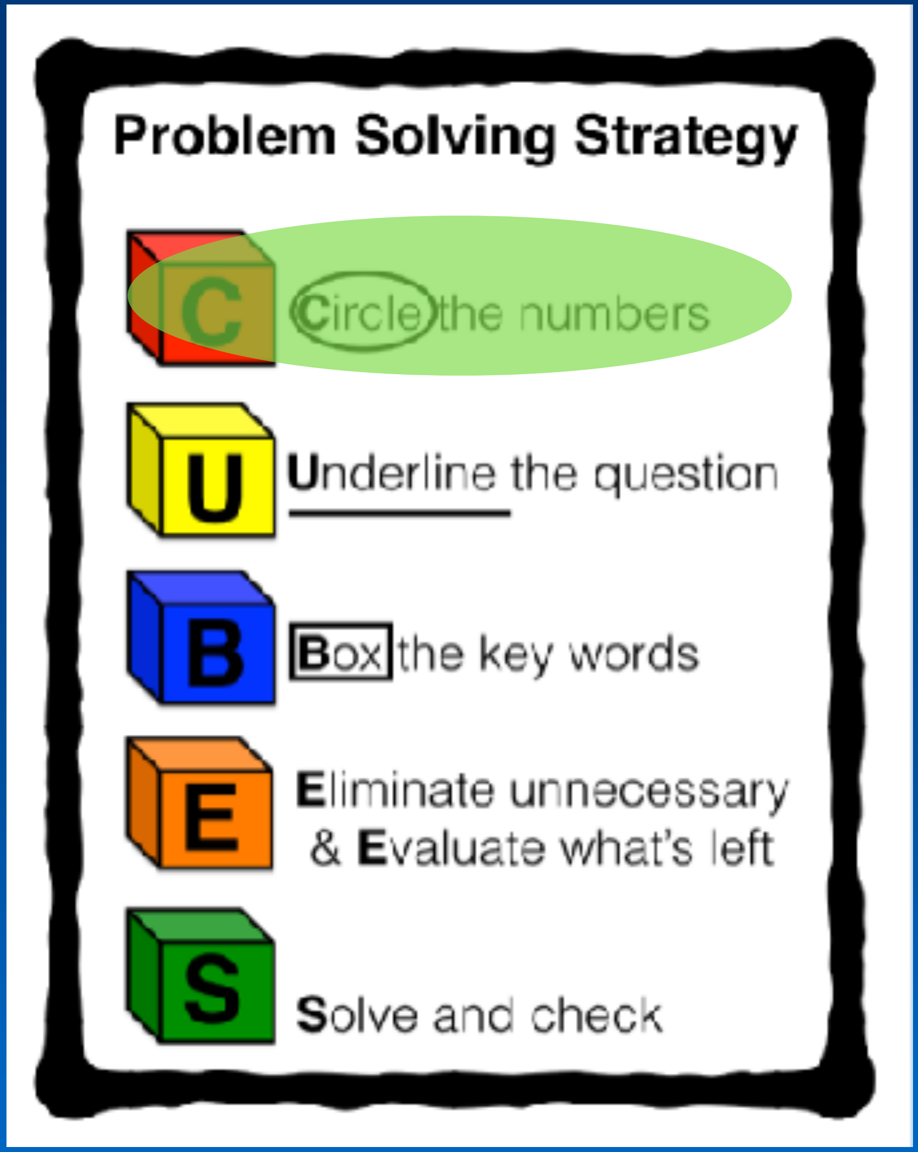

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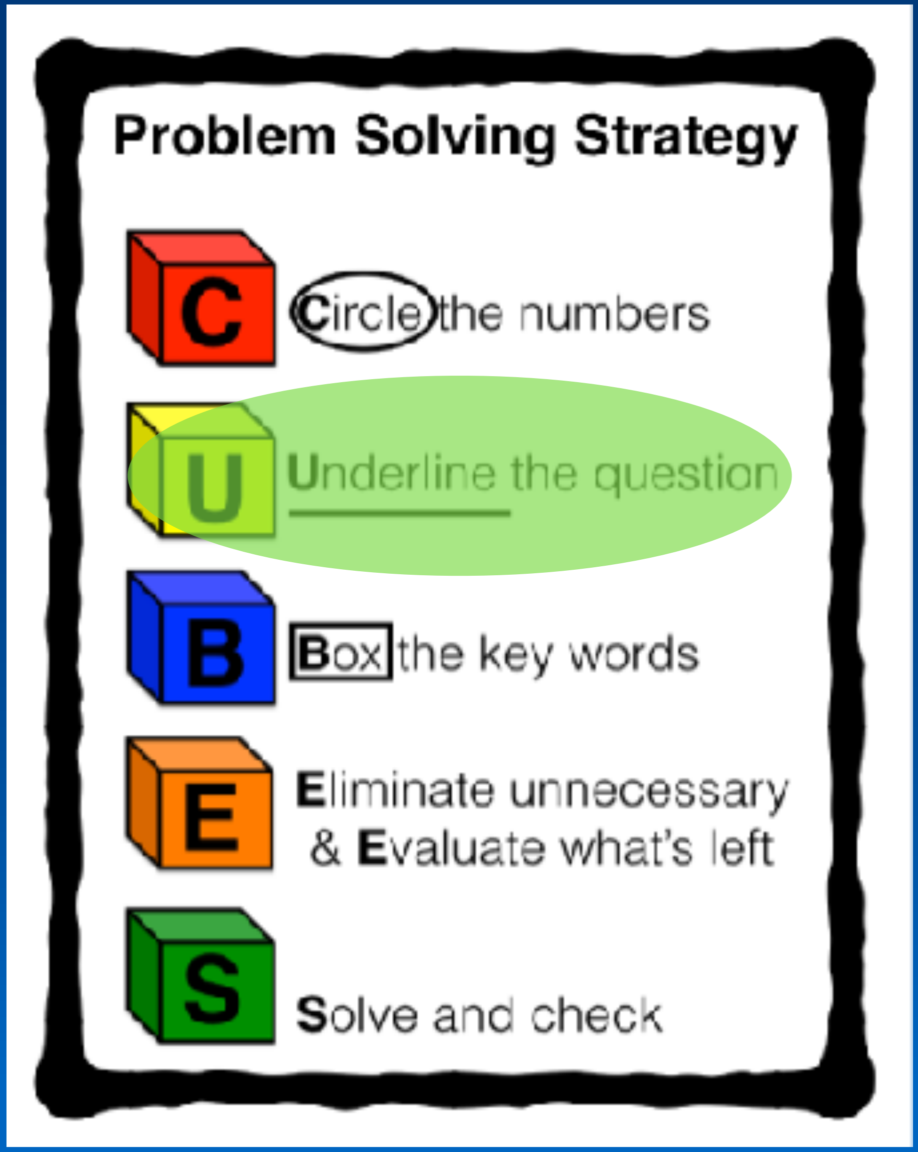

Demetrius has 17 Skittles which is 12 $\boxed{\text{fewer}}$ than Alicia.

