

All-City Tutors: Helping Students Make Sense of Math

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October 21st, 2017

Goals

- ▶ Know the key content in grades K - 5
- ▶ Use tools to understand, represent, and solve problems
- ▶ Support students' sense-making and growth mindset through questioning
- ▶ *What do you hope to get out of today's session?*

Horseshoes

- ▶ Use four digits to create an expression whose value is closest to a target number.
 - ▶ Example: The target number is 37. The digits are 2, 4, 4, and 9.
 - ▶ Possible values: 43, with $49 - 4 - 2$
38, with $9 \times 4 + 4 - 2$
37, with $44 - 9 + 2$

Number Talk

What is $524 + 289$?

Goals of a Number Talk

- ▶ Think flexibly with numbers
- ▶ Reason and make sense
- ▶ Convince and Question

Another Number Talk

What is $325 - 26$?

Do they still teach the standard algorithm?

- ▶ Yes, and....
- ▶ A better question might be, “WHEN do they teach the standard algorithm?”

Standard Algorithms

- ▶ Multi-digit Addition & Subtraction: 4th grade
 - ▶ Multi-digit Multiplication: 5th Grade
 - ▶ Multi-digit Division: 6th Grade
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- ▶ Why not teach the algorithm first?
 - ▶ What are they doing before they learn it?

Multiplication & Division

$$4 \times 16$$

How many ways can you
find the product?

Multiplication & Division

- working towards the standard algorithm

Using **Partial Products** and **Partial Quotients** to make sense of Multiplication & Division (10 min)

Tools to Promote Sense-making

Concrete Tools:

Pattern blocks, base-10 blocks, square tiles,
Unifix cubes, counters, 10-frames, fraction
circles & strips

Visual Tools:

Number lines, number bonds, area models,
partial sums/differences/products/quotients,
bar models (tape diagrams)

Growth Mindset

How can we help young people become capable mathematicians?

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

Fostering a Growth Mindset

Adolescent Brain Development

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 to support students in sense-making

Feedback prompts to support students when they

- ▶ Struggle
- ▶ Are making progress
- ▶ Succeed

Changing Mindset

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

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!

Questions?

Thank you for coming!

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