Fullerton School District

ROBERT KAPLINSKY

@robertkaplinsky

Junction

SUBPROCURADURIA
DE INVESTIGACIÓN ESPECIALIZADA
EN DELINCUENCIA ORGANIZADA

PGR

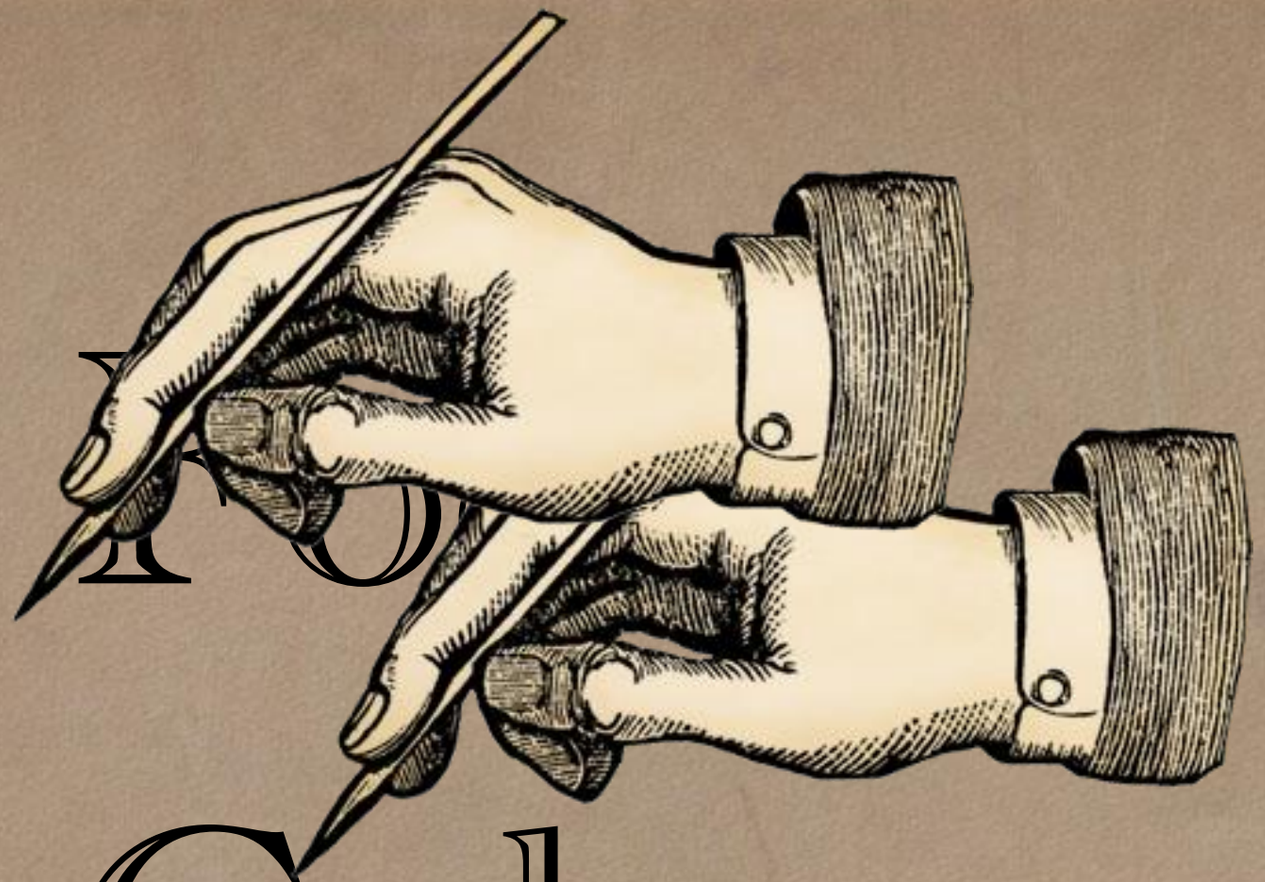
PROCURADURÍA GENERAL DE LA REPÚBLICA

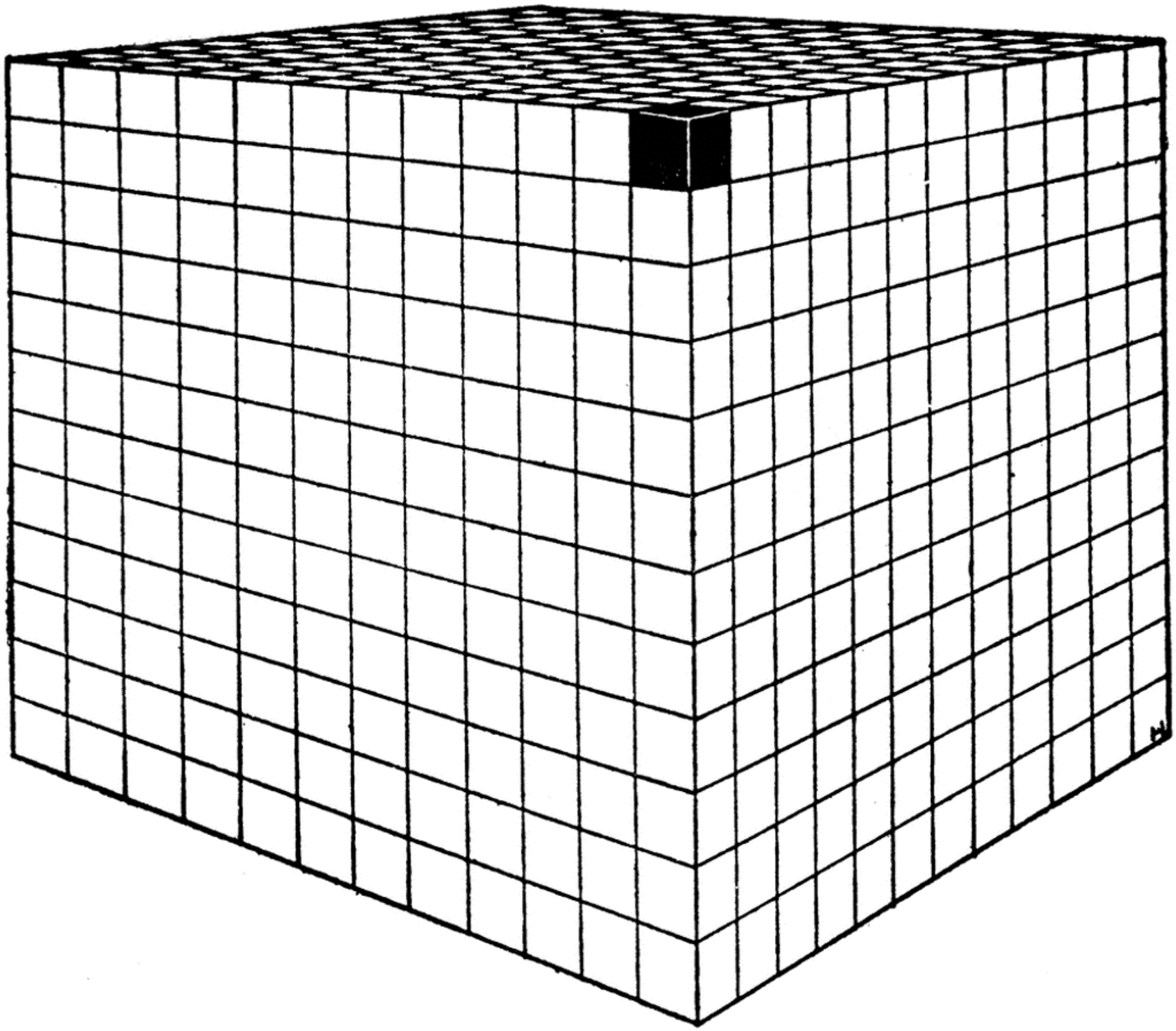
SIEDO


PGR
SIEDO
PGR
SIEDO


FOX

- Focus
- Coherence
- Rigor

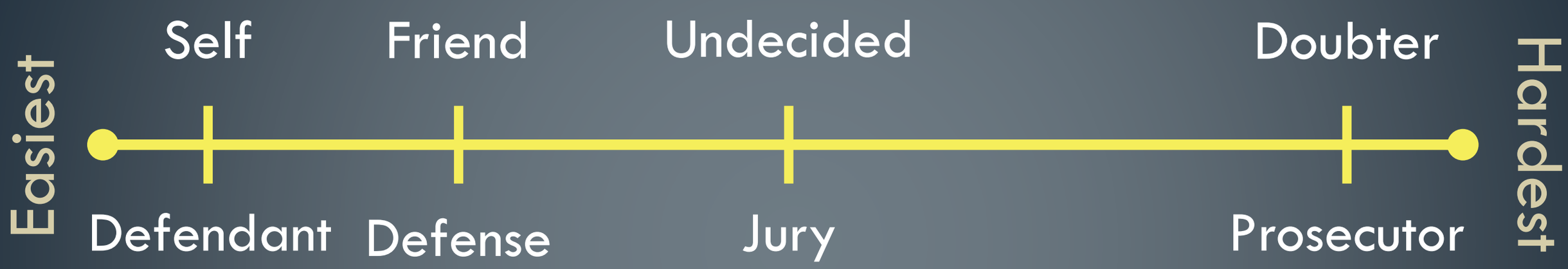




Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.

Levels of Convincing



Construct a viable argument

Critique the reasoning of others

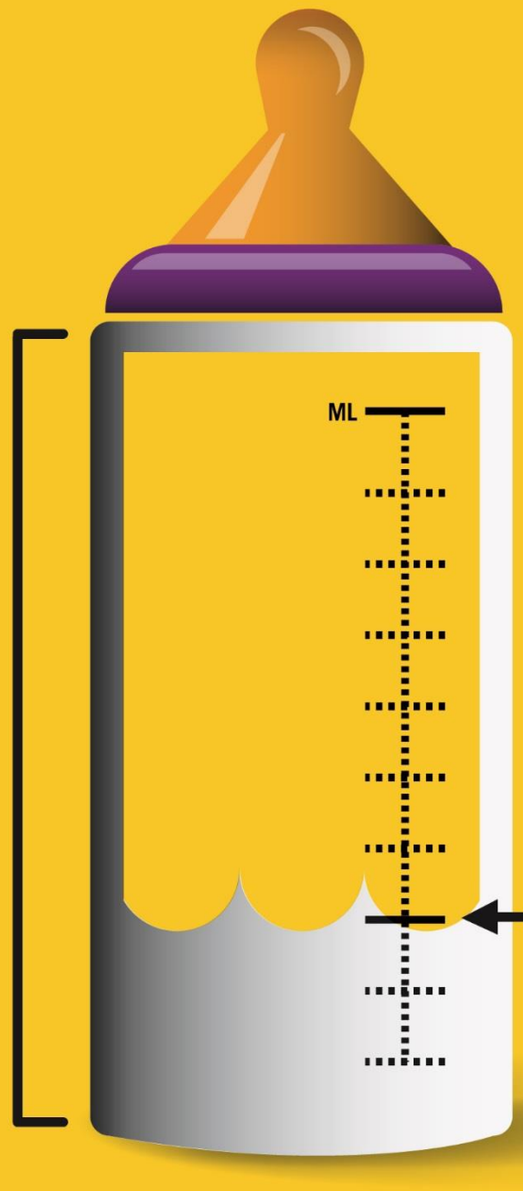
Inspired by *Connecting Mathematical Ideas* by Jo Boaler and Cathy Humphreys

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

CHOOSE CAR SEAT:
BY AGE & SIZE

THE NUMBER OF PEOPLE **WHO THINK** THEY HAVE THEIR CHILD IN THE RIGHT SEAT.