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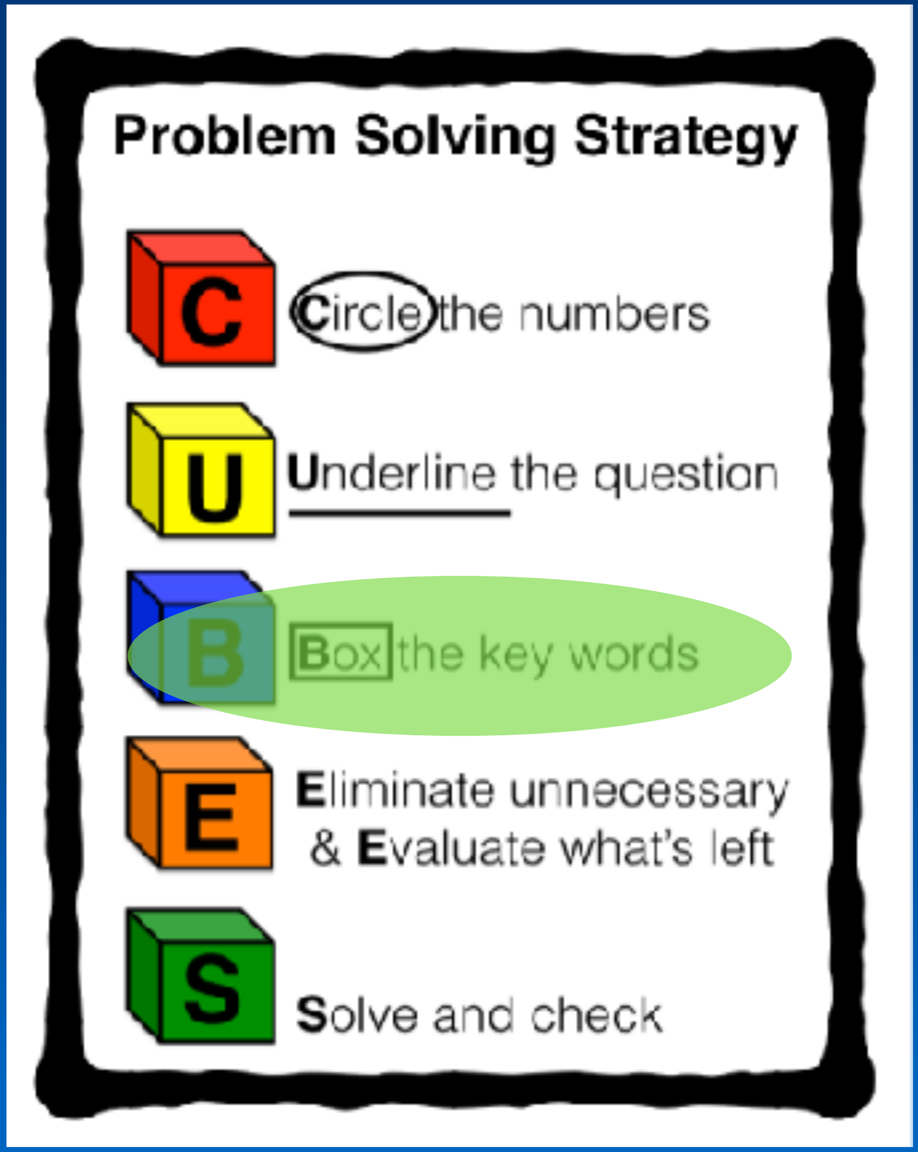
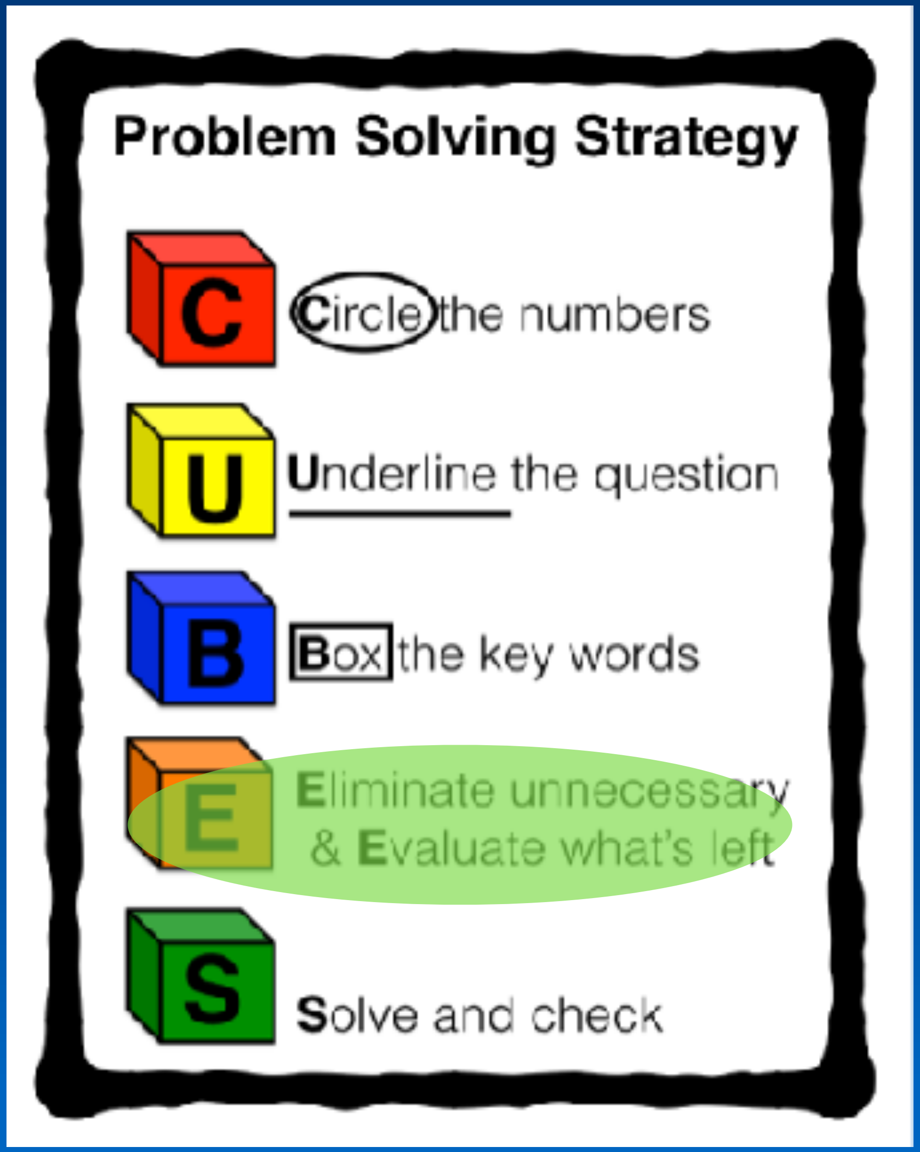


