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All-City Tutors: Helping Elementary Students Make Sense of Math

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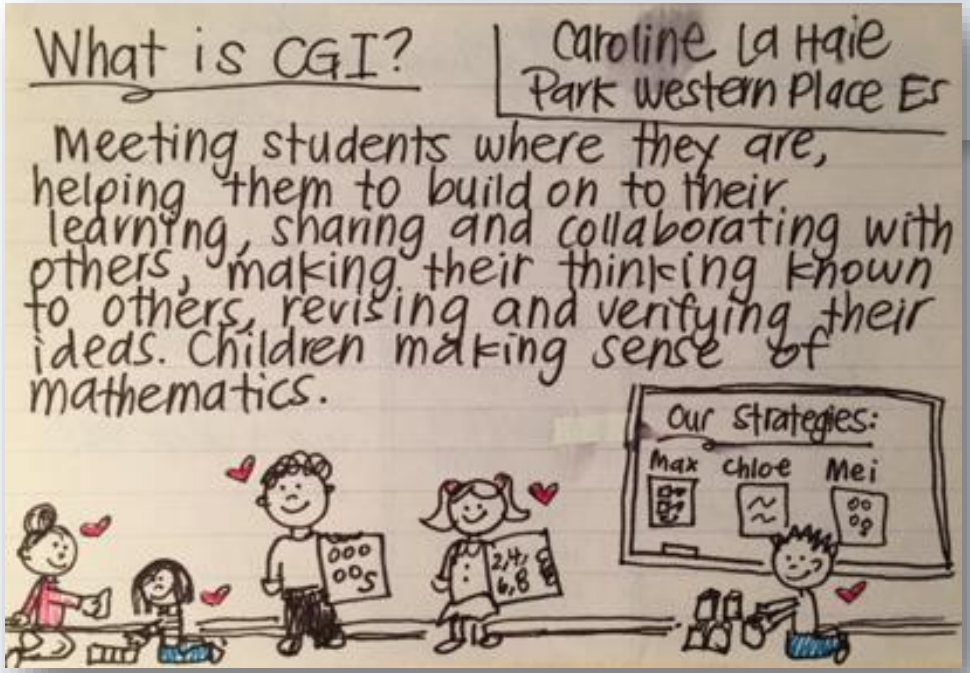
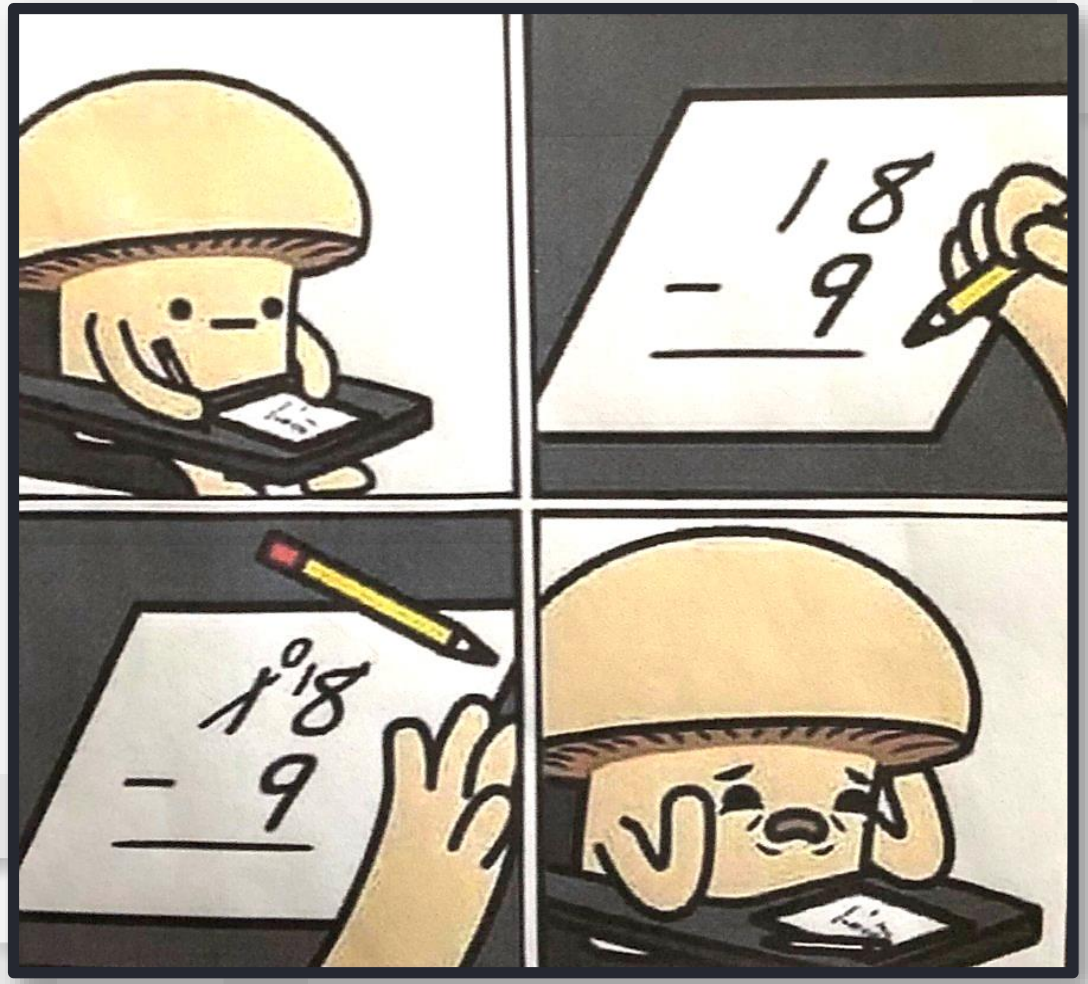
Goals:

- **Explore how students are learning math in school.**
- **Support students' sense-making through questioning.**
- **Help students incorporate Mathematician into their identity.**



"CGI is a student-centered approach to teaching math that builds on children's intuitive ideas for solving math problems or tasks and in which the primary role of the teacher is that of a listener, facilitator, and strategic questioner."