THE ONES **WHO ACTUALLY DO.**

KNOW FOR SURE

IF YOUR CHILD IS IN THE RIGHT CAR SEAT.

VISIT SAFERCAR.GOV/THERIGHTSEAT

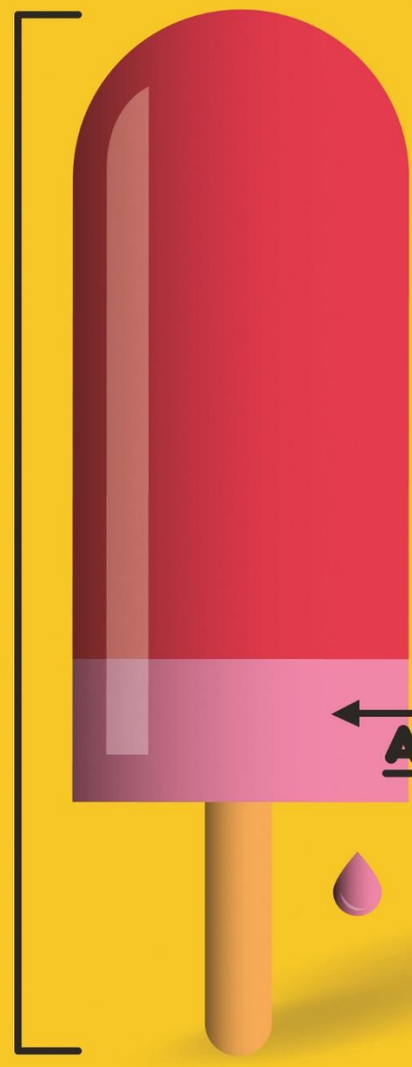
Ad Council

NHTSA www.nhtsa.gov

Child Car Safety

CHOOSE CAR SEAT:
BY AGE & SIZE

THE NUMBER OF PEOPLE **WHO THINK** THEY HAVE THEIR CHILD IN THE RIGHT SEAT.



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NHTSA www.nhtsa.gov

Child Car Safety

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

Of the 32 students I interviewed…

- 75% of them gave me numerical responses
- 2 students calculated the answer to be 130 (125 + 5)
- 2 students calculated the answer to be 120 (125 – 5)
- 12 students calculated the answer to be 25 (125 ÷ 5)
- 0 students calculated the answer to be 625 (125 x 5)
- 4 students stated that they guessed their answer (90, 5, 42, and 50)
- 4 students tried to divide 125 by 5 but could not correctly implement the procedure

Takeaways

- Making sense of mathematics
- Intellectual autonomy
  - Intellectual autonomy is about being able to think for yourself and not being dependent on others for the direction and control of one's thinking.

What Does the NHTSA Say?

Key Statistics and Consumer Insights:

- Motor vehicle crashes are the leading cause of death for children age 1 through 12 years old.[1]

According to a NHTSA study, 3 out of 4 kids are not as secure in the car as they should be because their car seats are not being used correctly.

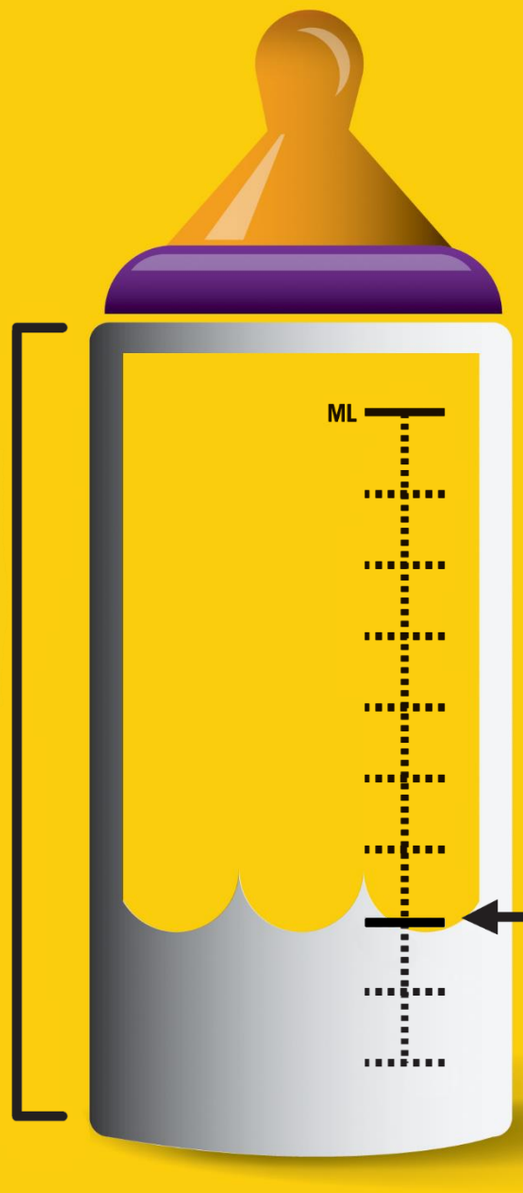
be reduced by about half if the correct child safety seats were always used.