17

12

$\boxed{\text{fewer}}$

<u>How many Skittles does Alicia have?</u>

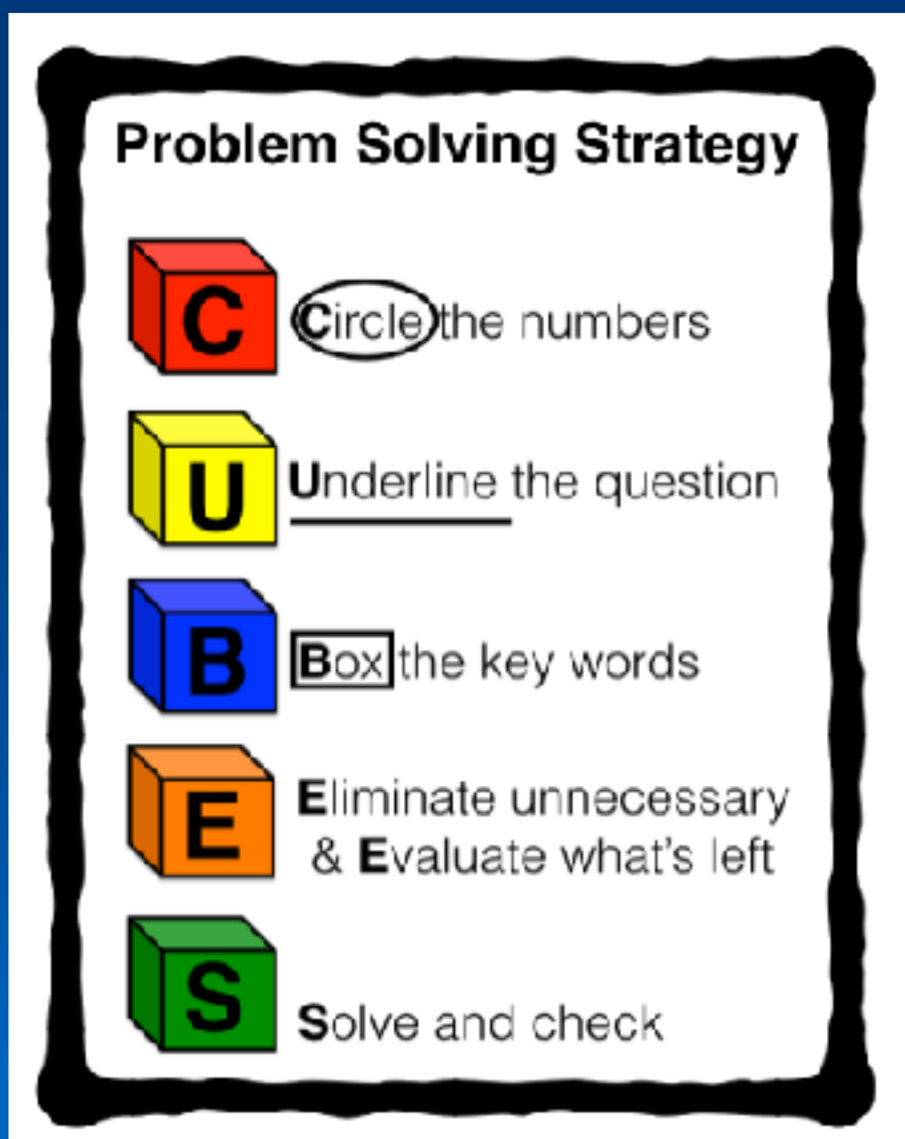


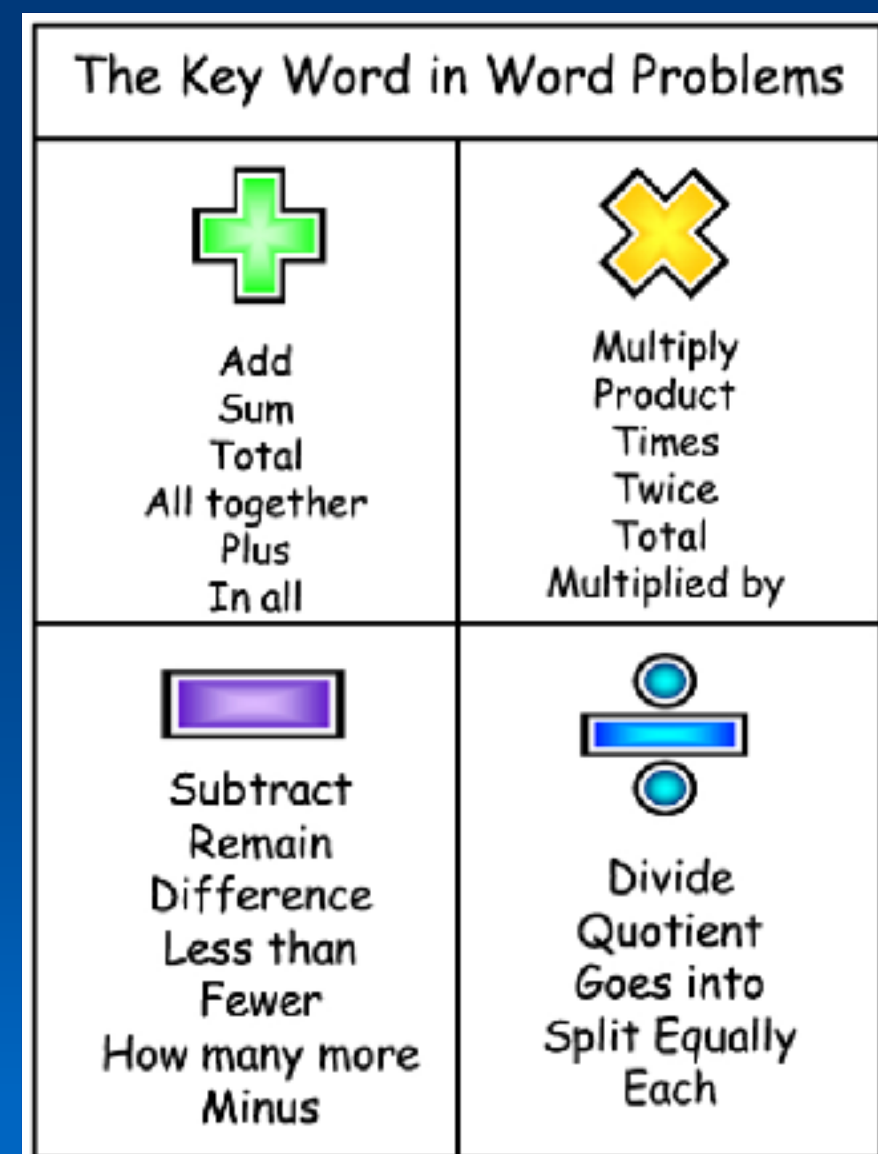
17

12

fewer

How many Skittles does Alicia have?

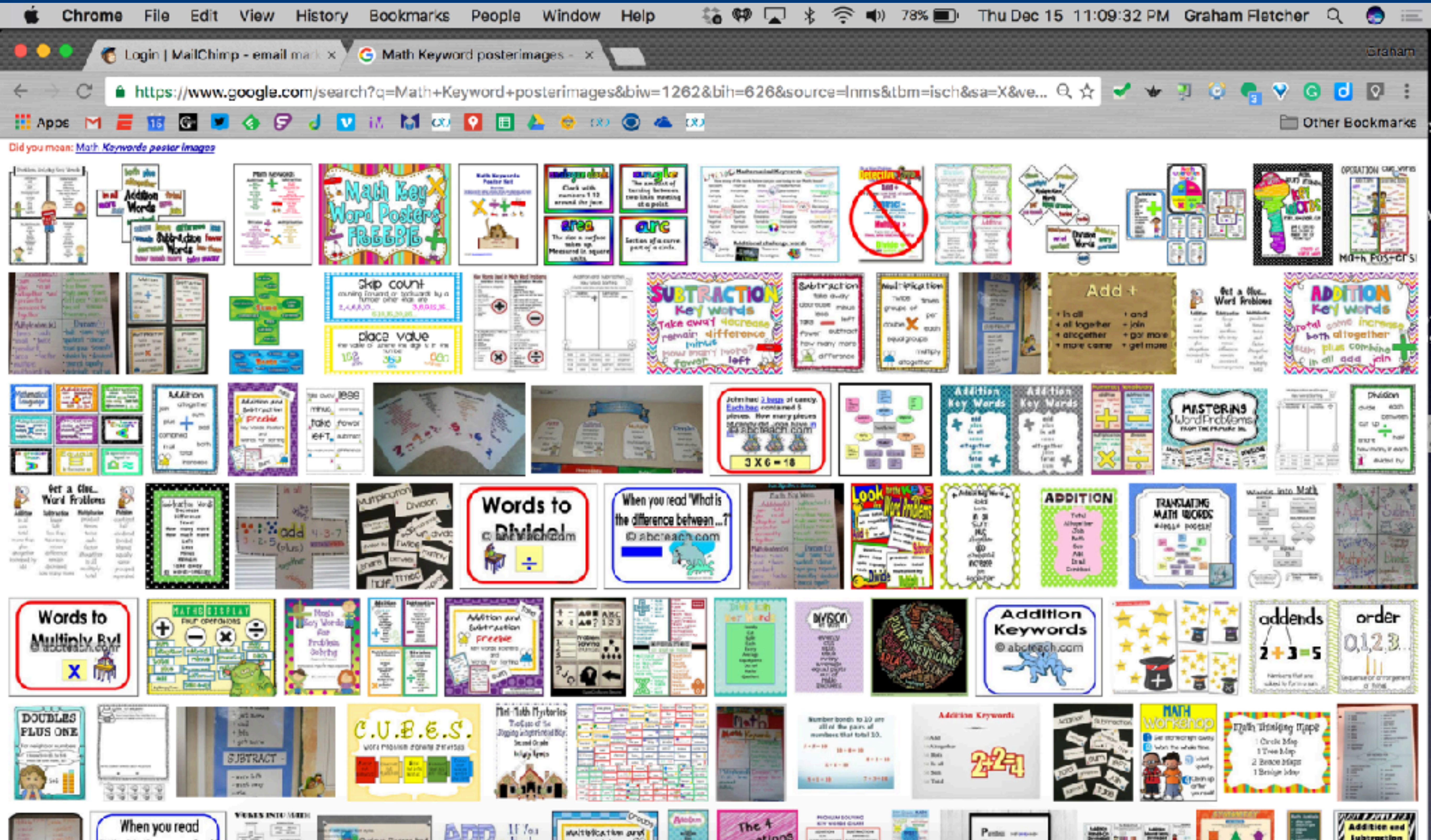




How many Skittles does Alicia have?

17 – 12

Current Research



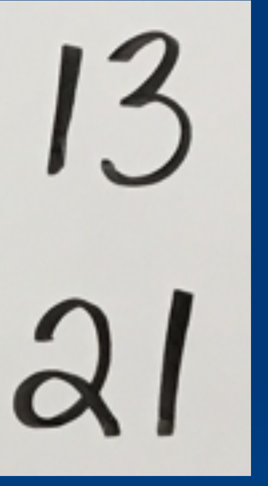
Tracy Zager:

“How can we break the cycle?”

Joe had some playing cards in his bag. Ashley gave him 13 more cards. Joe now has 21 cards. How many cards did Joe have in his bag?

13
21

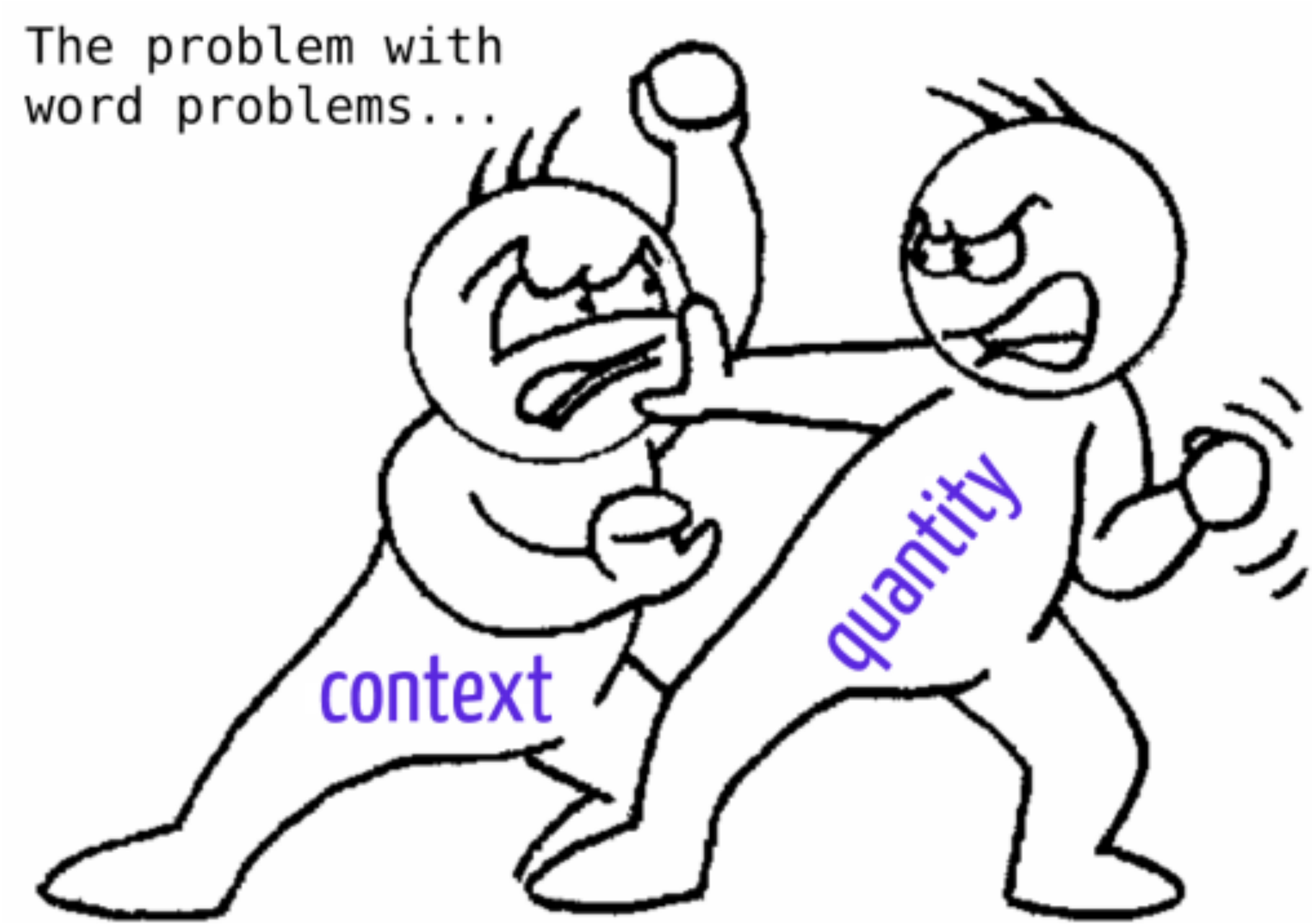
You little plucker!



number

You little plucker!

