Breaking the Status Quo:

Taking a fresh look at the choices we make

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Athletics DIRECT
Athletics DIRECT

Three Comparisons

- Change vs. Transition
- Complex vs. Complicated
- Power vs. Influence

Status Quo

- Change is transition

New Reality

- Change then transition

- Change
- Transition
- Ending
- Neutral Zone
- New Beginning

What does this mean for math education?

- Change
- Transition
- Ending

- People may not stop doing anything. They may try to do all the old things **and** the new things. Soon they burn out with the overload.
- People make their own decisions about what to discard and what to keep, and the result is inconsistency and chaos.
- People toss out everything that was done in the past.

- Change
- Transition
- Ending
- Neutral Zone
- New Beginning

Status Quo

- Change is transition

New Reality

- Change then transition

Status Quo

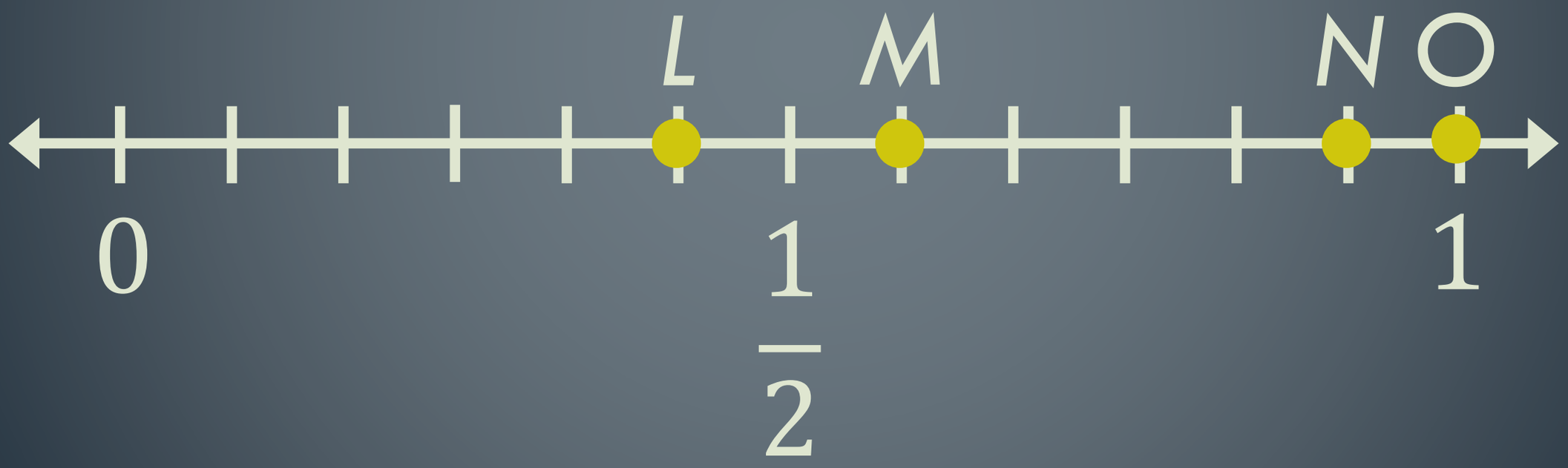
- Math education is complicated

New Reality

- Math education is complex

Fractions on a Number Line

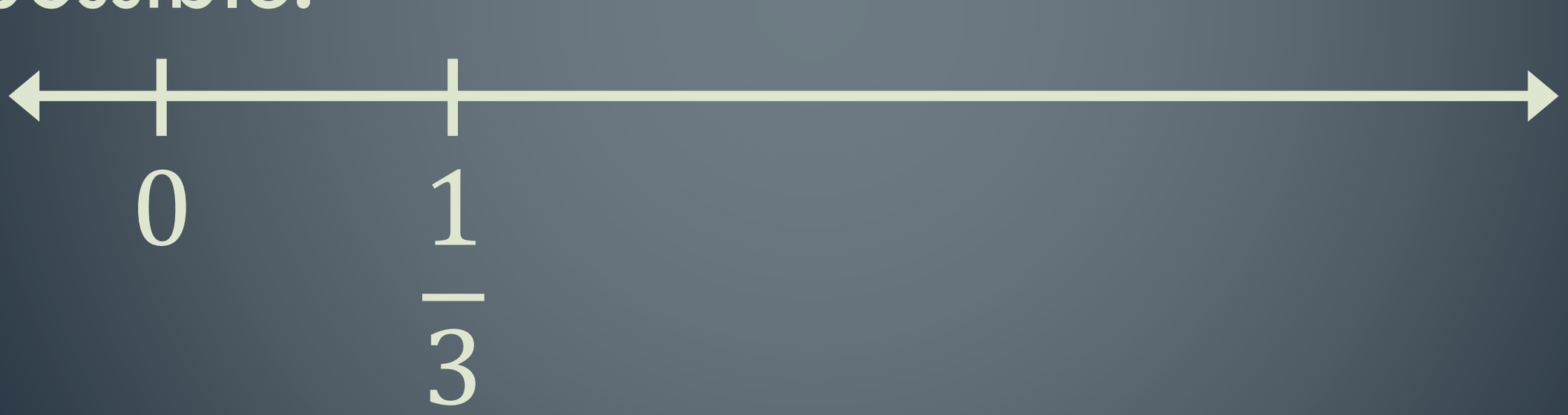
Which point is located at $\frac{7}{12}$ below?



Source: CA Released Test Questions – Grade 4 Math

Fractions on a Number Line

Label the point where $\frac{3}{4}$ belongs on the number line below. Be as precise as possible.



Source: Open Middle - openmiddle.com