[1] Source: Based on the latest mortality data currently available from the CDC's National Center for Health Statistics.

- “because they have their child in the right seat”
- “because their car seats are not being used correctly”

CHOOSE CAR SEAT:
BY AGE & SIZE

THE NUMBER
OF PEOPLE
WHO
THINK
THEIR CAR
SEATS ARE
BEING USED
CORRECTLY.



THE ONES
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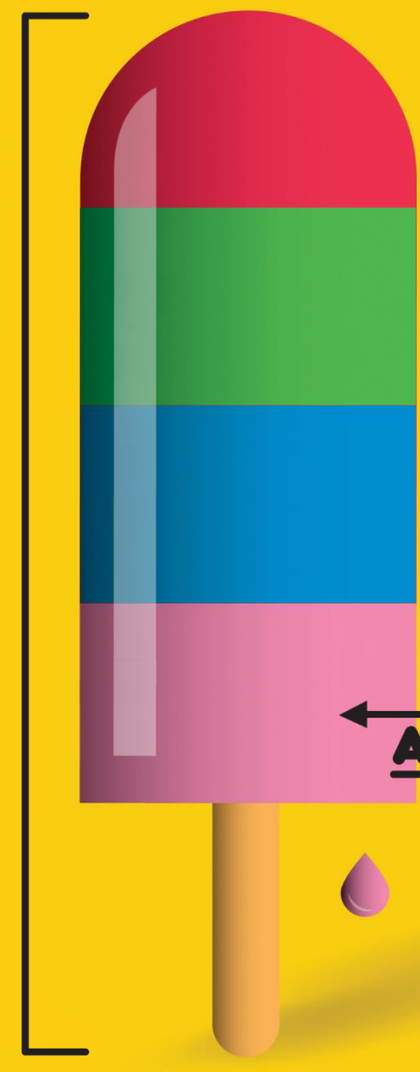

THE ONES
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Ad Council

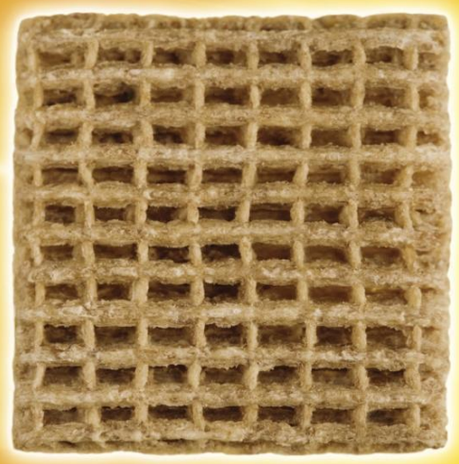
NHTSA
www.nhtsa.gov

Child Car Safety

NEW

Diamond Shreddies

Cereal



OLD
(Boring)

NEW
(Exciting!)


Shreddies
SQUARE OR DIAMOND?
Vote for your Favourite at DiamondShreddies.com
Post
Diamond
Shreddies
Combo Pack
ENLARGED TO SHOW TEXTURE
Square
Diamond
Made with 100% Whole Grain Wheat
620 g Cereal
SERVING SUGGESTION
COR 114
Limited Edition
Sensible Solution
• Very High Source of Fibre
• Good Source of 8 Essential Nutrients
• Low in Fat

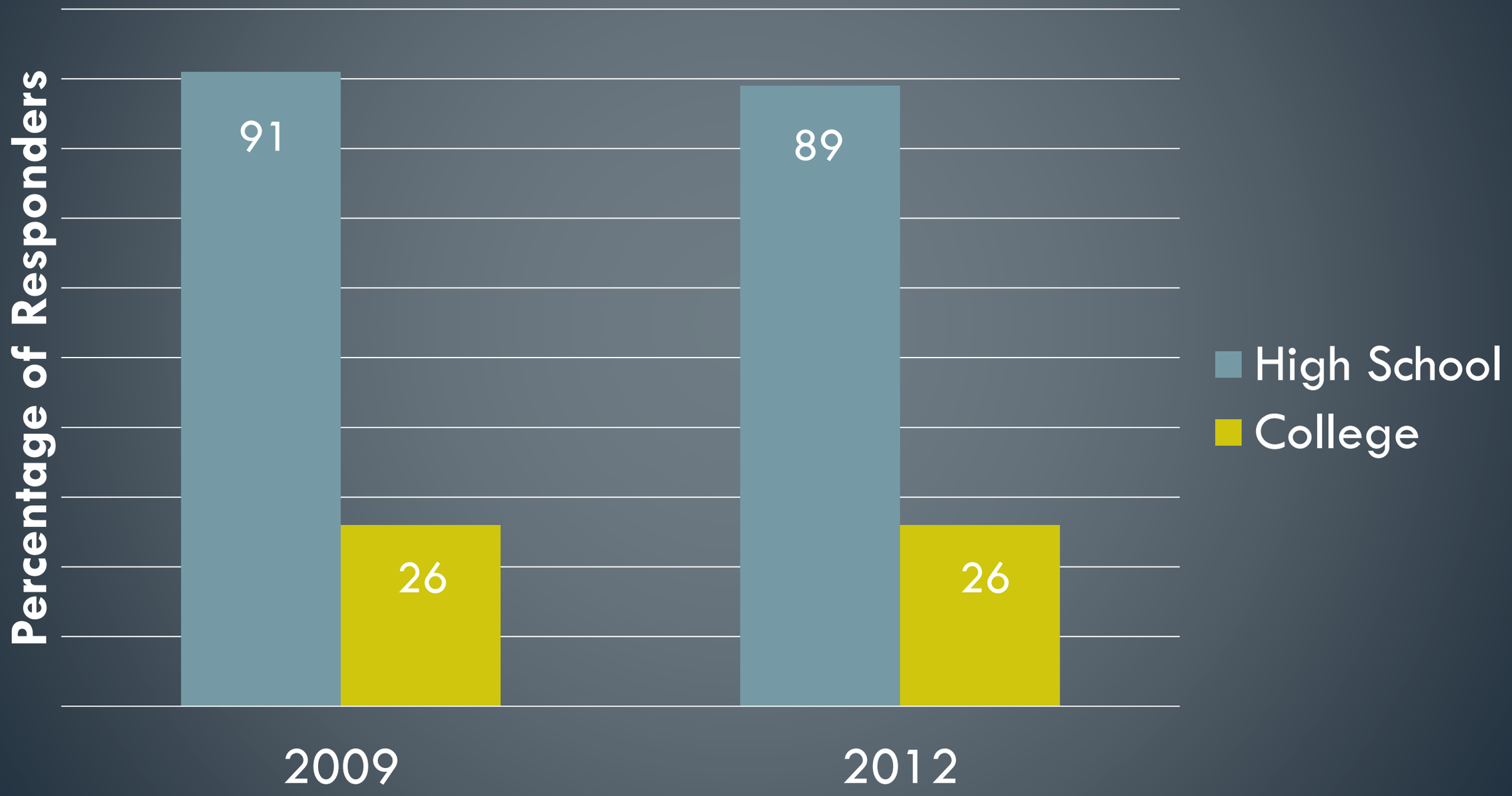
"Kraft Foods saw an immediate 18% increase in baseline sales of Shreddies within the first month alone, and for months thereafter."