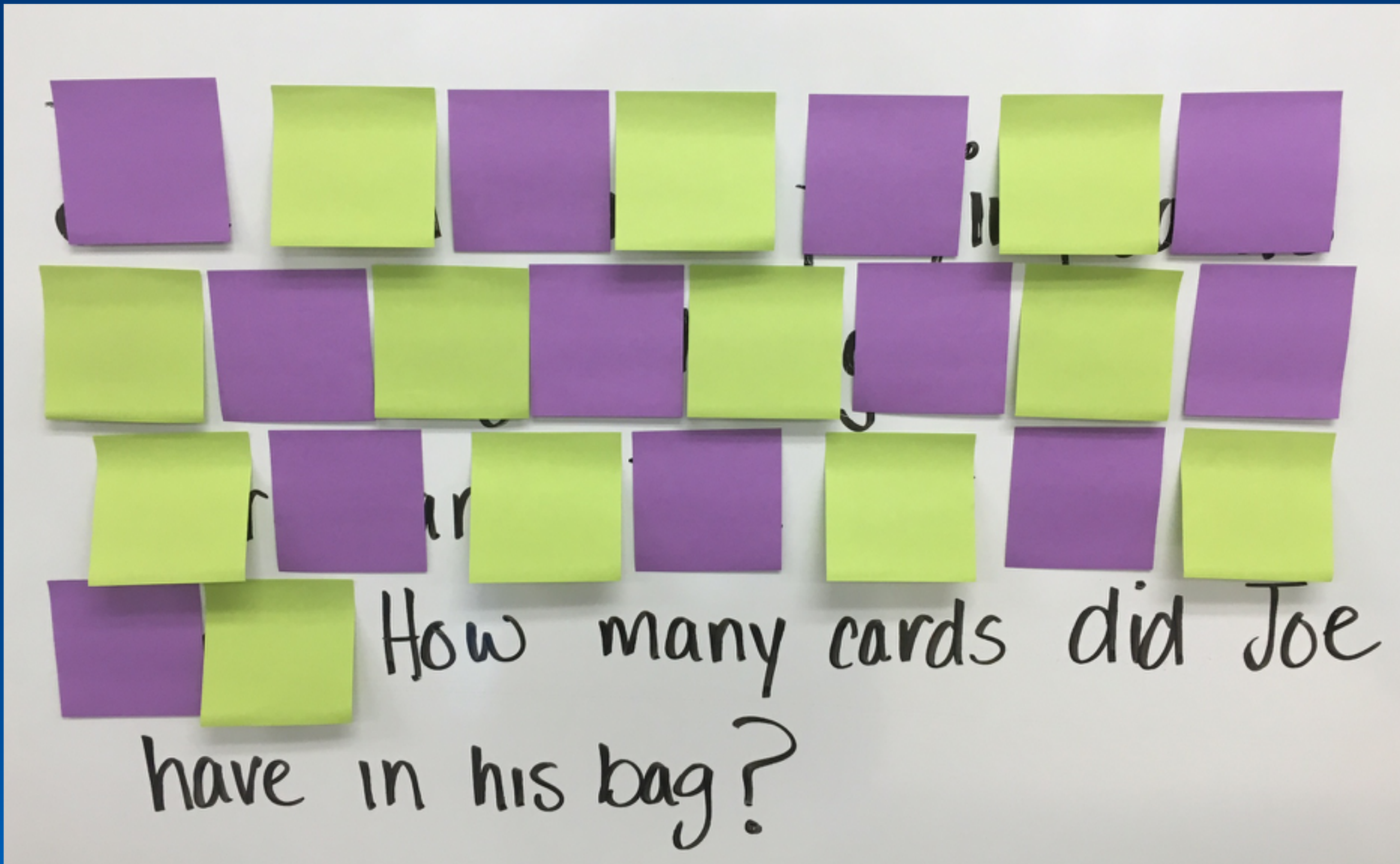
13
21



@gfletchy

Joe had some playing cards in his bag. Ashley gave him 13 more cards. Joe now has 21 cards. How many cards did Joe have in his bag?

Joe had some playing cards in his bag. Ashley gave him ___ more cards. Joe now has ___ cards. How many cards did Joe have in his bag?


How many cards did Joe have in his bag?

Name: ______________________________ Date: ______________

1. What did you notice?

2. What do you wonder?

3. Main Question:

4. Estimate

Low Estimate

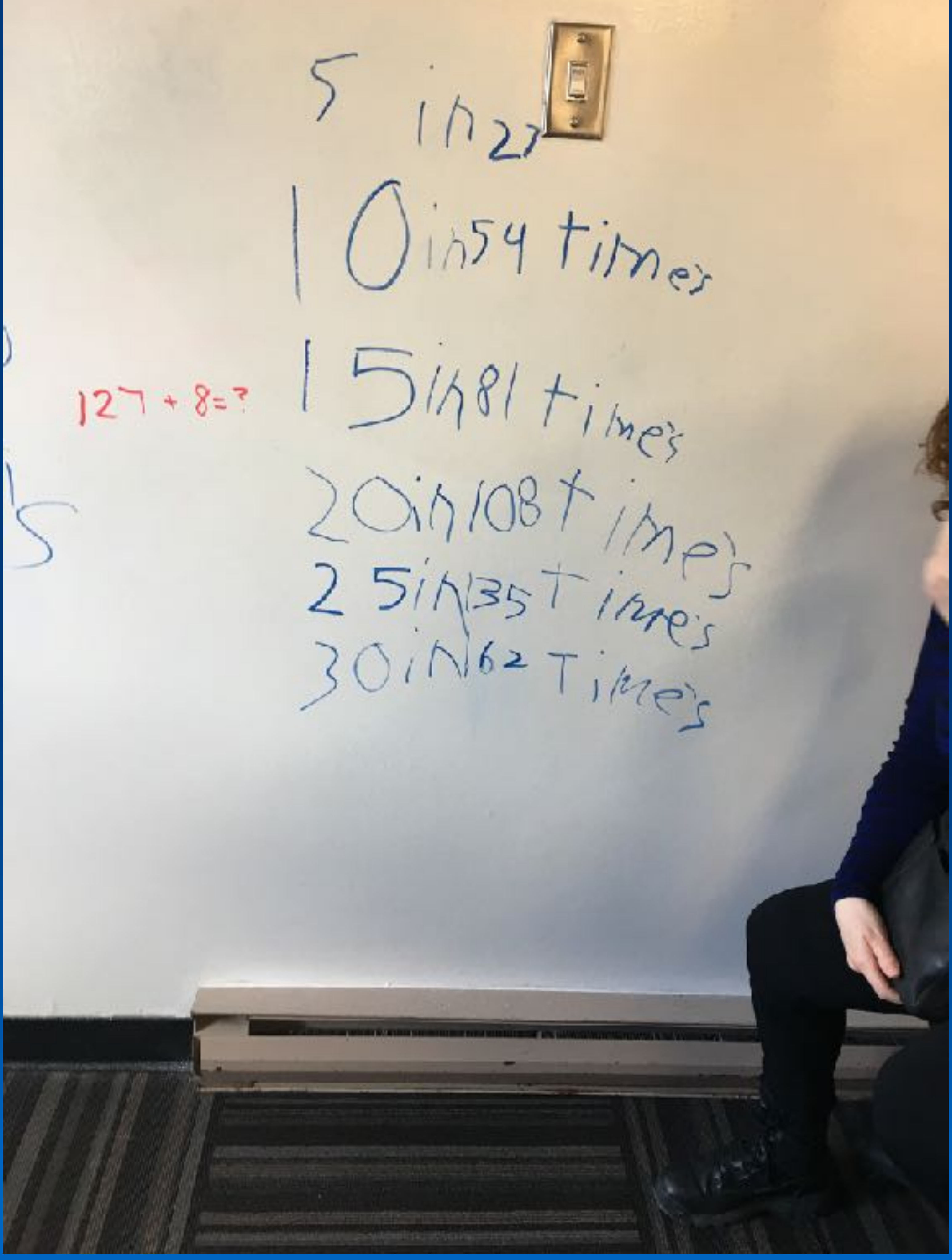
High Estimate

place your best estimate on the number line and label

5. What information would you like to know?

6. Answer

Rope Jumper


5 in 27
10 in 54 times
127 + 8 = ?
15 in 81 times
20 in 108 times
25 in 135 times
30 in 162 Times

Jumps

umps

mps

Nelsey + Erica

27+27+27+27+27+27=162

14

14

14

12

120

30

162

27+27

40 14

54 = 10 sec

54+27

70 11

81

27 54 81 108 135 162

5 10 15 20 25 30

Modification
&
Accessibilty

Mathematical Modeling

?

