Strengthsfinding: Building Mathematical Proficiency
Through a Strengths-Based Lens

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Think about the words:

- used to describe a learner who struggles
- spoken to a learner who struggles
What if we captured all these words?

Language barrier

She is a low-slow

Won't listen to a thing I say!

Can't/ won't get it.

Can't count to 10 - how will they ever add?

Always confused

Can't focus on the simplest problem.

The whole family is like that...

Under achieving

unmotivated

Lazy

Bad attitude
“The words we speak become the house we live in.”

Fourteenth century Persian Poet, Shams-ud-din Muhammad Hafiz (c. 1320-1389)
How does a deficit perspective about our students, colleagues and families influence our teaching practices?
“It’s Okay... Not everyone can be good at math...”

Exploring how we sometimes deliver mixed messages that confuse children.

(Rubie-Davies, 2010)
COVID-19 and student learning in the United States: The hurt could last a lifetime (McKinsey & Company)

CREDO, an education research organization, recently projected that the average student lost 136 to 232 days of learning in math, depending on their state.

New report finds COVID-19 learning loss will be drastic, and students will need significant support (CSBA)

Overcoming COVID-19 Learning Loss… (Education Week)

Academically Speaking, the 'COVID Slide' Could Be a Lot Worse Than You Think (Inside School Research)

Report: Up to 4 months of 'COVID slide' learning loss expected in K-5 (Education Dive)
Deficit Cycles Are Vicious - Assessment Cycle

- Identify Weaknesses
- Assess Computational Skills
- Build Targeted Intervention Based on Computational Skills
Deficit Cycles Are Vicious - Access Cycle

- Falling Behind
- Access Vocabulary in Word Problems
- Reduce the students opportunities to learn
- Reduce the Cognitive Rigor of the Problem
Deficit Cycles Are Vicious - Access Cycle

1. Instruct students on "Missed" content
2. Remote learning
3. Divide students by remote access
4. Students "Missed" Instruction
Deficit Cycles are Vicious - How Many Cycles? How Many Students?

- Build Targeted Intervention Based on Computational Skills
- Instruct students on “Missed” content
- Divide students by remote access
- Students “Missed” Instruction
- Remote learning
- Access Vocabulary in Word Problems
- Reduce the Cognitive Rigor of the Problem
When we understand our beliefs and expectations and systematically work towards making instructional decisions that reflect high expectations for all students, our students achieve more.

(Rubie-Davies, Peterson, Sibley, & Rosenthal, 2015)
ALL Children are Brilliant
Five Teaching Turnarounds

1. Identifying Your Teaching Strengths
2. Your Students’ Mathematical Strengths
3. Design Instruction from a Strengths-Based Perspective
4. Help Students Develop their Points of Power
5. Promote Strengths in the School Community
What are your Teaching Strengths?

- How often and when do you reflect on your own teaching strengths?
- How do you leverage your own teaching strengths to address challenges?
I teach because I’m still inspired by a great teacher I had when I was a kid. So, I get that what we do every single day truly matters.

- I think I can make mathematics memorable.

$K^2$
Math Teacher

Beth Kobett

- Strategic Thinker
- Questioner
- Connecting mathematical ideas
- Strong Beliefs in Students
A teacher affects eternity; he can never tell where his influence stops. (Henry Adams)

How might we...
Attitude
People Builder
Team Builder

Lifelong Learner

Faith & Belief

Are we teaching our students to “do math” or to critically think as “doers of mathematics?” (Staley, 1987)

Love of teaching
...students
...for understanding
...C-R-A
...multiple representation
...technology

John W. Staley, Ph. D.
Baltimore County Public Schools

jstaley@bcps.org
Good listener

Hard working

Team Player

Persistent

Reflective

Thy Dinh
Math TOSA
Poway USD
San Diego, CA
- patience and genuine curiosity about students’ thinking
- connecting representations; snapping pictures of students’ work and facilitating discussion to connect their thinking
- asking questions to understand
- growth mindset about students and teachers
- focus on equity
- knowing the elementary process and content standards well
- enjoy collaborating and sharing ideas
- friendly and genuinely want to help teachers and students learn and grow

Karla Bandemer
Grades 3-5 Math Teacher Leader
Lincoln Public Schools, Lincoln, NE
I believe in the power of PERSEVERANCE.