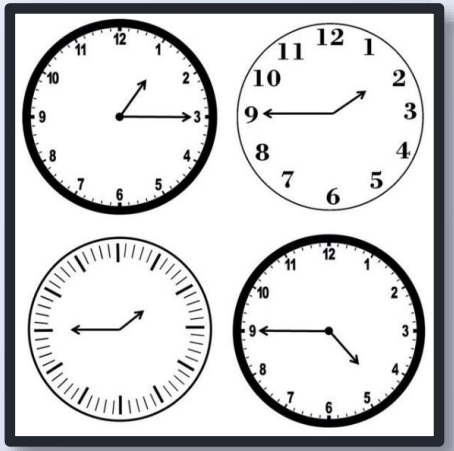

18
- 9
1°18
- 9

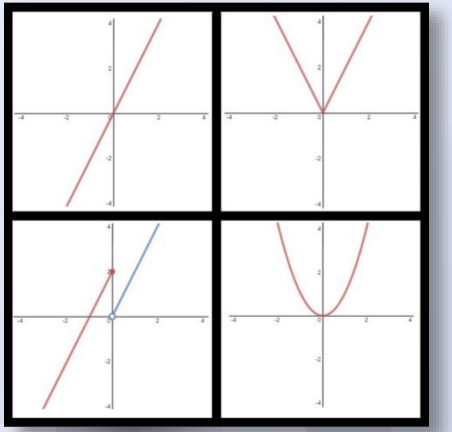
Math Routines: Choral Count

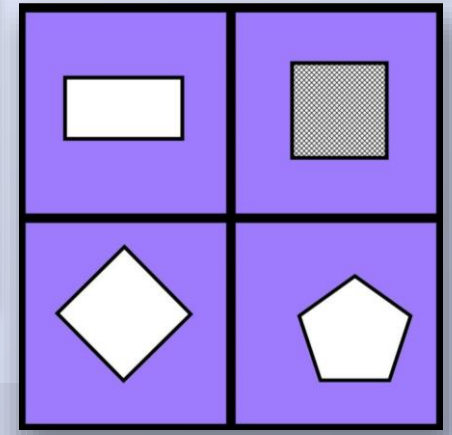
Skip Count by 5 starting at 16

$\frac{1}{2}$	$\frac{3}{2}$
$\frac{5}{8}$	$\frac{2}{6}$

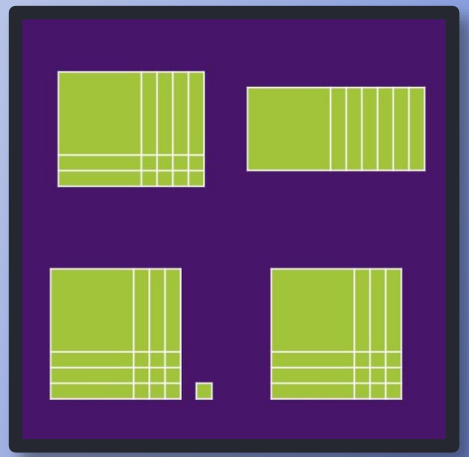
3	27
123	31







$y = 4x$	$y = x + 7$
$y = -2x + 4$	$y = 3x - 1$



Correct answers are still valued and expected

- Sometimes the goal of a lesson isn't to find the answer.
- Sometimes the goal of a lesson is to understand features of a number system and how they work together.
- Sometimes we want to provide students opportunities to think freely about what is going on in a low stakes situation.

Algorithms are still taught and fluency expected.

Just not taught as early as you might expect

Standard Algorithms

- Multi-digit Addition & Subtraction: 4th grade
- Multi-digit Multiplication: 5th Grade
- Multi-digit Division: 6th Grade

Why not teach the algorithm first?

What are they doing before they learn it?

Number Talk.

What is 6 x 16

Zero Facts

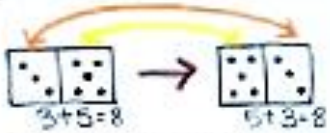
12 + 0 = 12

0 + 12 = 12

Any number + 0 = same number

No change!

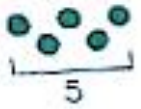
Turn-Around Facts



Flip the addends...
The sum DOESN'T change!

3+5 = 5+3

Counting On



* Put the bigger number in your head then count up!

+1, +2, +3 facts

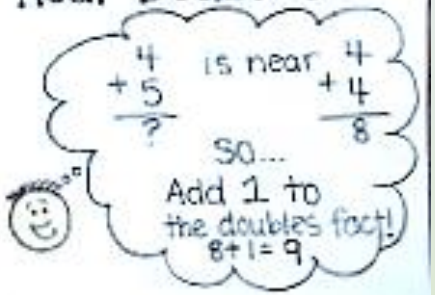
Doubles

4 + 4 = 8

the same number is added together!

My Addition Strategies Mat

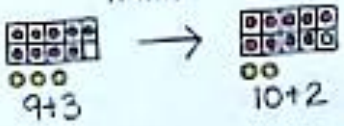
Near Doubles



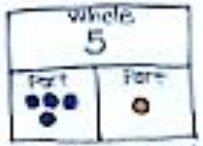
Make A Ten

9 + 3 = ?

Think:



Part-Part-Whole



Part + Part = Whole

Combine Numbers

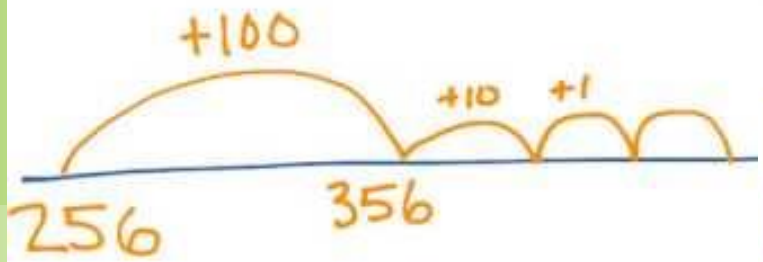
8 + 5 + 2 = ?