Modeling with Mathematics

What ISN"T mathematical modeling

- The use of manipulatives does not ensure that modeling with mathematics is taking place.
- If the mathematics is not contextualized, modeling with mathematics cannot exist.
- Modeling with mathematics does not mean, "I do, we do, you do."

Model with Mathematics

Mathematically proficient students can apply the mathematics they know to **solve problems arising in everyday life**, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. Mathematically proficient students who can apply what they know are comfortable **making assumptions and approximations** to simplify a complicated situation, realizing that these may need revision later. They are able to **identify important quantities** in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can **analyze those relationships** mathematically to draw conclusions. They routinely **interpret their mathematical results** in the context of the situation and **reflect on whether the results make sense**, possibly improving the model if it has not served its purpose.

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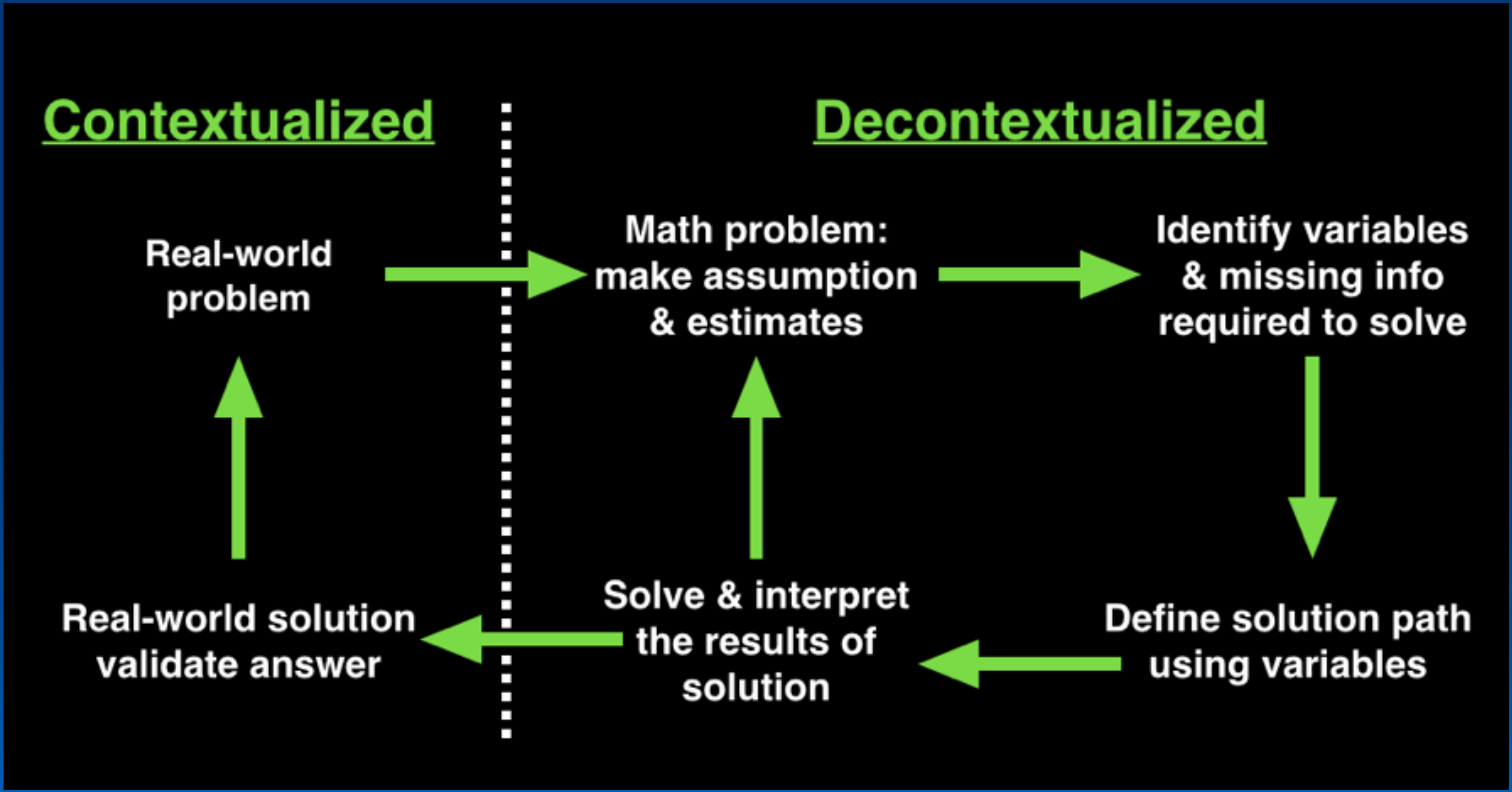
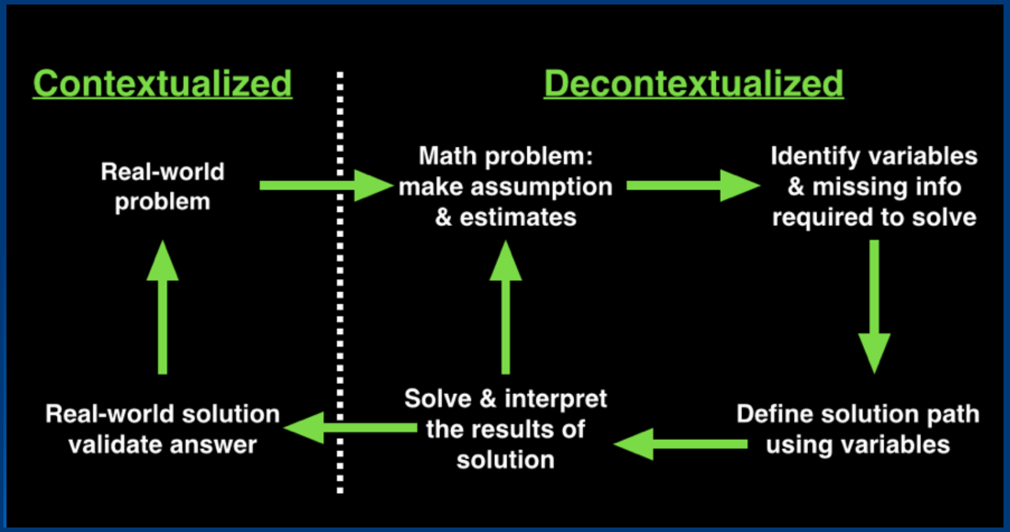
Mathematical Modeling



3-Act Tasks



Act 1:

- Real world problem or scenario presented
- What do you notice? What do you wonder?
- Make estimates

Act 2:

- Identify missing variables and missing variables to solve
- Define solution path using variables

Act 3:

- Solve and interpret results of the solution
- Validate answer

3 Things on the road to modeling…

- Identify the problem, or pose a question.
- Make an estimate.
- Identify the variables needed to solve, and answer the problem or question posed.

Most asked questions:

- How often should we use 3-Act Tasks?
- When should we use 3-Act tasks? How do they fit into the scope of a unit?
- How long does one task usually take?
- What if we don't have the time?
- Any others?

Orchestrating Discussions

Five practices constitute a model for effectively using student responses in whole-class discussions that can potentially make teaching with high-level tasks more manageable for teachers.

Margaret S. Smith, Elizabeth K. Hughes, Randi A. Engle, and Mary Kay Stein

The 5 practices are:

1. **Anticipating** student responses to challenging mathematical tasks;
2. **Monitoring** students' work on and engagement with the tasks;
3. **Selecting** particular students to present their mathematical work;
4. **Sequencing** the student responses that will be displayed in a specific order and;
5. C**onnecting** different students' responses and connecting the responses to key mathematical ideas.