Source: http://www.visualtargeting.com/diamondshreddies.html

WHAT IS THE PURPOSE OF A K-12 EDUCATION?

- *College readiness*
  - *ACT National Curriculum Survey*
  - *Surveyed 9,937 educators*

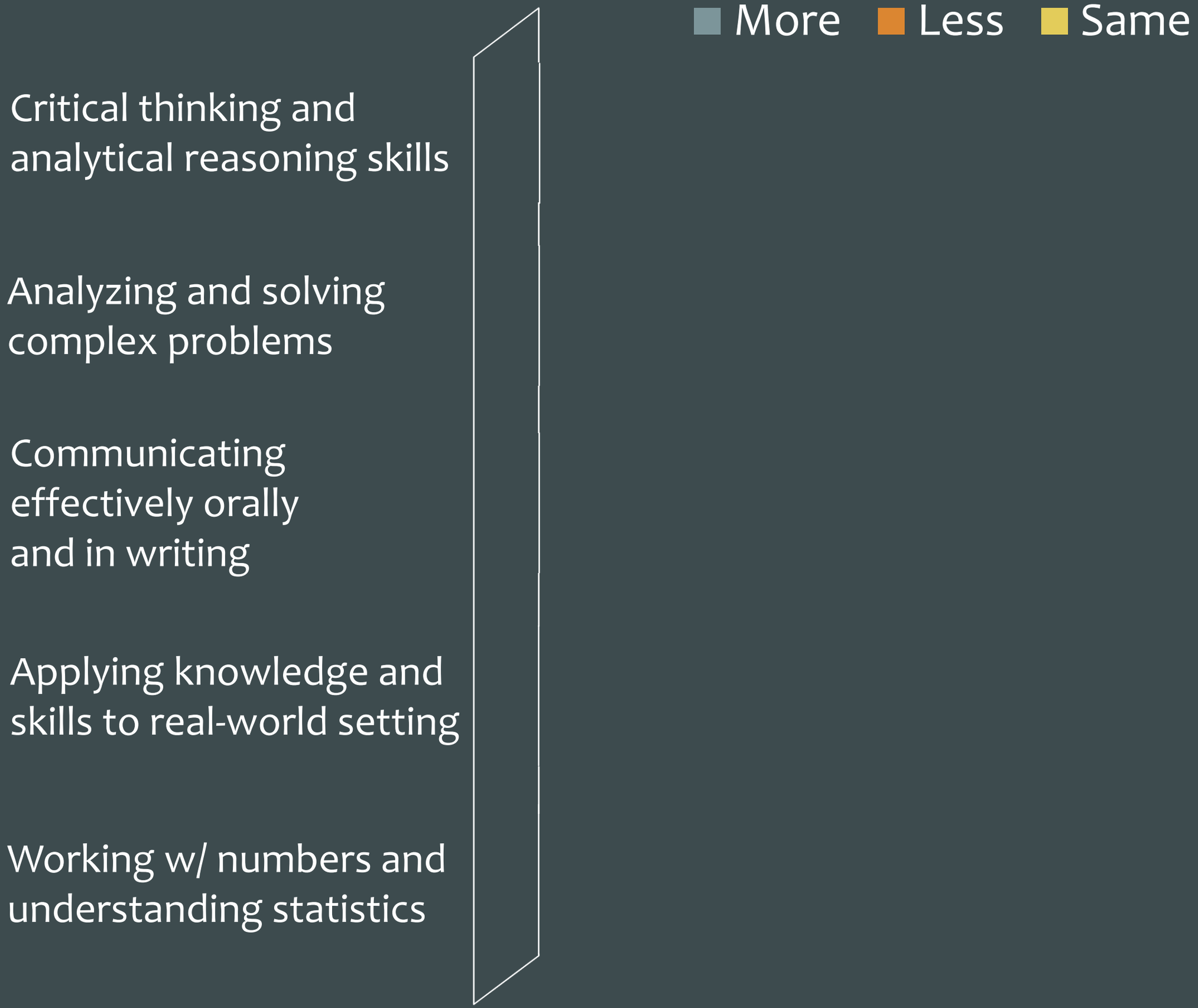
“Well” or “Very Well” Prepared for College



Source: http://www.act.org/research/policymakers/pdf/NCS-PolicySummary2012.pdf

WHAT IS THE PURPOSE OF A K-12 EDUCATION?