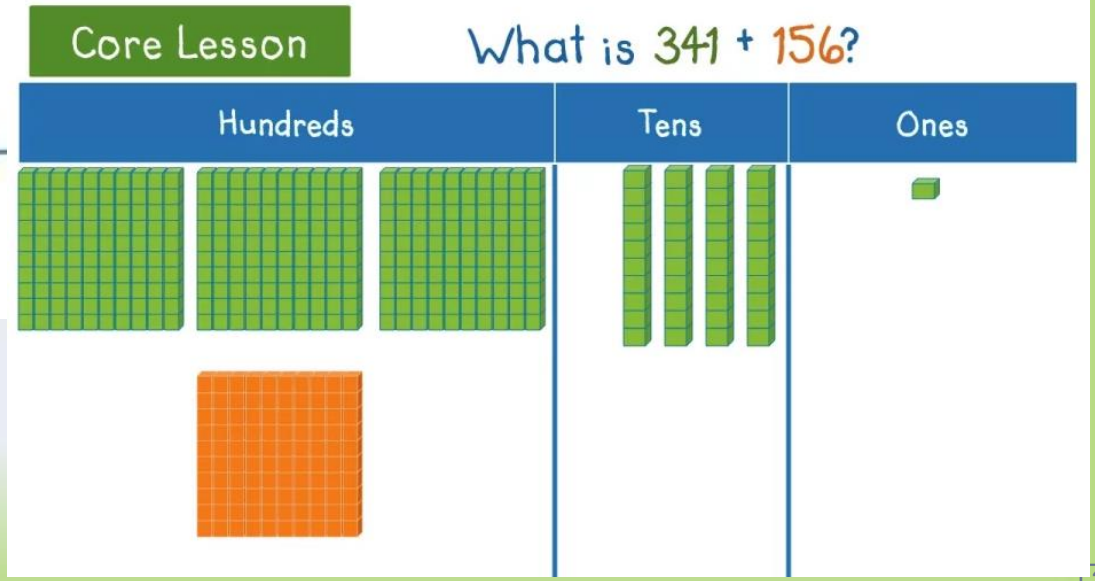
8+2=10

10 + 5 = 15

Open Number Line

256 + 137 =



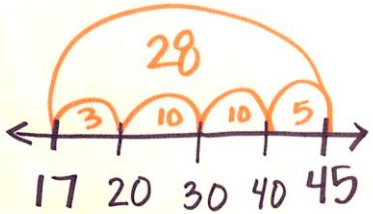


I can subtract two-digit numbers.

45-17

Think Addition

17 + 3 = 20
20 + 20 = 40
40 + 5 = 45
28

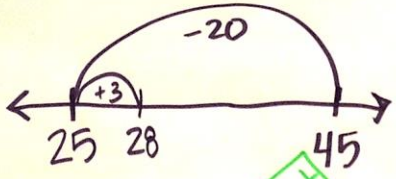


Use negatives

45
-17
30
-2
28

Compensation

45 - 20 = 25
25 + 3 = 28



Decompose a Ten

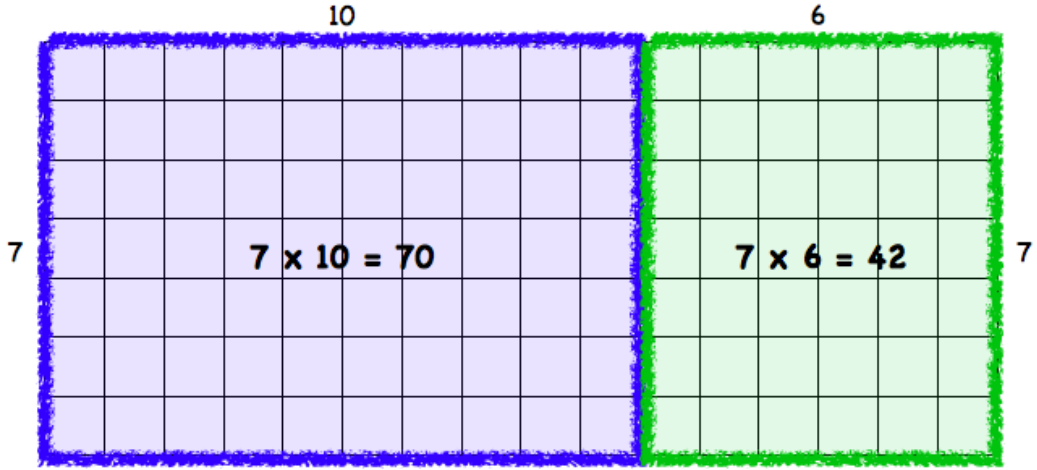
45 → 40 + 5 → 30 + 15
-17 → -10 - 7
20 + 8
28

