

Math Strategies

Inverse Operations

Resources



With

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This document is given to participants who attended the Math Strategy Sessions presented by Build Math Minds. You can watch the Strategy Sessions inside the Build Math Minds PD site, enroll here: buildmathminds.com/bmm

Hi! I'm Christina

Teaching math isn't easy and for a lot of teachers, it isn't fun...like **AT ALL!!** Especially in this era of education, there is a lot of unknowns about what and how we should be teaching. You are **NOT** alone.

With the implementation of something new all the time, teachers are feeling bogged down and yet left out on their own to make sense of it all. We are here to help with that.

Many students do not learn math the same way we did. All of us embarked on a journey to increase our understanding of mathematics in order to teach it to our students. Now we get the pleasure of helping other teachers learn what we have learned about how children think about mathematics.

This resource is meant to get you started with activities to provide your students as they develop their understanding of math strategies.

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buildmathminds.com/bmm-ss

I'm the founder of BMM, but there is a team of us that have created these resources. Inside the PD site, you will see videos and documents that are also created by Ann Elise Record and Rosalba Serrano. This resource was created by Rosalba Serrano. Check out Rosalba's work at ZennedMath.com



From left to right: Ann Elise Record, Rosalba Serrano and Christina Tondevold

These slides can be modified to suit your students' needs. We have provided these examples as a way for you to get started and see the various activities you can use to help your students develop an understanding of the Inverse Operation Strategy. You need to do what's right for you & your students. They are suggestions of what you COULD do and not what you HAVE to do. Each slide is a sample, please adjust number sets and contexts accordingly.

Strategy Practice *Number Talk*

$$554 - 226$$

$$226 + ? = 554$$

$$0.61 - 0.48$$

$$0.48 + ? = 0.61$$

$$576 \div 8$$

$$8 \times ? = 576$$

$$37.2 \div 6$$

$$6 \times ? = 37.2$$

$$3\frac{2}{5} - 1\frac{4}{5}$$

Efficiency

Number Talk

Which Strategy?

$$99 - 43$$

- Make it Friendly/
Compensation
- Decomposition
- Place Value
Decomposition
- Using the inverse
operation

Which Strategy?

$$8.5 - 5.7$$

- Make it Friendly/
Compensation
- Decomposition
- Place Value
Decomposition
- Using the inverse
operation

Which Strategy?

$$12.8 \div 4$$

- Make it Friendly/
Compensation
- Decomposition
- Place Value
Decomposition
- Using the inverse
operation

Number Routines

What Equations?

15

9

6

What Equations?

20

4

5

What Equations?

$$\frac{2}{5}$$

$$\frac{5}{5}$$

$$\frac{3}{5}$$

True or False?

$$15 + 9 = 6$$

$$9 + 6 = 15$$

$$9 - 6 = 15$$

$$15 - 6 = 9$$

True or False?

$$20 \times 5 = 4$$

$$5 \times 4 = 20$$

$$5 \div 4 = 20$$

$$20 \div 4 = 5$$

True or False?