Fractions on a Number Line

Create 5 fractions using the whole numbers 0 through 9, exactly than one time each, as numerators and denominators and correctly place them all on a number line.

Source: Open Middle - openmiddle.com

THIS UNIT NOT LABELED FOR INDIVIDUAL RETAIL SALE

grade AA

Ralphs

butter

NET WT. 4 OZ. (113g)

- 1/3 cup butter
- 1/3 cup white sugar
- 3 tablespoons and 1-3/4 teaspoons packed brown sugar
- 1/3 cup peanut butter
- 1/4 teaspoon vanilla extract

How can we tell where to cut the butter so you have 1/3 of a cup?

THIS UNIT NOT LABELED FOR INDIVIDUAL RETAIL SALE.

Ingredients: Pasteurized Cream, Salt.

DISTRIBUTED BY: RALPHS GROCERY CO. LOS ANGELES, CALIF. 90054

1 Tbsp.	2 Tbsp.	3 Tbsp.	4 Tbsp.	5 Tbsp.	6 Tbsp.	7 Tbsp.	8 Tbsp.

1/4 cup

1 FIRST QUALITY 1

Ralphs

grade AA

butter

NET WT. 4 OZ. (113g)

How can we tell where to cut the butter so you have 1/2 of a cup?

THIS UNIT NOT LABELED FOR INDIVIDUAL RETAIL SALE.

Ingredients: Pasteurized Cream, Salt.

DISTRIBUTED BY: RALPHS GROCERY CO. LOS ANGELES, CALIF. 90054

1 Tbsp.	2 Tbsp.	3 Tbsp.	4 Tbsp.	5 Tbsp.	6 Tbsp.	7 Tbsp.	8 Tbsp.
			1/4 cup				1/2 cup

1 FIRST QUALITY 1

Ralphs

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butter

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1 Tbsp.	2 Tbsp.	3 Tbsp.	4 Tbsp.	5 Tbsp.	6 Tbsp.	7 Tbsp.	8 Tbsp.
			1/4 cup	1/3 cup			1/2 cup