Shortcut

3 15
45
-17
28

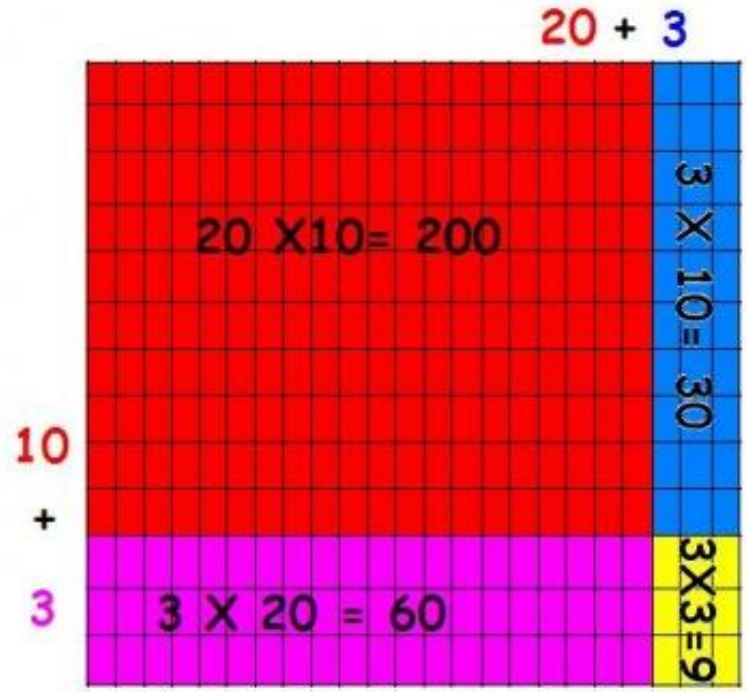
7 x 16 =

7 x (10 + 6) =



70 + 42 = 112

13 X 23

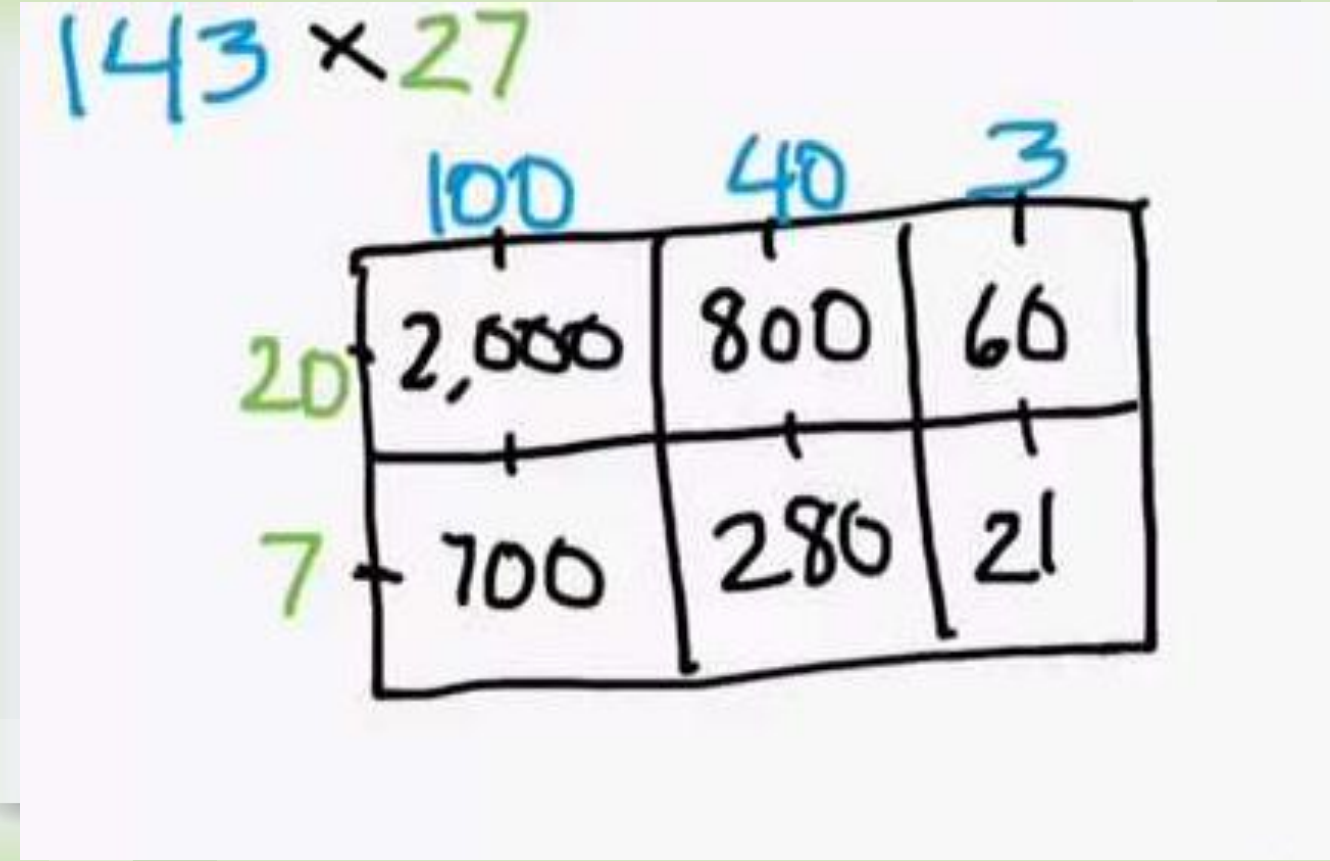


13
X 23

9= 3x3
30= 3x10
60= 20x3
200= 20x10

299

www.multiplication.weebly.com


143 × 27
100
40
3
20
2,000
800
60
7
700
280
21

$3{,}180 \div 15 = 213$

	200	10	3
15	3,000	150	30

$$
\begin{array}{r|l}
15 \;\; 3{,}180 & \\
\underline{-3{,}000} & 200 \\
180 & \\
\underline{-\;150} & 10 \\
30 & \\
\underline{-\;30} & 3 \\
0 & 213
\end{array}
$$

People value what makes sense.

Our number 1 standard of Math Practice is: Make sense of problems and preserver in solving them.

A school bought some math books and 4 times as many science books. The cost of a math book was $12. A science book cost $8. Altogether the school spent $528.

How many science books did they buy?

Make Sense of a Problem and Persevere in solving them. (SMP 1)

Read three times.