- *College readiness*
- *Career readiness*
  - *Association of American Colleges and Universities survey*
    - *Surveyed over 300 employers with at least 25 employees and many new hires*



Source: http://www.aacu.org/leap/documents/2013_EmployerSurvey.pdf

add/change photo

Biography for

Mike Myers (I)

Date of Birth

25 May 1963, Scarborough, Ontario, Canada

Birth Name

Michael John Myers

Height

5' 8" (1.73 m)

add/change photo

Biography for

Verne Troyer

Date of Birth

1 January 1969, Sturgis, Michigan, USA

Nickname

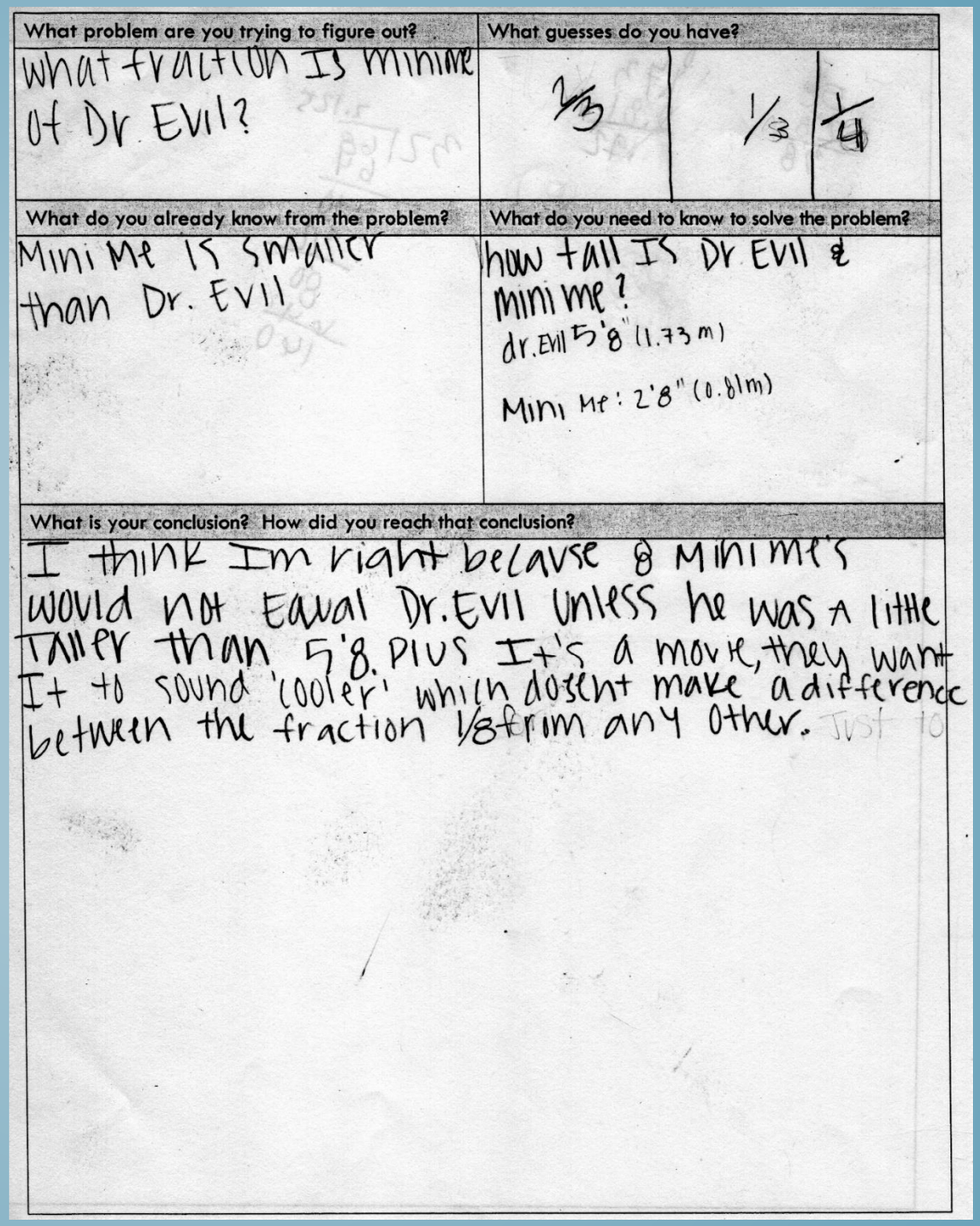
Mini Me

Mini-V

Height

2' 8" (0.81 m)

STUDENT WORK



What problem are you trying to figure out?

What fraction is Minime of Dr Evil?

What guesses do you have?

2/3 | 1/3 | 1/4

What do you already know from the problem?