MTMS: Vol. 14, No. 9, May 2009-5 Practices for Orchestrating Productive Mathematics Discussions

Task Planning Document

Task:		
Misconceptions:		
Strategy	**Who and What (highlight)**	**Order**

Anticipating → Monitoring → Selecting → Sequencing → Connecting

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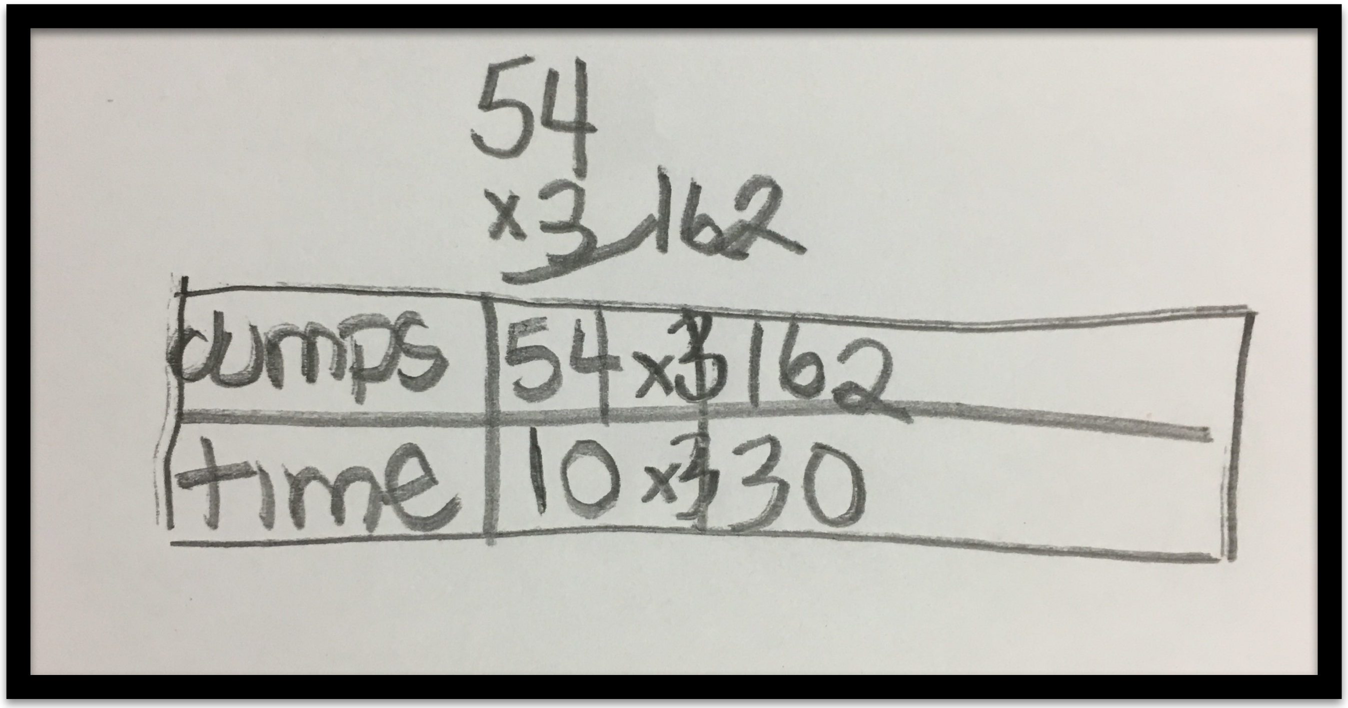
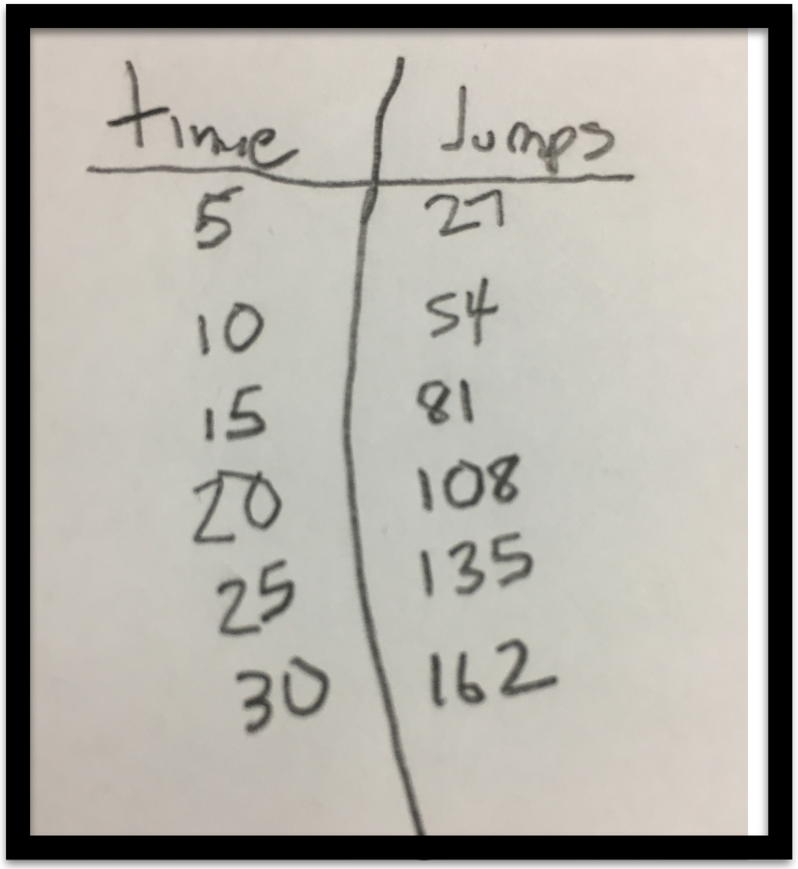
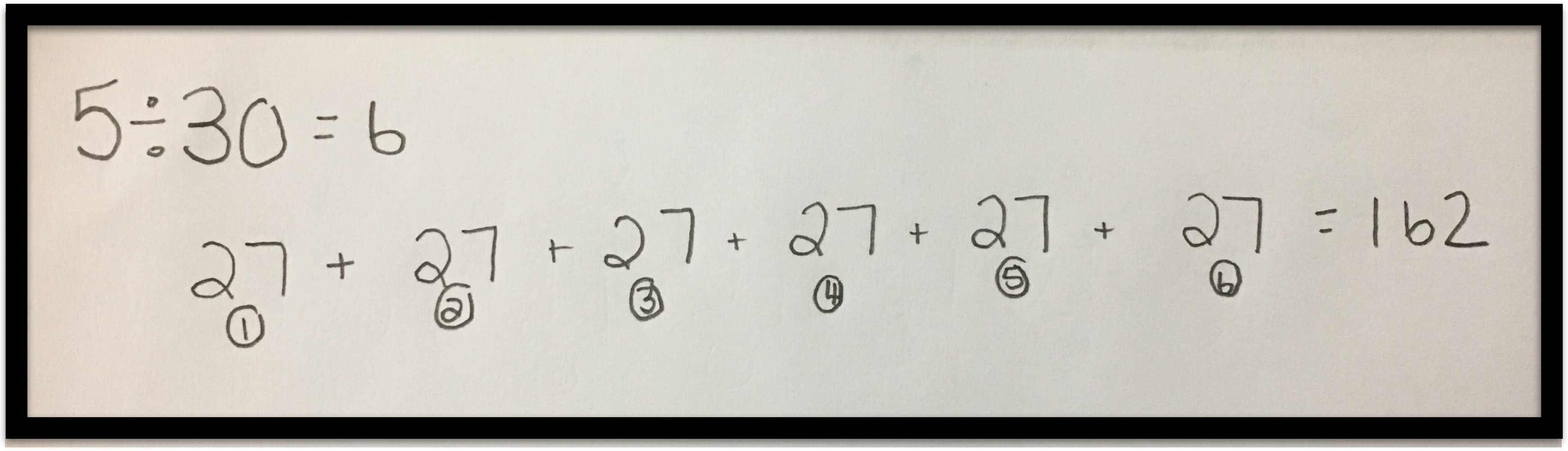
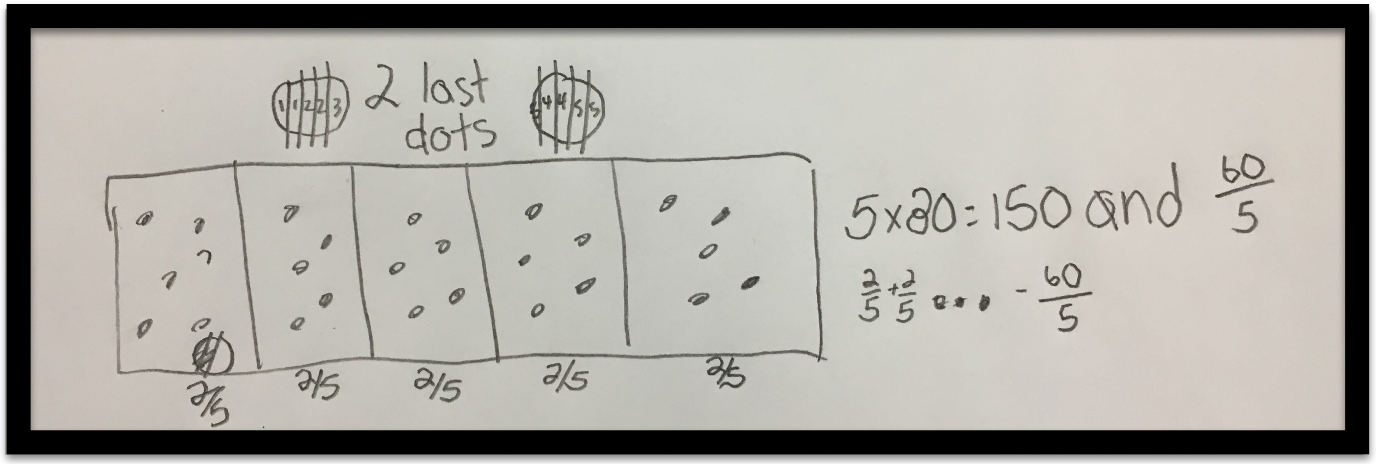
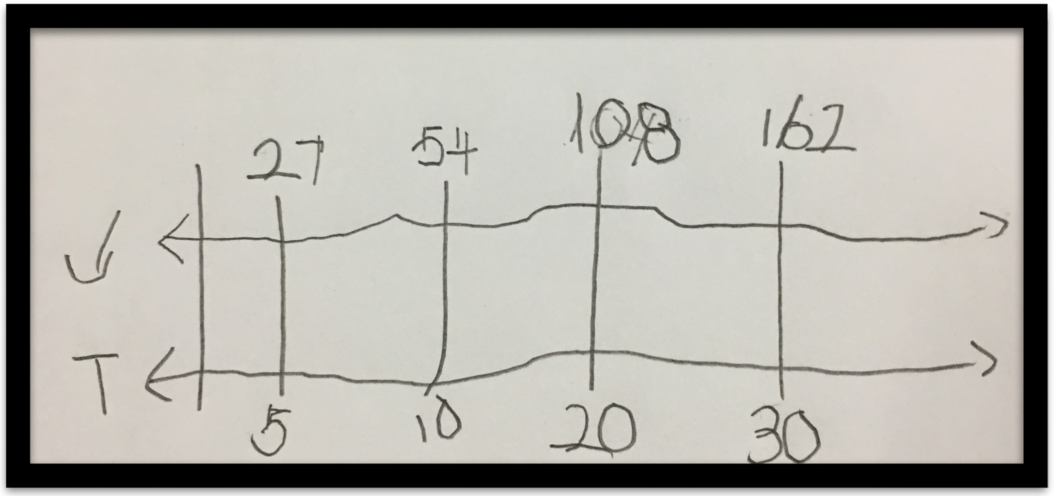
Rope Jumper