1 FIRST QUALITY 1

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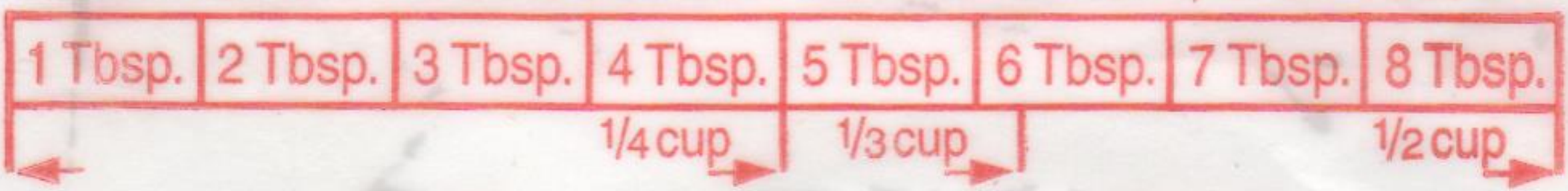


1 FIRST QUALITY 1

Ralphs

grade AA

butter

NET WT. 4 OZ. (113g)

WHY?

Complicated or Complex?


Cookie Monster Cupcakes


Nailed it

method

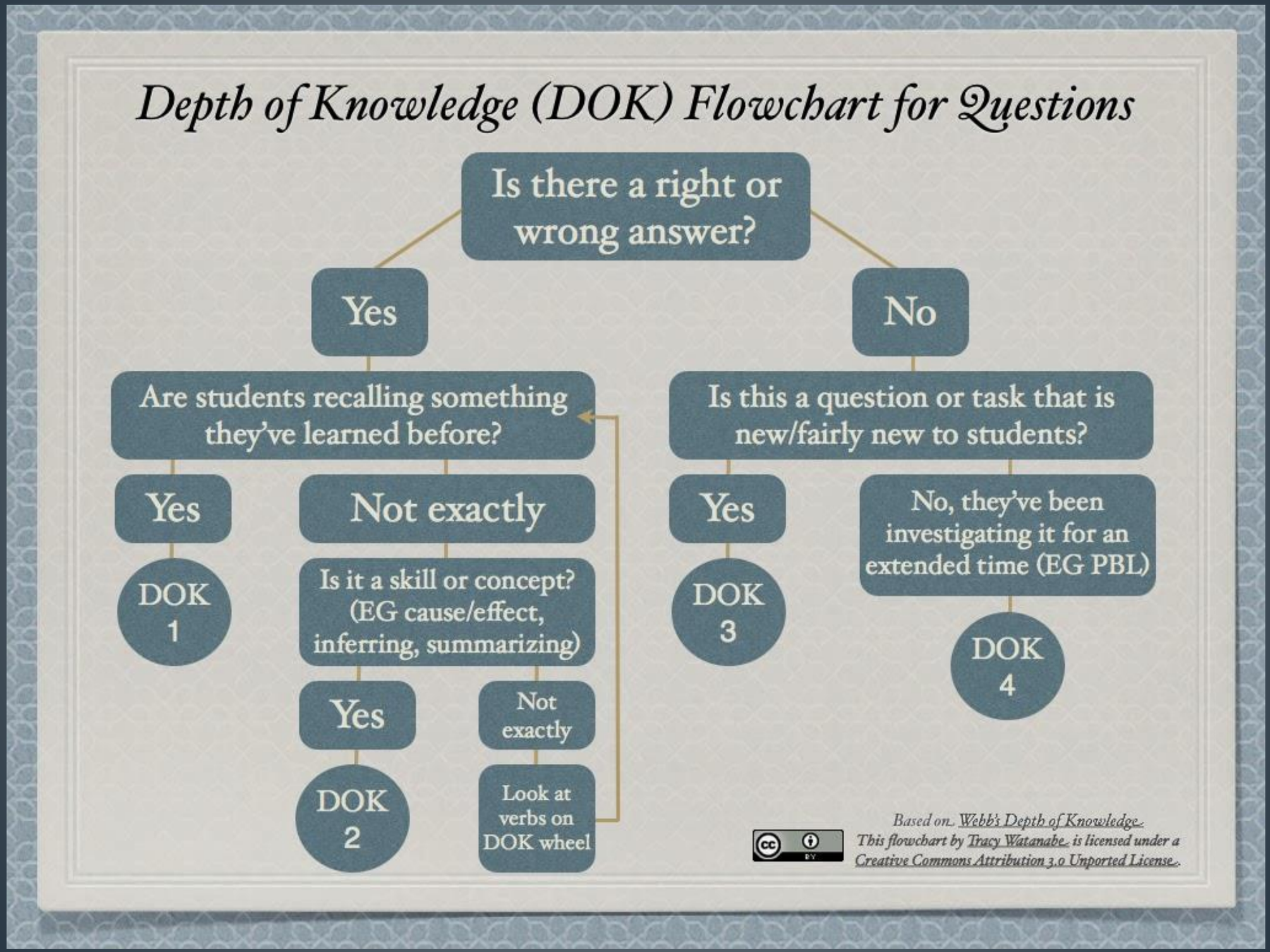
1. Using an electric mixer, whip the butter until it is pale. This will take at least 5 minutes on high.
2. Gradually add in the icing mixture and vanilla until well combined.
3. With the mixer running, add in food colouring until you get to the Cookie Monster colour. This may be a lot if you are using liquid food colouring or a little if using gel food colouring.
4. Add in the milk and mix until the frosting puffs up.
5. Fill a piping bag with a fluted nozzle and pipe on icing.
6. With the writing icing, place black spots on the marshmallows for pupils.
7. Place on each cupcake.
8. Cut cookies in half and place in 'mouth'.