- **What is the problem about ? What is happening? Understand the story and context**
- **Read again looking for just the question – what is the purpose of our problem solving.**
- **Read a third time looking for mathematically relevant information.**

Identify Quantities and Relationships (SMP 2)

Sara has 7 cookies

Catherine has 7 fewer cookies than Sara

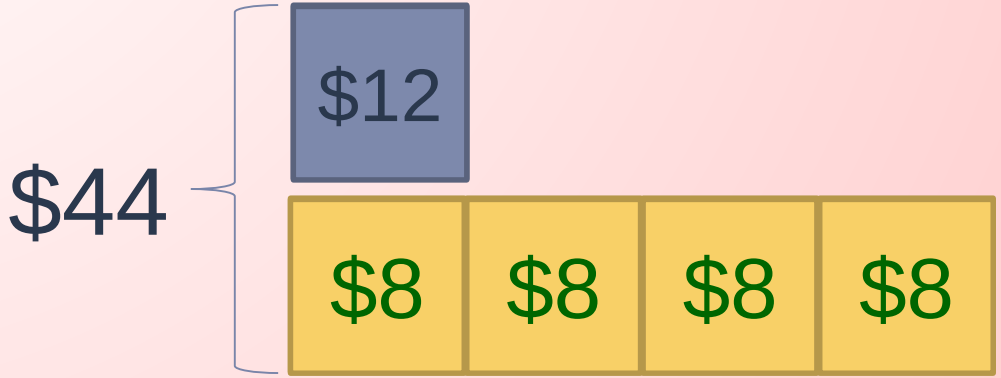
Jeff ran $\frac{1}{2}$ mile.

Jim ran $\frac{1}{2}$ as far as Jeff.

Understand the Structure of a problem (SMP 7)

Have I seen a problem that acts like this before... What is happening in this problem.

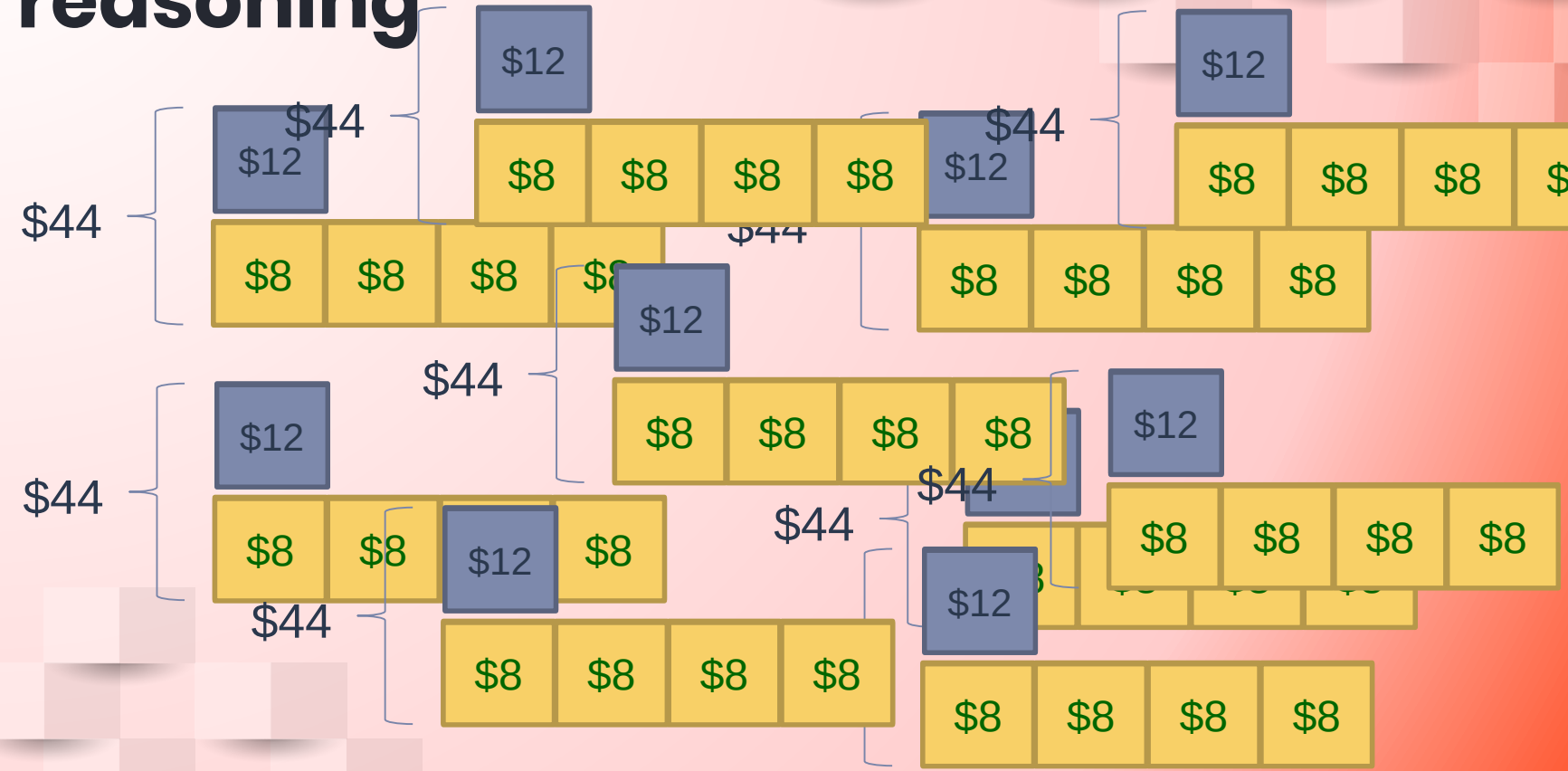
Understand the Structure of a problem



Look for regularity and repeated reasoning (SMP 8)