$$6 \times 0.3 = 0.2$$

$$0.3 \times 0.2 = 6$$

$$0.3 \div 0.2 = 6$$

$$6 \div 0.2 = 0.3$$

Tip

$$9 + \underline{\quad} = 15$$

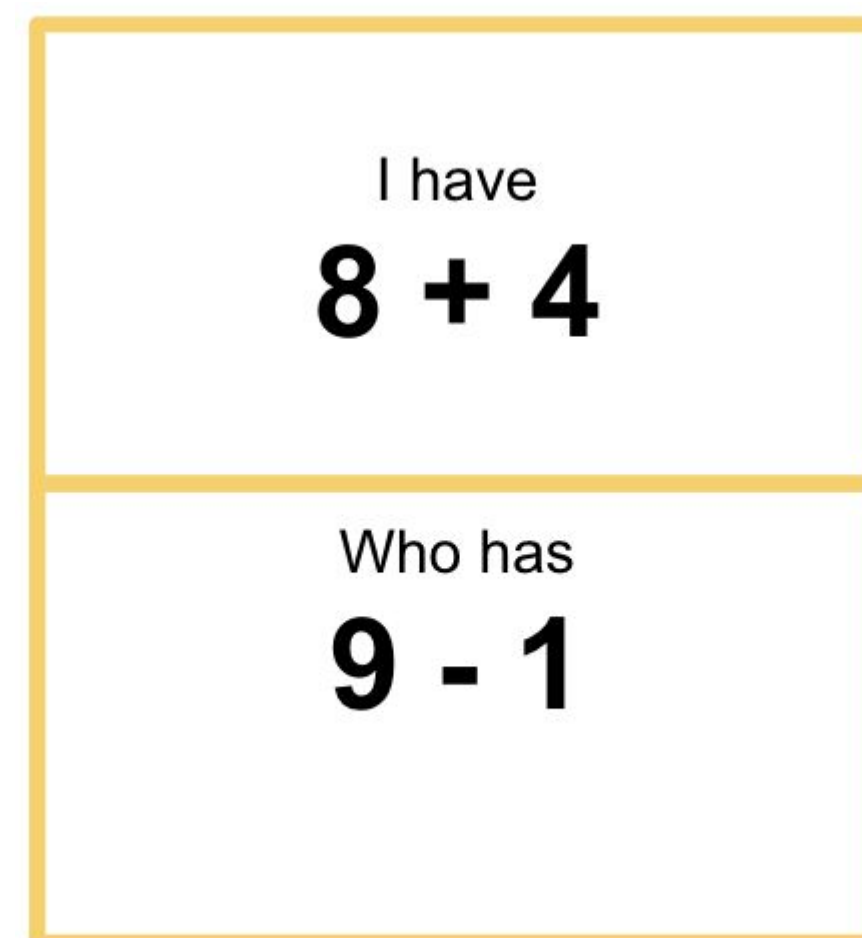
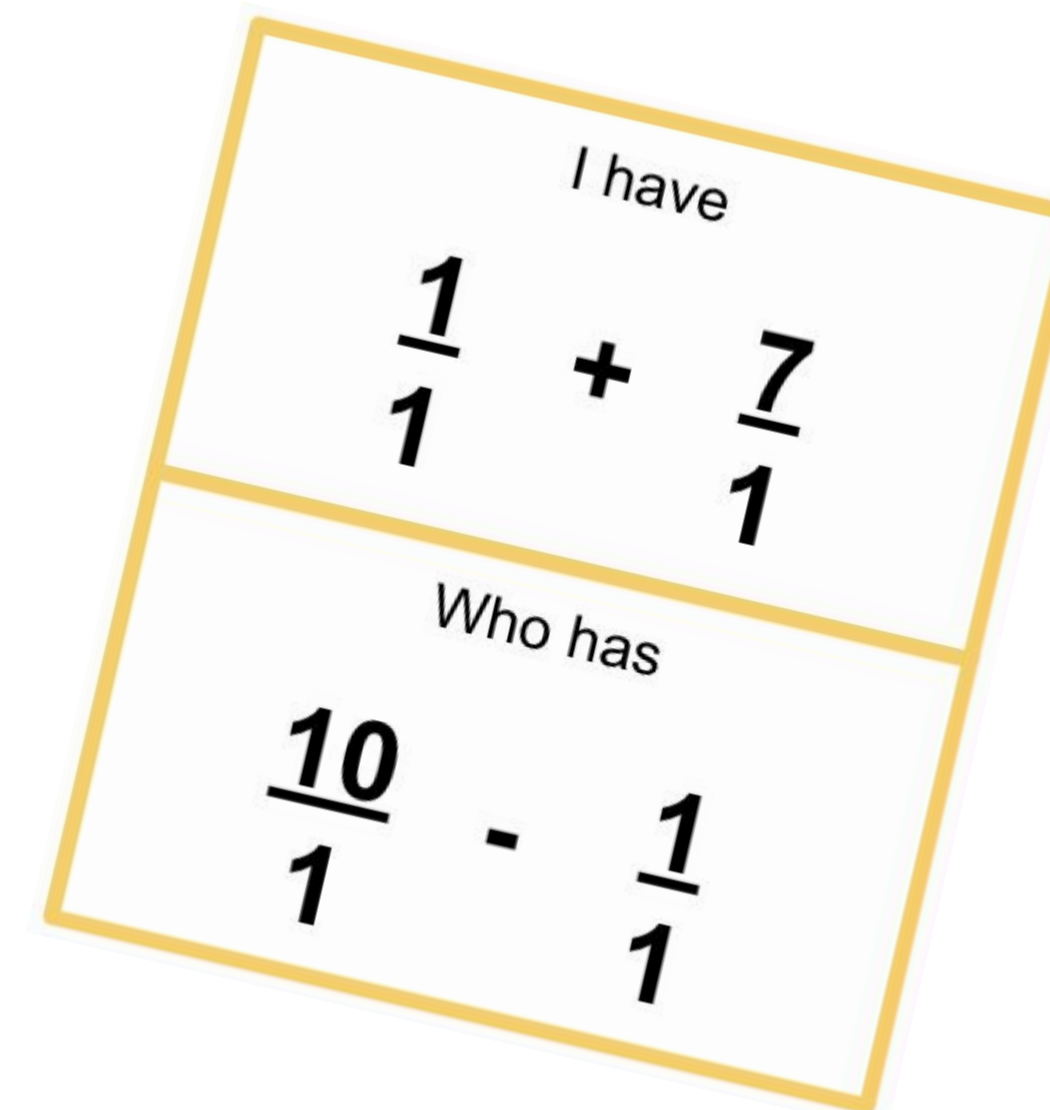
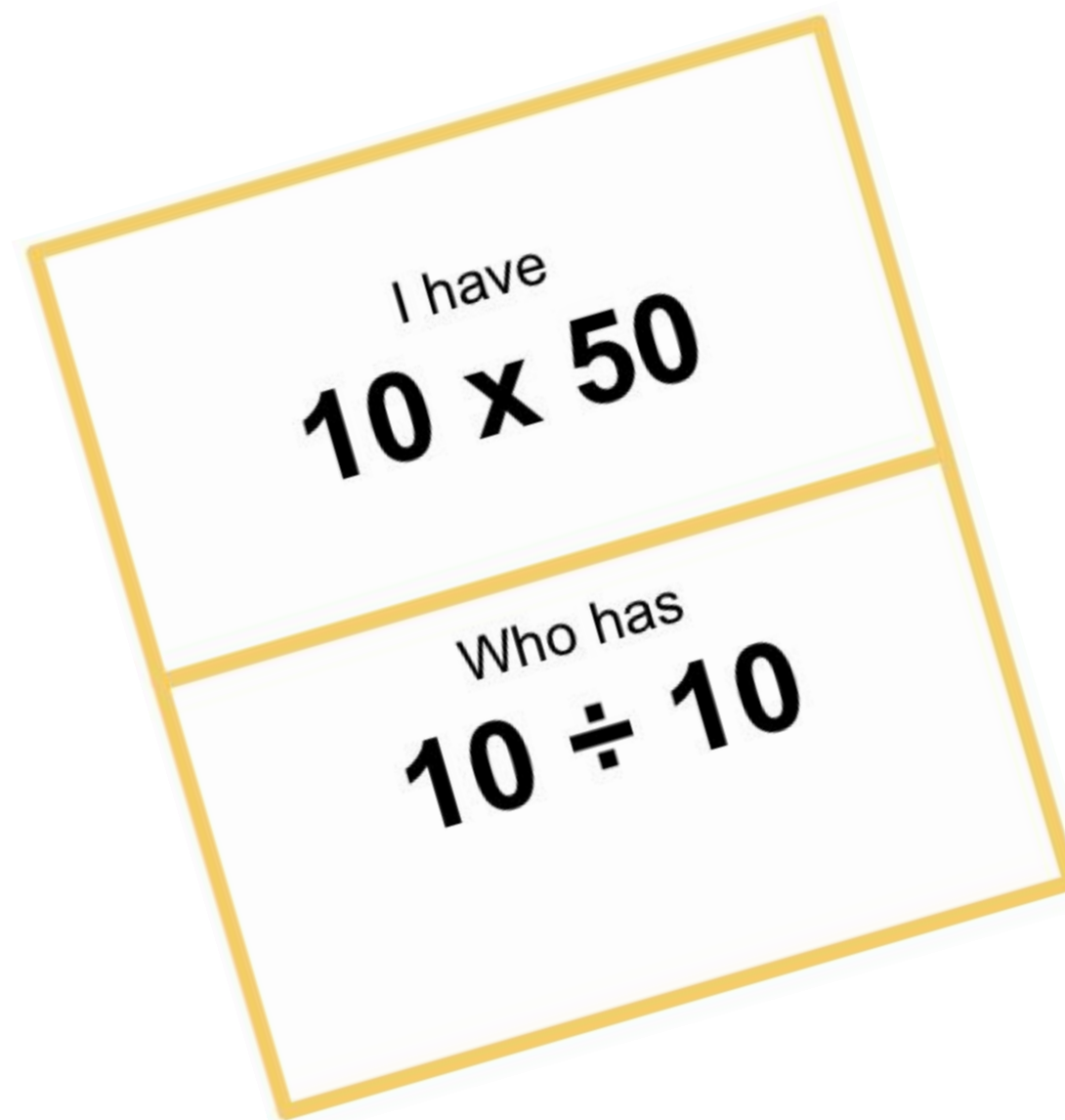
$$6 + \underline{\quad} = 15$$