54
x3 162
jumps
54 x3 162
time
10 x3 30

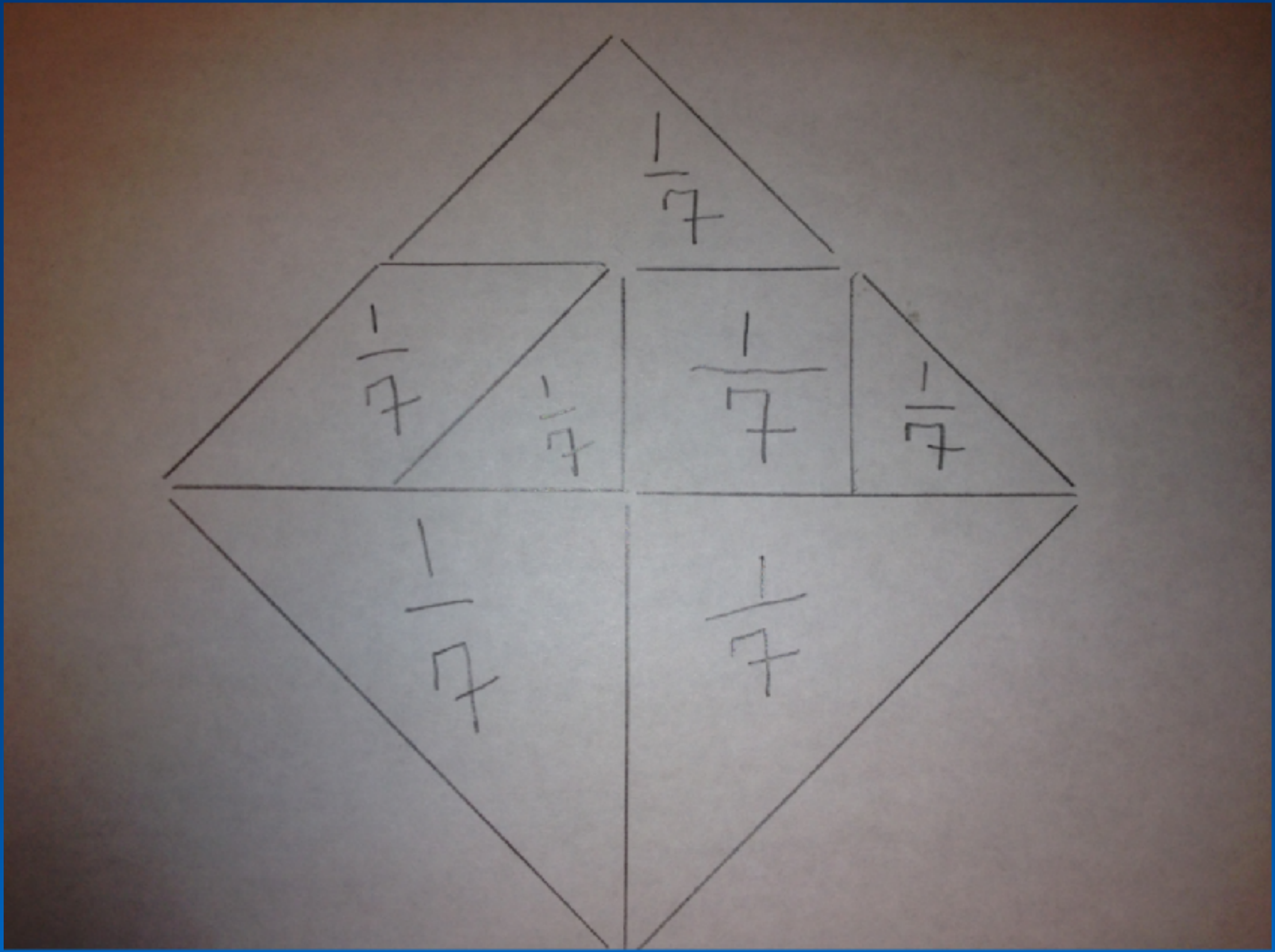

time
Jumps
5
27
10
54
15
81
20
108
25
135
30
162


5÷30=6
27 + 27 + 27 + 27 + 27 + 27 =162
1
2
3
4
5
6


2 last dots
5x30=150 and 60/5
2/5+2/5 ... 60/5
2/5
2/5
2/5
2/5
2/5


27
54
108
162
J
T
5
10
20
30

Unit Fractions

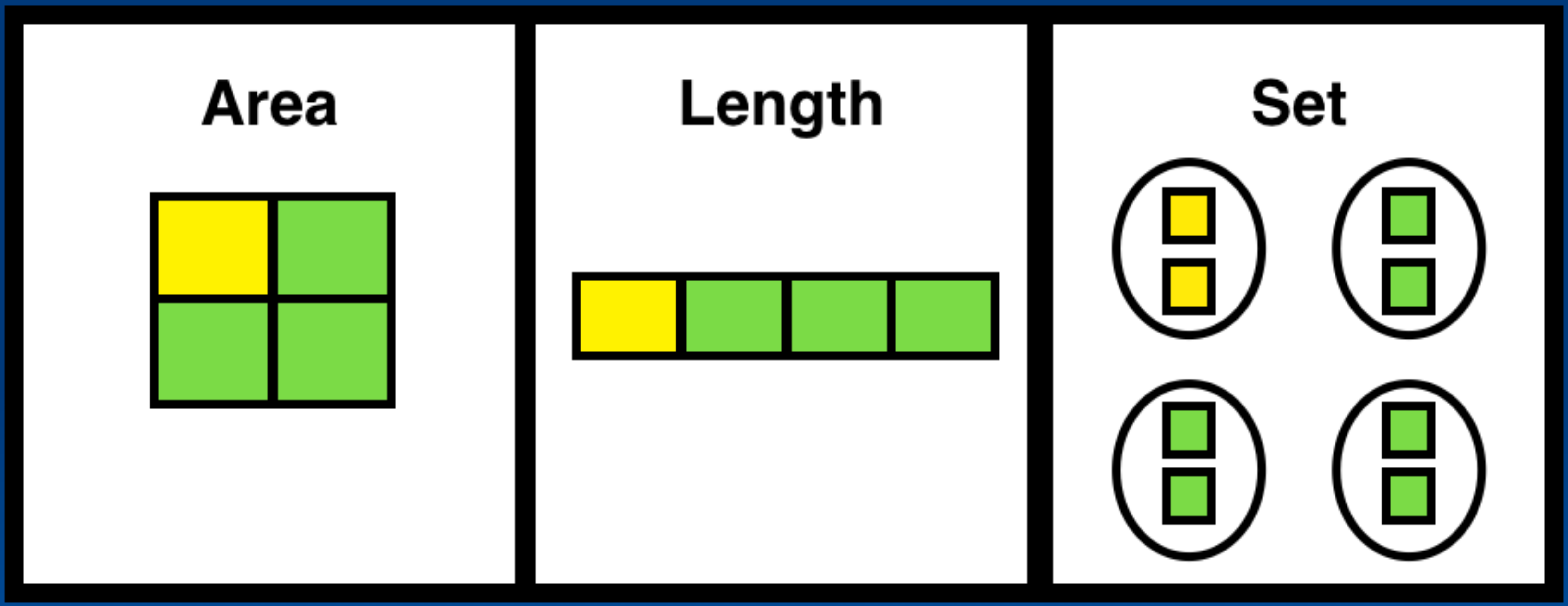

1/7
1/7
1/7
1/7
1/7
1/7
1/7

Task Instruction

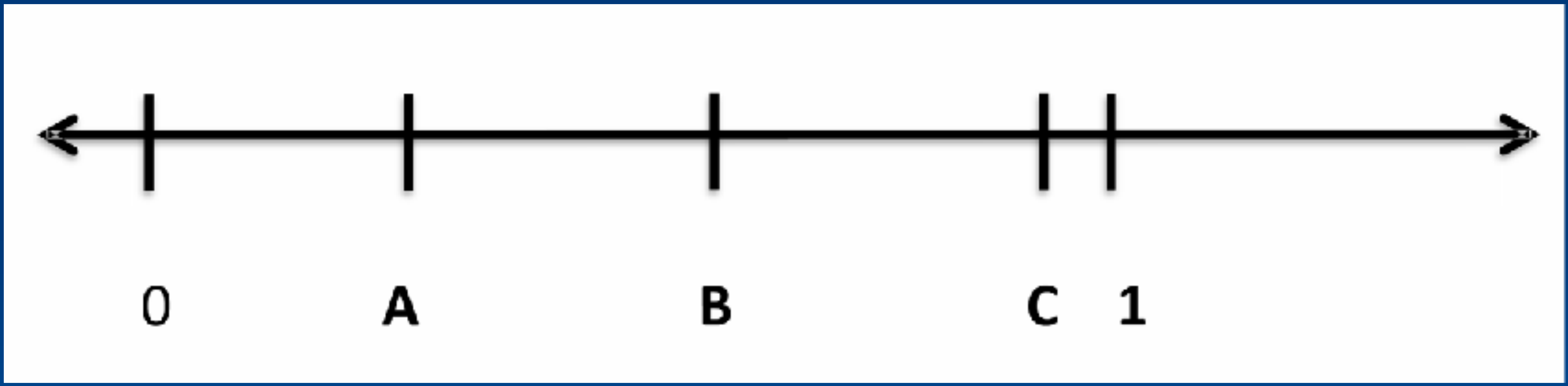
For each part of the problem, start with a square sheet of paper and make folds to construct a new shape. Then, explain how you know the shape you constructed has the specified area.

1. Construct a square with exactly ¼ the area of the original square.
2. Construct a triangle with exactly ¼ the area of the original square.
3. Construct another triangle, also with ¼ the area, that is not congruent to the first one you constructed.
4. Construct a square with exactly ½ the area of the original square.

Representation of a Fraction



unit fraction $\frac{1}{a}$


0
A
B
C
1

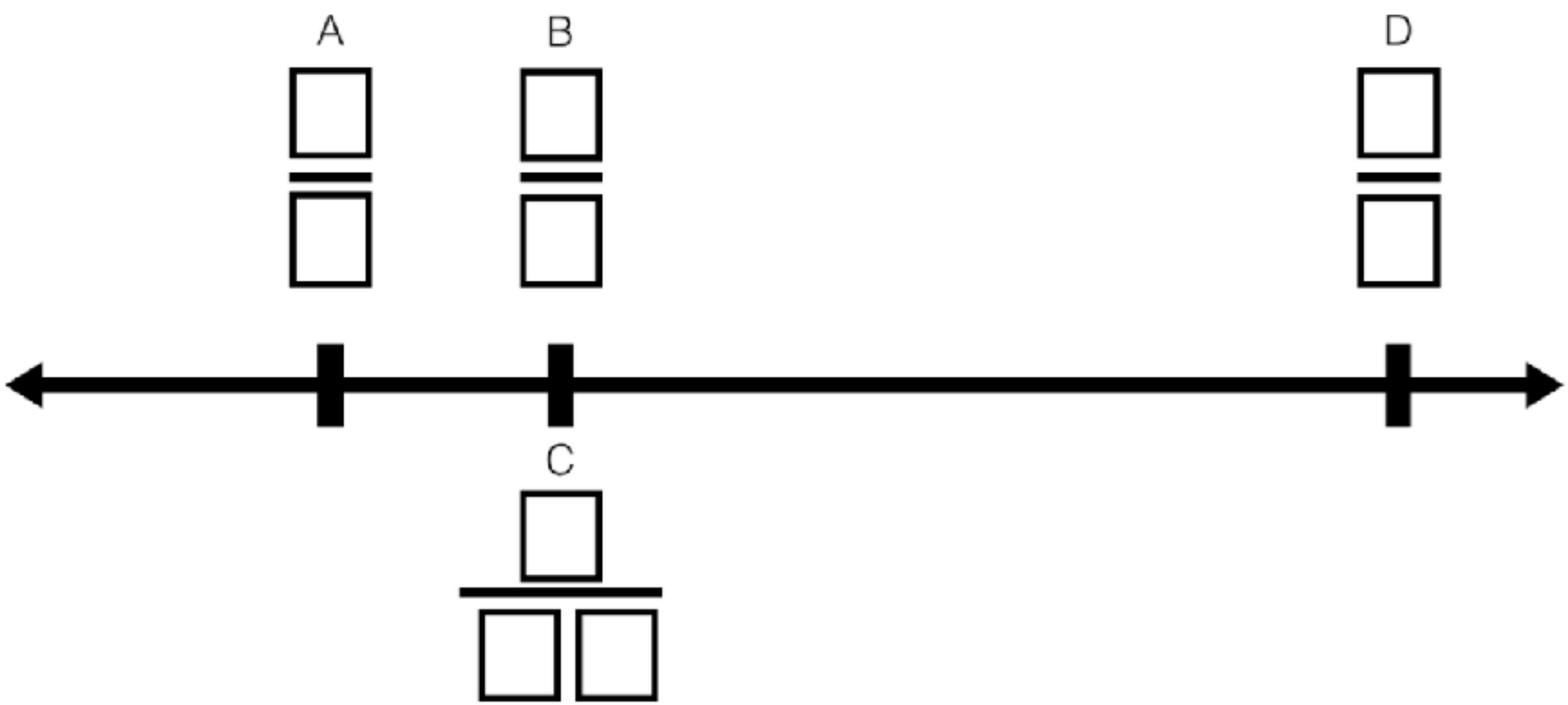

½
A
2
B

ESTIMATION 180


We Will Rock You
Queen — Greatest Hits I
0:00
QUEEN
GREATEST HITS
ESTIMATION180.COM

COMPARING AND IDENTIFYING FRACTIONS ON A NUMBER LINE

Directions: Using the whole numbers 1-9 once each, create and place 4 fractions on the number line in the correct order. (fractions B & C are equal)

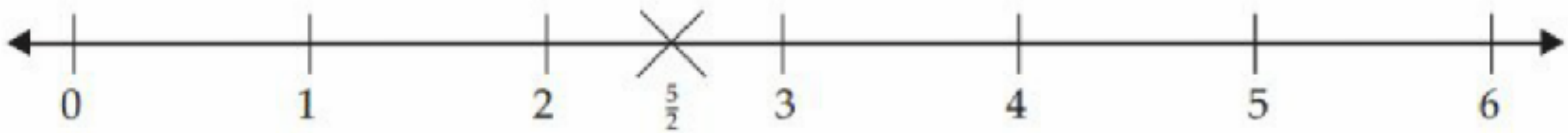


Open Middle

Challenging math problems worth solving

Dotty Pairs Game

The students play in pairs. One student takes dots, the other takes crosses. Place the cards (cards 1–6, two lots, see Material Master 4-1) face down in a pile. The players take turns turning over two cards. The numbers are used to form a fraction, e.g., 2 and 5 are turned over, so $\frac{5}{2}$ or $\frac{2}{5}$ can be made. One fraction is chosen, made with the fraction pieces, if necessary, and marked on a 0–6 number line with the player's identifying mark (dot or cross).