Mini Me is smaller than Dr. Evil

What do you need to know to solve the problem?

how tall is Dr Evil & mini me?

dr. Evil 5'8" (1.73 m)

Mini Me: 2'8" (0.81m)

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

I think Im right because & Minime's would not Equal Dr. Evil unless he was a little Taller than 5'8. Plus It's a movie, they want It to sound 'cooler' which dosent make a difference between the fraction 1/8 from any other. Just 10

What do you already know from the problem?	What do you need to know to solve the problem?
Mini Me is smaller than Dr. Evil	how tall is Dr Evil & mini me? dr. Evil 5'8" (1.73 m) Mini Me: 2'8" (0.81m)

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

I think Im right because 8 Mini me's would not Equal Dr. Evil Unless he was a little taller than 5'8. Plus It's a movie, they want It to sound 'cooler' which dosent make a difference between the fraction 1/8 from any other. Just to

What do you already know from the problem?	What do you need to know to solve the problem?
-It seems like mini-me is 1/4 of Dr. Evil -Answer is a fraction -Answer has to be smaller than 1	-how tall mini-me and dr. Evil are - Dr. Evil: 5'8" (1.78m) Mini-Me: 2'8" (0.81m)

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

Mini-Me is about 1/2 of Dr. Evil. The commentator is incorrect because if Mini-Me were really 1/8 of Dr. Evil then Dr. Evil would have to be 256 inches, which means he would have to be about 21 feet tall.

Dr. Evil

Mini is shorter than Dr.E

Dr. Evil - 5'8" (1.73 m)

Mini Me - 2'8" (0.81 m)

How tall is Mini Me

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

I think im right because five point eight divided by two point one is two point eight and five point eight timesed by eight is four point six. Half of that is about the six so, still believe im right and he is wrong.

What do you already know from the problem?	What do you need to know to solve the problem?
mini me is smaller than dr evil is smaller	

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

We are wrong because Dr evil's character is probably a giant.

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'.

CUBES

A problem solving strategy

C - circle the #s

U - underline the ques.

B - box the words

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

WHAT ISN'T MATHEMATICAL MODELING?

- *It is not modeling in the sense of, "I do; now you do."*
- *It is not modeling in the sense of using manipulatives to represent mathematical concepts.*
- *It is not modeling in the sense of a "model" being just a graph, equation, or function.*
- *It is not just starting with a real world situation and solving a math problem.*
- *It is not beginning with the mathematics and then moving to the real world.*

Source: http://www.cde.ca.gov/ci/ma/cf/documents/aug2013apxdmathmodel.pdf

Content and Language Objectives using

Content Objective Example:

SWBAT apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. (MP4)

Language Objective Example:

SWBAT understand and use stated assumptions, definitions, and previously established results in constructing arguments. (MP3)

example:

- In early grades, this might be as simple as writing an addition equation to describe a situation. (MP4)
- In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. (MP4)
- By high school, a student might use geometry to solve a design problem or use a function to describe how one

WHAT DOES IT LOOK LIKE…

- when students have procedural skill but not conceptual understanding or the ability to apply mathematics?
- when students **can** work with numbers but **cannot**:
  - critically think
  - applying knowledge and skills to real-world settings
  - analyze and solve complex problems

How far apart are the exits on this freeway: Jct 90 and Jefferson Blvd?

$$1\frac{1}{2} - 1\frac{1}{4}$$

$$1\frac{1}{2} - 1\frac{1}{4}$$

The Four C's

- Communication
- Curiosity

- 5.NBT.7 – Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Dollars	9
Half-Dollars	0
Quarters	51
Dimes	104
Nickels	208

- 5.NF.5a – Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.


11:35 34°

- 5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.

- 5.MD.3 - Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- 5.MD.4 - Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
- 5.MD.5 - Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

The Four C's

- Communication
- Curiosity
- Critical Thinking

Problem Solving Framework

- Inspired by Geoff Krall's resources at emergentmath.com

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?	

Problem Solving Framework v7.2

The Four C's

- Communication
- Curiosity
- Critical Thinking
- Content Knowledge

Problem-Based Lesson Resources

- Problem-based lesson search engine: http://robertkaplinsky.com/prbl-search-engine/
- My lessons: http://www.robertkaplinsky.com/lessons
- Dan Meyer: http://threeacts.mrmeyer.com
- Andrew Stadel: http://tinyurl.com/mrstadel
- Graham Fletcher: http://gfletchy.com/3-act-lessons/
- Geoff Krall: http://tinyurl.com/PrBLmaps
- Dan Meyer's TED talk: http://tinyurl.com/meyer-TED

Why Choose Robert?

1 Math content expert

Robert graduated from University of California, Los Angeles (UCLA) with a Bachelors of Science in Mathematics. He has taught mathematics to students at the elementary, middle, and high school levels.

Lessons

How Many Chip Bags Will There Be?

How Can We Make Stronger Passwords?