Every student and teacher is a Mathematician. We are all natural mathematicians.

Mathematical thinking and reasoning applies in all aspects of life.

Conceptual understanding and asking “Why” is my go-to for teaching and learning.

Who Am I? Lunella Lafayette, the smartest Marvel Hero and I am 9.

It is never too late to learn something new, hard, or different.

Ask questions and keep asking them until things make sense.

Discussion and talk is where mathematical ideas come alive. Every voice matters.

I develop a learner’s mindset and stance in everyone I meet.

Take the time to invite and include families.
What would be on Your slide?
Strengths Spotting
How do you interpret the following student comments?

I don’t get it!

This doesn’t make sense!
Your Students’ Mathematical Strengths

- Conceptual Understanding
- Procedural Fluency
- Strategic Competence
- Adaptive Reasoning
- Productive Disposition

(National Research Council, 2001)
Leveraging Strengths
<table>
<thead>
<tr>
<th>Component</th>
<th>Definition (NRC, 2001)</th>
<th>What this looks like as a Strength</th>
</tr>
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<tbody>
<tr>
<td>Conceptual Understanding</td>
<td>Comprehension of mathematical concepts, operations, and relationships</td>
<td>When students make a comment when something doesn’t make sense to them, that is an indication that they desire mathematics to be a sense-making experience.</td>
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<tr>
<td></td>
<td></td>
<td>They are CU seekers!</td>
</tr>
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<td>Productive Disposition</td>
<td>Habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy</td>
<td>Students who demonstrate strength in productive disposition express interest and joy when learning mathematics. They are likely to join the after school math club, even when if they believe that mathematics isn’t their best subject. They are just curious and fascinated. They work diligently, even when faced with obstacles. They try again when stymied.</td>
</tr>
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</table>
Building Strengths in Problem Solving

● Encourage students to persevere by calling attention to students who continue to solve the problem amidst confusion.

● Select tasks for students to showcase their perseverance.

● Give students a “walk back” option by explicitly helping them connect to prior knowledge to break a barrier they are facing.

● Engage students in creating different ways to show their solutions through such means as concrete materials, visuals, or verbal presentations.
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<td>Procedural Fluency</td>
<td>Skill in carrying out procedures flexibly, accurately, efficiently, and appropriately</td>
<td>Students who demonstrate strength in procedural <strong>fluency</strong> want to record their actions about mathematical problems using procedures, often represented by symbols, sometimes with words, and sometimes with a combination of symbols, sketches, and words. Early on, they construct their own procedures and recording approaches that document their thinking as a way to demonstrate their mathematics learning.</td>
</tr>
<tr>
<td>What are some facts you know?</td>
<td>What are some facts you are learning?</td>
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<td>-------------------------------</td>
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<td></td>
</tr>
<tr>
<td>$7 \times 7 = 49$</td>
<td>$7 \times 8 = 56$</td>
<td></td>
</tr>
<tr>
<td>$8 \times 8 = 64$</td>
<td>$6 \times 8 = 48$</td>
<td></td>
</tr>
<tr>
<td>$6 \times 6 = 36$</td>
<td>$3 \times 8 = 24$</td>
<td></td>
</tr>
<tr>
<td>$5 \times 5 = 25$</td>
<td>$4 \times 8 = 32$</td>
<td></td>
</tr>
<tr>
<td>$2 \times 4 = 8$</td>
<td>$3 \times 7 = 21$</td>
<td></td>
</tr>
<tr>
<td>$5 \times 2 = 10$</td>
<td>$9 \times 3 = 27$</td>
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</tr>
<tr>
<td>$2 \times 6 = 12$</td>
<td>$3 \times 4 = 12$</td>
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<td>$7 \times 2 = 14$</td>
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<td>Strategic Competence</td>
<td>Ability to formulate, represent, and solve mathematical problems</td>
<td>Students who demonstrate strength in strategic competence thrive when representing their mathematical thinking. They sketch pictures, make graphs from data, construct and use number lines, hundreds charts, and strip diagrams to solve problems.</td>
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<td></td>
<td></td>
<td>They may focus on one representation or choose to represent their thinking using multiple representations. These students flourish when they can select their own way to solve a problem or represent their thinking.</td>
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<td>Adaptive Reasoning</td>
<td>Capacity for logical thought, reflection, explanation, and justification</td>
<td>Students who demonstrate strength in adaptive reasoning love to explain their work and hear about the approaches others used. They often remember details about their own work that may seem extraneous to others. They thrive when they are offered opportunities to share their mathematical ideas with peers or other adults. These students also thrive when they apply mathematics they are learning to situations that reflect their interests, culture, or family contexts.</td>
</tr>
</tbody>
</table>
Jake