What does a complicated approach to Depth of Knowledge look like?

DOK Verb Wheel

Source: Unknown

DOK Flowchart for Questions



Source: Tracy Watanabe - @tracywatanabe

DOK Posters

DOK 1

Routine Thinking

- Can you recall ____?
- Can you identify ____?
- How would you describe ____?
- What might you include on a list about____?
- Can you select____?
- How can you find the meaning of____?

arrange	calculate	memorize
measure	name	recognize
recall	repeat	identify
illustrate	match	label
state	list	state

DOK 2

Conceptual Thinking

- Can you explain how _____ affected____?
- How would you apply what you learned to develop____?
- How would you summarize____?
- What do you notice about____?
- How would you estimate____?
- How could you organize____?

compare	classify	categorize
measure	graph	distinguish
predict	modify	construct
organize	infer	summarize
interpret	make observations	

DOK 3

Strategic Reasoning

- How is____related to____?
- What conclusions can be drawn?
- Can you elaborate on____?
- How would you test____?
- What evidence supports____?
- What would happen if____?
- Why is that the best answer?

assess	compare	construct
apprise	revise	hypothesize
critique	investigate	
draw conclusions		
develop a logical argument		

DOK 4

Extended Reasoning

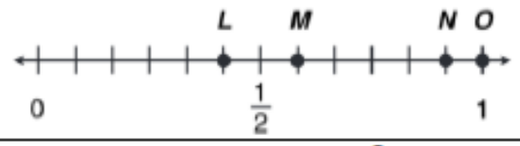
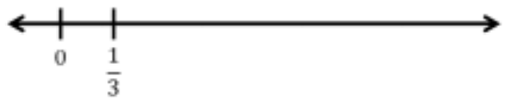
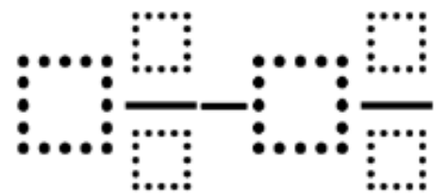
- Write a research paper.
- What information can you gather to support your idea about____?
- Write a thesis, drawing conclusions from multiple sources.
- Apply information from one text to another to develop an persuasive argument.