Robert Kaplinsky's Problem-Based Lessons

File Edit View Insert Format Data Tools Help All changes saved in Drive

	A	B	C	D	E	F
1	Task Name	Concept / Skill	Standard 1	Standard 2	Standard 3	Standard 4
2	How Can We Water All Of The Grass?	Circles, Pythagorean Theorem, trigonometric ratios	7.G.4	8.G.7	G-SRT.8	G-MG.1
3	How Much Money IS That?!	Volume of rectangular prism	5.MD.3	5.MD.4	5.MD.5	5.MD.5b
4	How Much Money Should Dr. Evil Demand?	Exponential Growth	N-RN.2	A-SSE.1	A-SSE.3c	A-SSE.4
5	How Tall Is Mini-Me?	Scale and Dividing Decimals	5.NF.5	5.NF.5a	5.NF.5b	6.NS.3
6	How Did They Make Ms. Pac-Man?	Transformations (Rotations, Reflections, and Translations)	8.G.1	8.G.2	8.G.3	8.G.4
7	Which Ticket Option Is The Best Deal?	Unit Rates and Ratios	6.RP.2	6.RP.3	6.RP.3a	6.RP.3b
8	How Far Apart Are The Freeway Exits?	Fractions on a Number Line and Subtracting Fractions	3.NF.2	3.NF.2b	4.NF.2	4.NF.3a
9	Do We Have Enough Paint?	Area	3.MD.5	3.MD.6	3.MD.7	
10	How Many Stars Are There In The Universe?	Scientific Notation	8.EE.3	8.EE.4		
11	What Rides Can You Go On?	Inequalities and Measurement	2.MD.1	6.NS.7a	6.NS.7b	
12	Do You Have Enough Money?	Money	2.MD.8			
13	Which Bed Bath & Beyond Coupon Should You Use?	Percent Discount	7.RP.3			
14	Is Gas Cheaper With Cash Or Credit Card?	Percent Discount	7.RP.3			
15	Where's The Nearest Toys R Us?	Pythagorean Theorem (Distance in coordinate system)	8.G.8	G-SRT.8	G-GPE.7	
16	How Sharp Is The iPhone 5's Retina Display?	Pythagorean Theorem (Length of a side)	8.G.7	G-SRT.8	G-GPE.7	
17	When Should She Take Her Medicine?	Operations with Time Intervals	4.MD.2			
18	How Big Are Sunspots?	Converting Units, Proportions, and Scientific Notation	5.MD.1	7.RP.2	7.G.4	8.EE.4
19	What Michael's Coupon Should I Use?	Percent Discount	7.RP.3	A-CED.3		
20	Is It Cheaper To Pay Monthly or Annually?	Decimal Operations and/or Systems of Equations	5.NBT.7	8.EE.8c	A-CED.3	A-REI.11
21	How Big Is The 2010 Guatemalan Sinkhole?	Volume of Cylinder	5.MD.3	5.MD.4	5.MD.5	8.G.9
22	How Can You Win Every Prize At Chuck E. Cheese's?	Decomposing Numbers and/or Systems of Equations	2.NBT.7	3.NBT.2	3.NBT.3	8.EE.8c
23	How Many Royal Flushes Will You Get?	Probability	7.SP.5	7.SP.6	7.SP.7	S-MD.5
24	How Much Does The Paint On A Space Shuttle Weigh?	Surface Area	6.G.4	7.G.6	8.G.7	G-MG.1
25	How Did Motel 6 Go From $6 to $66?	Percent Increase and Compound Interest	7.RP.3	A-SSE.1b	F-BF.1	F-IF.8b
26	How Much Does The Aluminum Foil Prank Cost?	Surface Area and Unit Rates	6.G.4	6.RP.2	6.RP.3	7.G.6
27	How Many Laps Is A 5k Race?	Perimeter	4.MD.3			
28	Which Toilet Uses Less Water?	Systems of Equations/Inequalities	8.EE.8c	A-CED.3	A-REI.11	F-BF.1
29	How Did Someone Get A $103,000 Speeding Ticket In Finland?	Linear Equations	A-CED.2	F-BF.1	F-IF.4	F-IF.6
30	Which Pizza Is A Better Deal?	Area or Circle, Square, and Unit Rates	3.MD.5	3.MD.6	3.MD.7	4.MD.3
31	How Big Is The World's Largest Deliverable Pizza?	Area of Square	3.MD.5	3.MD.6	3.MD.7	4.NBT.3
32	How Many Sheets Do You Need To Break Out Of Prison?	Integer Operations	5.NBT.6			
33	Do Hybrid Cars Pay For Themselves?	Systems of Equations or Rates	6.RP.2	6.RP.3	8.EE.8c	A-CED.3
34	How Many Hot Dogs Did They Eat?!	Linear and Quadratic Functions	8.F.3	8.F.4	F-BF.1	F-BF.2
35	How Much Purple Ribbon Will You Need?	Perimeter & Circumference	3.MD.8	4.MD.3	7.G.4	
36	Are We There Yet?	Adding Times	3.MD.1	4.MD.2		
37	Which Chinese Food Coupon Should I Use?	Percent Discount	7.RP.3			
38	How Big Is The Vehicle That Uses Those Tires?	Ratio and Proportions	7.RP.2			
39	Where Would The Angry Birds Have Landed?	Create Equation From Quadratic Graph	A-CED.1	F-BF.1	F-IF.4	F-IF.7a
40	How Many Movies Can You See In One Day?	Adding Times	3.MD.1	4.MD.2		
41	Which Carrots Should You Buy?	Unit Rates	6.RP.1	6.RP.2	6.RP.3	
42	How Fast Can You Throw A Baseball?	Converting Units and Unit Rates	5.MD.1	6.RP.2		

Problem-Based Lesson Search Engine

This search engine searches all of the sites below to quickly help you find a problem-based lesson (also called 3-Act Task, mathematical modeling, or application problem):

Submit

The links below are the pages that are being searched by the search engine:

- 101 Questions
- Andrew Stadel
- Dan Meyer
- Dane Ehlert
- Emergent Math's Problem Based Curriculum Maps
- Estimation180
- Geoff Krall

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Andrew Stadel

Dan Meyer

Mathalicious

Problem Based Curriculum Maps

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tsd_5th