Think about what you are doing over and over to establish procedure

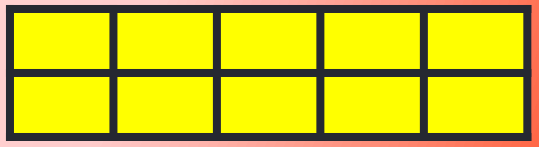
Look for repeated reasoning



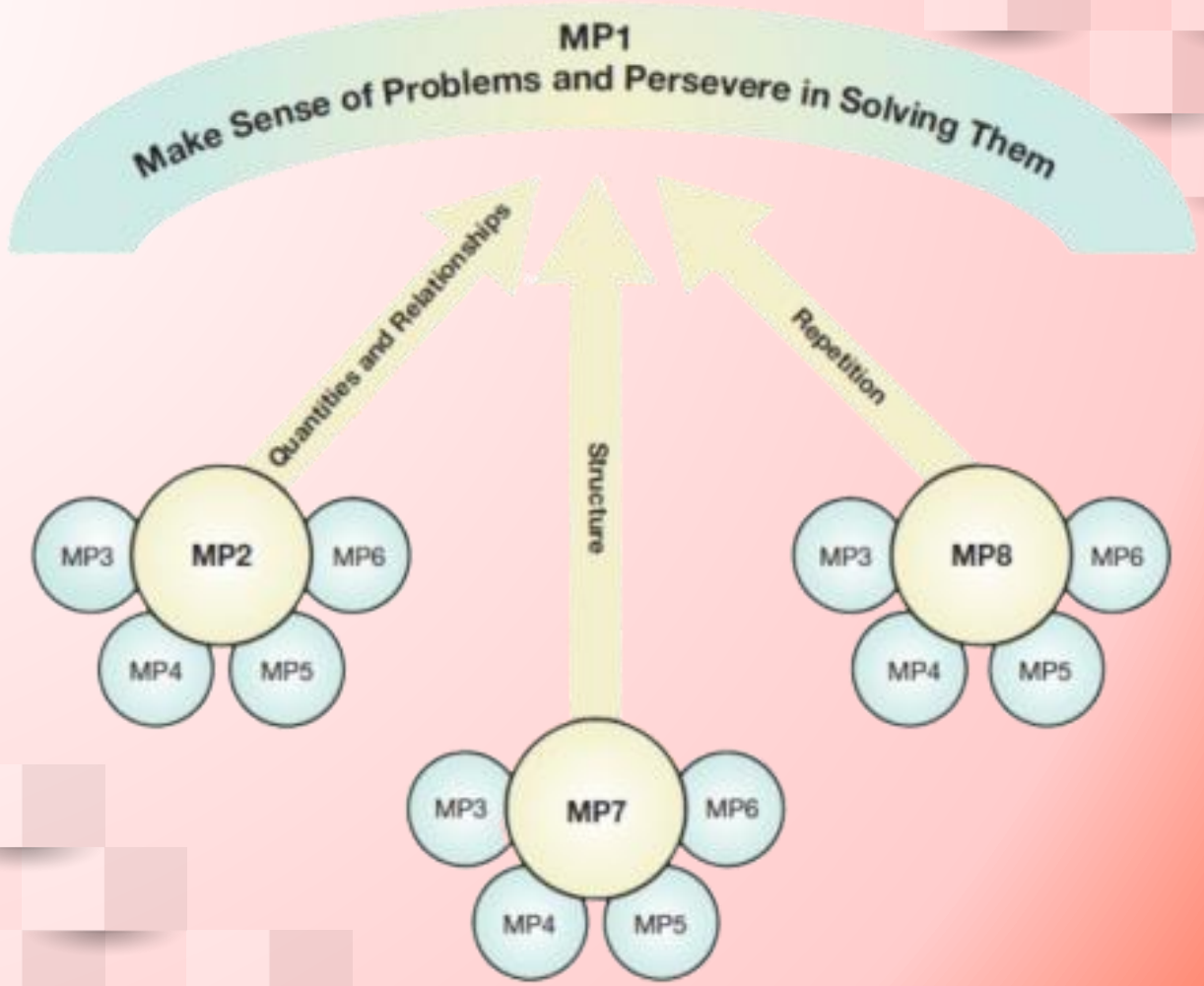
Look for regularity and repeated reasoning (SMP 8)

Think about what you are doing over and over to establish procedure

2+2+2+2+2 = 10



$\frac{3}{8} + \frac{2}{4} = ?$ $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{24}$ 2 x 5 =


MP1
Make Sense of Problems and Persevere in Solving Them
Quantities and Relationships
Structure
Repetition
MP3
MP2
MP6
MP4
MP5
MP3
MP8
MP6
MP4
MP5
MP3
MP7
MP6
MP4
MP5

Growth Mindset and Identity

How can we help young people see themselves as capable mathematicians?

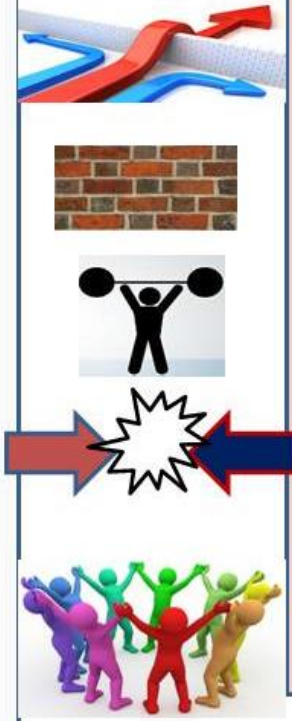
Take one minutes to write down what you know or have heard about the idea of “growth mindset.”

Fostering a Growth Mindset

Fixed Mindset

intelligence is static

- **Challenges** … avoid
- **Obstacles** … give up
- **Effort** … no point
- **Criticism** … deflect
- **Success of others** … feel threatened



Growth Mindset

intelligence is developing

- **Challenges**… embraces
- **Obstacles** … fortitude
- **Effort** … work hard
- **Criticism** … learns
- **Success of others** … celebrates

Growth Mindset for Mentors

60 minute online module

www.mindsetkit.org

Topic 1: What is a Growth Mindset?

Topic 2: How Mentors Support Growth Mindset

Topic 3: Key Strategy: Using Growth Mindset Language

Topic 4: Key Strategy: Reframing Challenges, Failures, and Mistakes

Topic 5: Additional Tips and strategies

Changing Mindset:

Questions & Feedback

- Questions support students in sense-making
- Feedback prompts to support students when they
  - Struggle
  - Are making progress
  - Succeed

Using Growth Mindset Language and Fostering Math Practices

You and a partner will work on a math problem. One partner plays the student, and the other plays the tutor.