design	connect	prove
analyze	critique	synthesize
create	apply concepts	

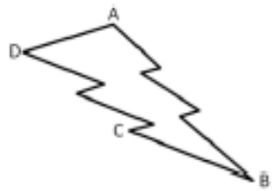
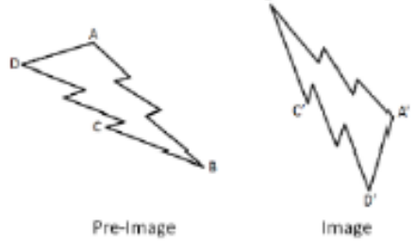
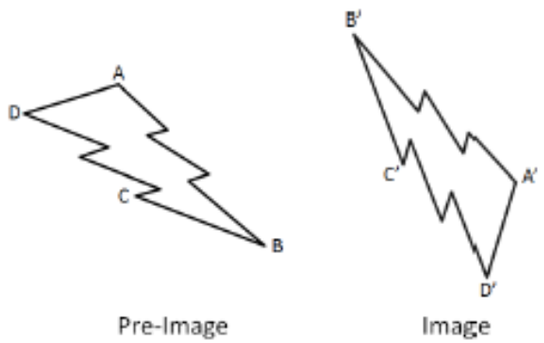
Created by Penny Lund 2013

Source: Penny Lund
http://isntitelementary.blogspot.com/

DOK | Distinguishing Between Depth of Knowledge Levels in Mathematics

Topic	Adding Whole Numbers	Money	Fractions on a Number Line	Area and Perimeter	Subtracting Mixed Numbers
CCSS Standard(s)	• 1.NBT.4 • 2.NBT.5	• 2.MD.8	• 3.NF.2	• 3.MD.8 • 4.MD.3	• 5.NF.1
DOK 1 Example	Find the sum. $44 + 27 =$	If you have 2 dimes and 3 pennies, how many cents do you have	Which point is located at $\frac{7}{12}$ below? 	Find the perimeter of a rectangle that measures 4 units by 8 units.	Find the difference. $5\frac{1}{2} - 4\frac{2}{3} =$
DOK 2 Example	Fill in the boxes below using the whole numbers 1 through 9, no more than one time each, so that you make a true equation. □□ + 53 = □□	Make 47¢ in three different ways with either quarters, dimes, nickels, or pennies.	Label the point where $\frac{3}{4}$ belongs on the number line below. Be as precise as possible. 	List the measurements of three different rectangles that each has a perimeter of 20 units.	Create three different mixed numbers that will make the equation true by using the whole numbers 1 through 9, no more than one time each. You may reuse the same whole numbers for each of the three mixed numbers. $5\frac{4}{5} - \square\frac{\square}{\square} = 3\frac{1}{20}$
DOK 3 Example	Make the largest sum by filling in the boxes below using the whole numbers 1 through 9, no more than one time each. □□ + □□ =	Make 47¢ using exactly 6 coins with either quarters, dimes, nickels, or pennies.	Create 5 fractions using the whole numbers 0 through 9, exactly one time each as numerators and denominators, and place them all on a number line.	What is the greatest area you can make with a rectangle that has a perimeter of 24 units?	Make the smallest difference by filling in the boxes below using the whole numbers 1 through 9, no more than one time each. 