$$15 - \underline{\quad} = 9$$

$$15 - \underline{\quad} = 6$$

Games/Practice

I Have/Who Has



I have

Who has

I have

Who has

I have

Who has

I have

Who has

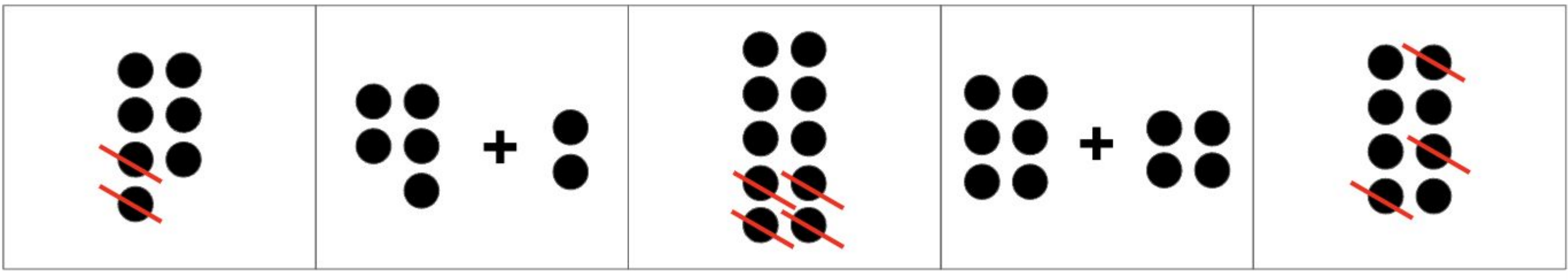
I have

Who has

I have

Who has

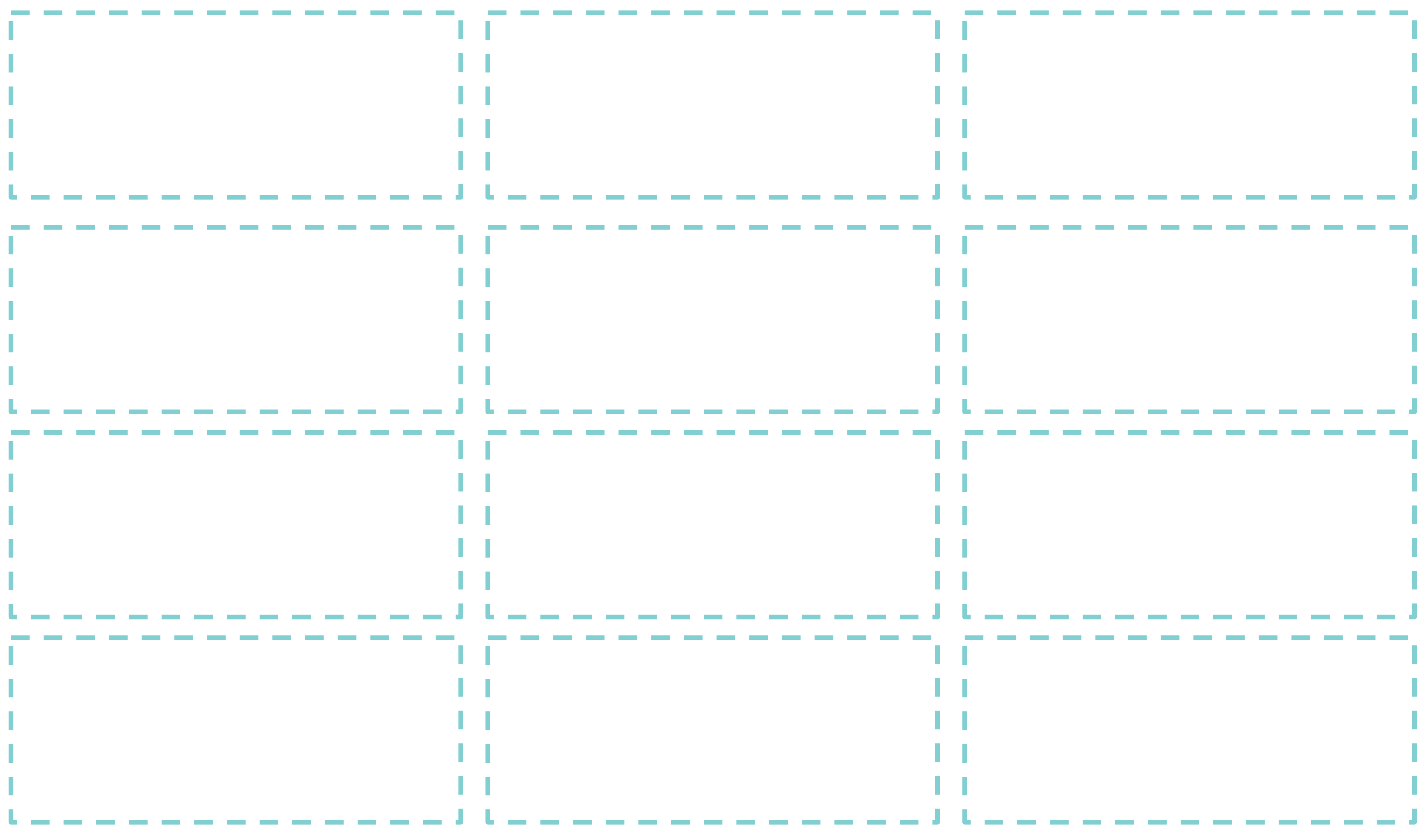
Memory



$\frac{0}{1} + \frac{6}{1}$	$\frac{0}{1} + \frac{7}{1}$	$\frac{0}{1} + \frac{8}{1}$
$\frac{100}{1} - \frac{0}{1}$	$\frac{10}{1} - \frac{0}{1}$	$\frac{9}{1} - \frac{0}{1}$
$\frac{0}{1} + \frac{9}{1}$	$\frac{0}{1} + \frac{10}{1}$	$\frac{0}{1} + \frac{100}{1}$
$\frac{8}{1} - \frac{0}{1}$	$\frac{7}{1} - \frac{0}{1}$	$\frac{6}{1} - \frac{0}{1}$

5×0	5×1	5×2
$25 \div 5$	$20 \div 5$	$15 \div 5$
5×3	5×4	5×5
$10 \div 5$	$5 \div 1$	$5 \div 0$

$3 + 0$	$3 + 1$	$3 + 2$
$8 - 5$	$7 - 3$	$6 - 3$
$3 + 3$	$3 + 4$	$3 + 5$
$5 - 2$	$4 - 1$	$3 - 0$



School Store



Word Problems

Culturally Relevant Word Problems



THE CULTURAL ICEBERG

SURFACE CULTURE

Food
Flags Festivals
Fashion Holidays Music
Performances Dances Games
Arts & Crafts Literature Language

DEEP CULTURE

Communications Styles and Rules:

Facial Expressions Gestures Eye Contact
Personal Space Touching Body Language
Conversational Patterns in Different Social Situations
Handling and Displaying of Emotion
Tone of Voice

Notions of:

Courtesy and Manners
Friendship Leadership
Cleanliness Modesty
Beauty

Concepts of:

Self Time Past and Future
Fairness and Justice
Roles related to Age, Sex,
Class, Family, etc.

Attitudes toward:

Elders Adolescents Dependents
Rule Expectations Work Authority
Cooperation vs. Competition
Relationships with Animals Age
Sin Death

Approaches to:

Religion Courtship Marriage
Raising Children Decision-Making
Problem Solving

Plug and Play

28 - 16

Person (name), place (setting), thing (item)
Action involved

Difference unknown

Person (name), place (setting), thing (item)

Make Culturally Relevant Problems with Context/less Word Problems

28 - 16

There were 28 _____ on _____.
16 of those _____ did not get _____.
How many _____ will _____?

Example: There were 28 shows on Disney Channel. 16 of those shows did not get renewed for a second season this year.
How many Disney shows will get a second season this year?