Use the last three pages to determine the situation and develop a response

Students have not yet developed a growth mindset, so the tutor will help the student reframe things in growth mindset language. Use your handouts to help you!

The driver of the 48 bus drives for 8 hours each day. They drive a route that is 18 miles long and ends at the same place it starts – the intersection of MLK and Rainer Avenue. 2 times each hour, how many miles did they drive in one day?

Questions?

Thank you for coming!

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BIG CONCEPT

Bring the attention of your audience over a key concept using icons or illustrations

HELLO!

I am Jayden Smith

I am here because I love to give presentations.

You can find me at @username

1.

TRANSITION HEADLINE

Let’s start with the first set of slides

“Quotations are commonly printed as a means of inspiration and to invoke philosophical thoughts from the reader”

THIS IS A SLIDE TITLE

- Here you have a list of items
- And some text
- But remember not to overload your slides with content

Your audience will listen to you or read the content, but won’t do both.

YOU CAN ALSO SPLIT YOUR CONTENT

White

Is the color of milk and fresh snow, the color produced by the combination of all the colors of the visible spectrum.

Black

Is the color of coal, ebony, and of outer space. It is the darkest color, the result of the absence of or complete absorption of light.

IN TWO OR THREE COLUMNS

Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

Red

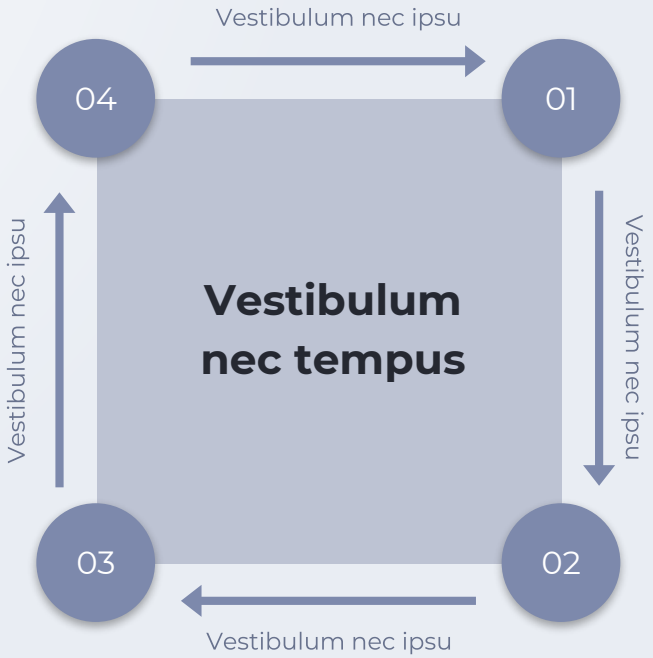
Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

A PICTURE IS WORTH A THOUSAND WORDS

A complex idea can be conveyed with just a single still image, namely making it possible to absorb large amounts of data quickly.

WANT BIG IMPACT?
USE BIG IMAGE.

USE DIAGRAMS TO EXPLAIN YOUR IDEAS



AND TABLES TO COMPARE DATA

	A	B	C
Yellow	**10**	**20**	**7**
Blue	**30**	**15**	**10**
Orange	**5**	**24**	**16**

MAPS

89,526,124

Whoa! That’s a big number, aren’t you proud?

89,526,124$

That’s a lot of money

185,244 users

And a lot of users

100%

Total success!

OUR PROCESS IS EASY

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

20XX

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

20XX

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

20XX

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

20XX

LET'S REVIEW SOME CONCEPTS

Yellow

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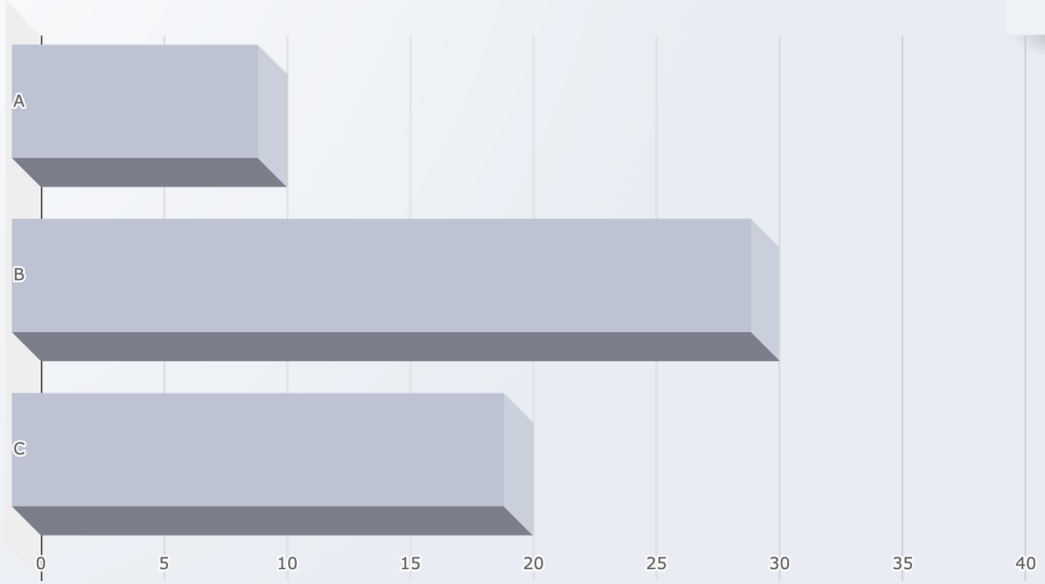