DOK | Distinguishing Between Depth of Knowledge Levels in Mathematics

Topic	Surface Area and Volume	Probability	Transformations	Factoring Quadratics	Quadratics in Vertex Form
CCSS Standard(s)	• 6.G.4 • 7.G.6	• 7.SP.5 • 7.SP.7	• 8.G.1 • G-CO.5	• A-SSE.3a	• F-IF.7a
DOK 1 Example	Find the surface area of a rectangular prism that measures 3 units by 4 units by 5 units.	What is the probability of rolling a sum of 5 using two 6-sided dice?	Rotate the image below 90° counterclockwise about point D and reflect it across a horizontal line. 	Find the factors: $2x^2 + 7x + 3$	Find the roots and maximum of the quadratic equation below. $y = -3(x-4)^2 - 3$
DOK 2 Example	List the measurements of three different rectangular prisms that each have a surface area of 20 square units.	What value(s) have a 1/12 probability of being rolled as the sum of two 6-sided dice?	List three sequences of transformations that take pre-image ABCD to image A′B′C′D′.  Pre-Image Image	Fill in the blank with integers so that the quadratic expression is factorable. $x^2 + \_\_x + 4$	Create three equations for quadratics in vertex form that have roots at 3 and 5 but have different maximum and/or minimum values.
DOK 3 Example	What is the greatest volume you can make with a rectangular prism that has a surface area of 20 square units?	Fill in the blanks to complete this sentence using the whole numbers 1 through 9, no more than one time each. Rolling a sum of ___ on two ___-sided dice is the same probability as rolling a sum of ___ on two ___-sided dice.	What is the fewest number of transformations needed to take pre-image ABCD to image A′B′C′D′?  Pre-Image Image	Fill the blank by finding the largest and smallest integers that will make the quadratic expression factorable. $2x^2 + 3x + \_\_$	Create a quadratic equation with the largest maximum value using the whole numbers 1 through 9, no more than one time each. $y = -\square(x-\square)^2 + \square$

What does a complicated approach to problem solving look like?

CUBES

A problem solving strategy

C - circle the #s

U - underline the ques.

B - box the words

http://www.teachingwithsimplicity.com/math-anchor-charts

There are 125 sheep and 5 dogs in a flock. How old is the shepherd?

What problem are you trying to figure out?	What guesses do you have?
What do you already know from the problem?	What do you need to know to solve the problem?

What is your conclusion? How did you reach that conclusion?

	Landing Page	Sessions	Pages / Session	Avg. Session Duration
		79,408 % of Total: 100.00% (79,408)	3.98 Avg for View: 3.98 (0.00%)	00:02:00 Avg for View: 00:02:00 (0.00%)
1.	How Much Is One Third Of A Cup Of Butter?	**13,699** (17.25%)	2.08	00:00:15
2.	Lessons	**12,558** (15.81%)	7.29	
3.	Home Page	**7,198** (9.06%)	8.10	00:04:44
4.	How Much Does A 100×100 In-N-Out Cheeseburger Cost?	**4,321** (5.44%)	2.87	00:01:49
5.	How Did They Make Ms. Pac-Man?	**2,112** (2.66%)	2.71	00:01:55
6.	How Do You Write A Check To Pay For Something?	**1,775** (2.24%)	2.54	00:00:45
7.	How Many Hot Dogs And Buns Should He Buy?	**1,750** (2.20%)	3.23	00:01:47
8.	Problem-Based Lesson Search Engine	**1,712** (2.16%)	4.59	00:03:30
9.	How Much Money IS That?!	**1,439** (1.81%)	2.47	00:00:39
10.	Which Bed Bath & Beyond Coupon Should You Use?	**1,396** (1.76%)	2.41	00:00:39

Google

How much is one third of a cup of butter?

All News Shopping Maps Images More Search tools

Status Quo

- Math education is complicated

New Reality

- Math education is complex

Status Quo

- Power

New Reality

- Influence

Power

Influence

[Associated Press]

[Agence France Presse/Getty Images]

[Associated Press]

[Agence France Presse/Getty Images]

Power versus Influence

Power

- Positional
- Wielded
- Pushes
- Resented
- Expires

Influence

- Personal
- Granted
- Persuades
- Respected
- Endures

Source: Richard McKeown - www.RichardMcKeown.com

Give power

Gain influence

Who Can Empower Others?

- Teachers with their students
- Students with each other and/or the community
- Department chairs
- Principals and administrators
- #MTBoS
- Professional teacher organizations


Diet 7UP
Diet Coke

Status Quo

- Power

New Reality

- Influence

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