Players take turns. The aim of the game is to get three of their marks uninterrupted by their opponent's marks on the number line. If a player chooses a fraction that is equivalent to a mark that is already there, they miss that turn.

NB: A fraction such as $\frac{4}{1}$ can be made using the cards. Students may not be familiar with fractions in this form and the meaning of the numerator and denominator will need to be explored with the fraction circles.

https://www.random.org/integers/

4-in-a-Row Equivalence

Dice 1

Dice 2

Materials:

- A game board, three 6-sided dice, two color counters

Directions:

- Roll three dice at the same time and select two dice to create an equivalent fraction to a fraction on the game board.
- Represent the 2 selected dice as a fraction. (Discard #3 die)
- Use a color marker to cover an equivalent fraction on the game board.
- The winner is the first player to cover 4 squares in a row.

$\frac{2}{12}$	$\frac{8}{10}$	$\frac{2}{4}$	$\frac{1}{1}$	$\frac{2}{3}$	$\frac{2}{8}$
$\frac{4}{2}$	$\frac{1}{2}$	$\frac{8}{12}$	$\frac{12}{4}$	$\frac{2}{10}$	$\frac{10}{5}$
$\frac{4}{8}$	$\frac{10}{12}$	$\frac{4}{6}$	$\frac{2}{1}$	$\frac{6}{12}$	$\frac{5}{10}$
$\frac{6}{10}$	$\frac{6}{3}$	$\frac{3}{12}$	$\frac{1}{3}$	$\frac{8}{4}$	$\frac{4}{8}$
$\frac{3}{9}$	$\frac{3}{1}$	$\frac{4}{10}$	$\frac{3}{6}$	$\frac{8}{2}$	$\frac{3}{12}$
$\frac{9}{12}$	$\frac{4}{12}$	$\frac{1}{4}$	$\frac{6}{8}$	$\frac{6}{9}$	$\frac{2}{2}$

Making Sense Series

The Progression of Fractions
Meaning, Equivalence, & Comparison

created by Graham Fletcher
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