You can insert graphs from Google Sheets

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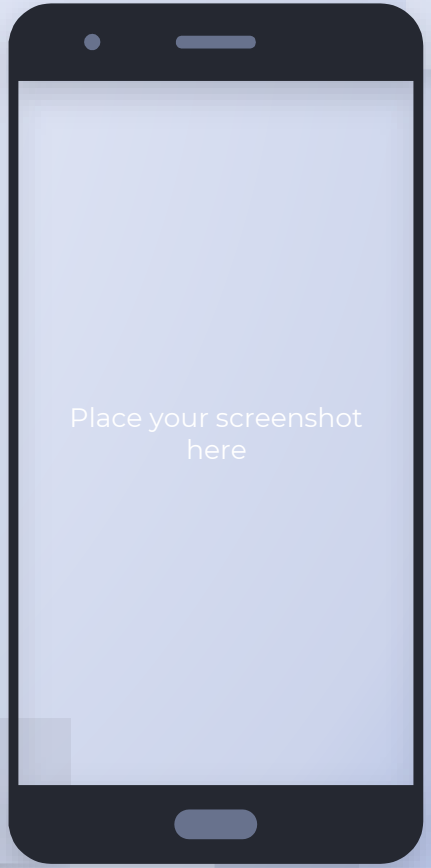

TABLET PROJECT

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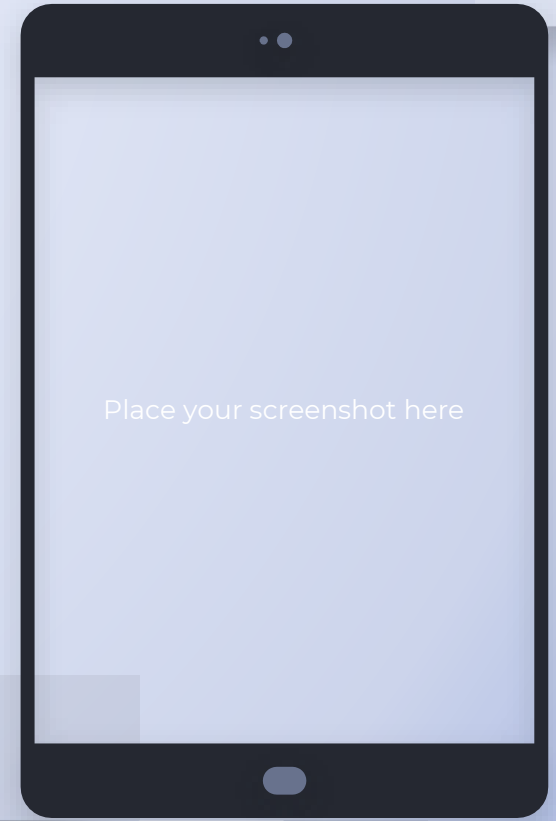

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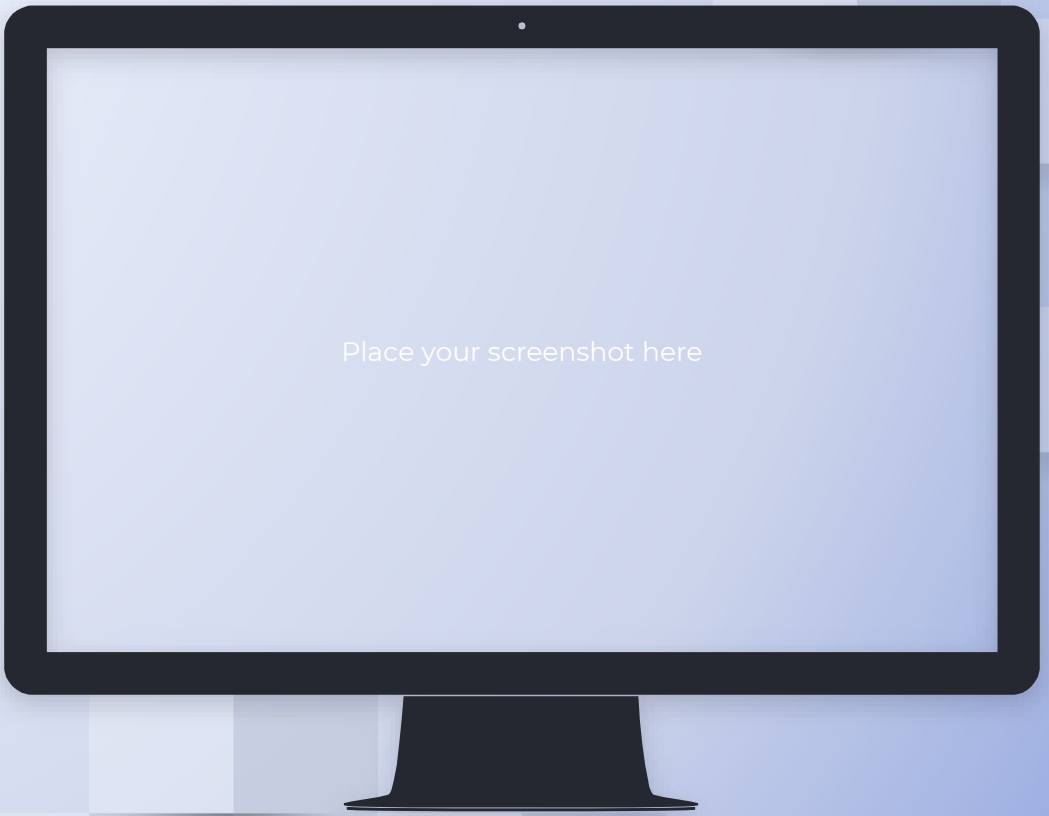

THANKS!

Any questions?

You can find me at:

- @username
- user@mail.me

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SlidesCarnival icons are editable shapes.

This means that you can:

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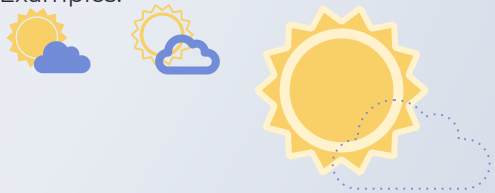
- Change fill color and opacity.
- Change line color, width and style.

Isn't that nice? :)

Examples:



You can also use any emoji as an icon!
And of course it resizes without losing quality.

How? Follow Google instructions
https://twitter.com/googledocs/status/730087240156643328

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Blow your audience away with attractive visuals