	Result Unknown	Change Unknown	Start Unknown
Add To (Join)	John had 4 balloons blown up. His brother blew up 8 more for him. How many balloons does he have blown up now?	John had 4 balloons blown up. His brother blew up some more. Now he has 12 balloons blown up. How many balloons did his brother blow up?	John had some balloons blown up. His brother blew up 8 more. Now he has 12 balloons blown up. How many balloons did he have blown up to start?
Take From (Separate)	John had 12 balloons blown up. His brother popped 8 of them. How many balloons does he have blown up now?	John had 12 balloons blown up. His brother popped some of them. Now he has 4 balloons blown up. How many balloons did his brother pop?	John had some balloons blown up. His brother popped 8 of them. Now he has 4 balloons blown up. How many balloons did he have before his brother popped some?
Put Together/ Take Apart (Part-Part-Whole)	Total Unknown	Addend Unknown	Both Addends Unknown
	John had 8 red balloons and 4 blue balloons. How many balloons does he have?	John had 8 red balloons and the rest are blue. If he has 12 total balloons, how many blue balloons does he have?	John has 12 balloons some are red and some are blue. How many of each color could he have?
Compare	Difference Unknown	Bigger Unknown	Smaller Unknown
	(more version) John has 12 balloons. His brother has 8. How many more balloons does John have than his brother? (fewer version) John has 12 balloons. His brother has 8. How many fewer balloons does his brother have than John?	(more version) John has 4 more balloons than his brother. His brother has 8 balloons. How many balloons does John have? (fewer version) John's brother has 4 fewer balloons than John. His brother has 8 balloons. How many balloons does John have?	(more version) John has 4 more balloons than his brother. John has 12 balloons. How many balloons does his brother have? (fewer version) John's brother has 4 fewer balloons than John. John has 12 balloons. How many balloons does his brother have?

	Unknown Product	Group Size Unknown	Number of Groups Unknown
	$5 \times 6 = ?$	$5 \times ? = 30$ or $30 \div 5 = ?$	$? \times 6 = 30$ or $30 \div 6 = ?$
Equal Groups	John had 5 bunches of balloons blown up. Each bunch has 6 balloons. How many balloons does he have blown up? <i>Measurement Example:</i> You need 6 inches of ribbon for each bow you are making. You need to make 5 bows, how much ribbon do you need?	John had 5 bunches of balloons blown up. Each bunch has the same number of balloons. He has 30 balloons total, so how many balloons are in each bunch? <i>Measurement Example:</i> You have 30 inches of ribbon to make 5 bows. If you use the same amount of ribbon for each bow, how much ribbon should you cut for each bow?	John had 30 balloons blown up. He separates them into bunches of 6 balloons. How many bunches can he make? <i>Measurement Example:</i> You have 30 inches of ribbon to make bows. Each bow uses 6 inches of ribbon. How many bows can you make?
Arrays/Area	John has 5 rows of cookies with 6 cookies in each row. How many cookies are there? <i>Area Example:</i> What is the area of a 5 inch by 6 inch rectangle?	John has 30 cookies arranged into 5 equal rows. How many cookies are in each row? <i>Area Example:</i> A rectangle has an area of 30 inches. One side is 5 inches long. How long is the other side?	John has 30 cookies arranged with 6 cookies in a row. How many rows of cookies does he have? <i>Area Example:</i> A rectangle has an area of 30 inches. One side is 6 inches long. How long is the other side?
Compare	John sold 5 items during the school fundraiser. His brother sold 6 times as much as John. How many items did his brother sell? <i>Measurement Example:</i> John sawed off 6 inches of a board to make a shelf, but decided that was too small. So he cut one that was 5 times longer. How long was the new board?	John's brother sold 30 items in the school fundraiser. That is 5 times as much as what John sold. How many items did John sell? <i>Measurement Example:</i> John sawed off a board to make a shelf, but decided that it was too small. So he cut one 30 inches and that was 5 times longer than the first one. How long was the first board cut?	John's brother sold 30 items in the school fundraiser and John sold 5 items. How many times as much did John's brother sell than John? <i>Measurement Example:</i> John sawed off 6 inches of a board to make a shelf, but decided that was too small. So he cut one 30 inches. How many times as long is the new board than the first one?

Additional Tips

Fluency involves- accuracy, flexibility, and efficiency.

Instruction requires ongoing reinforcement.

Strategy choice is about the individual student.

Students must learn and practice strategies so they can **CHOOSE** and **USE** them.

Figuring Out Fluency