- What are the student’s strengths?
- How can the student’s strengths be leveraged?

3 + 4 = 8

21 + 23 = 100
Up Next, **Turnaround Three:** Building Students’ Strengths through Instructional Design
Chalk Talk
Connecting Ideas
Addition and Subtraction

$6 + 2 = 8$

Fact Families
$2 + 5 = 7$ and $7 - 5 = 2$

Make 10

Doubles like $7 + 7 = 14$

Opposites

Double and half it

Count On and Count Back

Mines is take away

$10 - 5 = 5$

$4 + 4 = 8$

$8 - 4 = 4$
Chalk Talks

Addition and Subtraction

Fact Families:
2 + 5 = 7 and 7 - 5 = 2

Make 10

Doubles like 7 + 7 = 14

Opposites

Double and half it

Count On and Count Back

 Mines is take away
Addition and Subtraction

6 + 2 = 8

Double and half it

Fact Families
2 + 5 = 7 and
7 - 5 = 2

4 + 4 = 8
8 - 4 = 4

Doubles like 7 + 7 = 14
Count On and Count Back
Make 10

Opposites
Mines is take away
Math Amendments

What representations will enhance your solution?

How can you use mathematics vocabulary to communicate your idea?

What can you add to your explanation to communicate your understanding of the task, the math, and the reason you picked a particular solution strategy?
## Recognizing and Building Communication Strengths

<table>
<thead>
<tr>
<th>Oral Explanation</th>
<th>Active Listening</th>
<th>Using Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organized explanation</td>
<td>Listens to others speak</td>
<td>Uses tools strategically</td>
</tr>
<tr>
<td>Explains reasoning</td>
<td>Does not interrupt</td>
<td>Explains why tools were selected</td>
</tr>
<tr>
<td>Explains different strategies used</td>
<td>Asks strategic follow up questions that connects to the strategy or solution</td>
<td>Model matches the problem</td>
</tr>
<tr>
<td>Uses precise vocabulary</td>
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</table>
Share our ideas

Respectfully listen with our ears and eyes.

Show our models and representations.

Ask questions when we want to know more.

Ask for suggestions about how to make our work stronger.

Share what we like about our classmates work.

Ask for permission before making a suggestion.

Show and explain our models and representations.
Line 1 - First name
Line 2 - Four adjectives that describe your strengths
Line 3 - Three math activities we have done in math class that you love
Line 4 - Two of your favorite mathematics topics
Line 5 - Two ways you have grown as a math student this year
Line 6 - Three people who you like to ask for math help
Line 7 - Four math tools you are in expert in using
Line 8 - Last name
OUR MATHEMATICS IDENTITIES
Strengths-Based Mathematics Learning: A Tool Kit for Families

Affirming Mathematics Strengths

I am capable of ____
I am strong in ____
I work hard at ____
I am proud of ____
I trust my decision to ____

Family Communication About Mathematics

Directions:
Our experiences learning mathematics often shape how we feel and communicate about mathematics. As you work with your family members to learn mathematics, please write down your communication and consider how you might turn it around to include strengths-based language.

I said... I want to say...
i can't do this. I CAN do this!

https://resources.corwin.com/teachingturnarounds
Strengths Work is Equity Work

- Students and teachers are valued for what they bring to the learning environment.
- Diversity in ideas, culture, traits, and dispositions are viewed as strengths.
- The Learning Community (students, teachers, leaders, families) recognizes what learners know.
- Focusing on strengths helps us understand underlying beliefs about who can do mathematics.
- Strengths-Spotting supports students to develop positive mathematical identities.