Word Problems

March 17, 2023

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Say hello.

Describe your spring break plans!

November 2022
Operations
- Addition and subtraction concepts
- Multiplication and division concepts
- Computation with addition, subtraction, multiplication, and division

January 2023
Fractions
- Length, area, and set models
- Comparison of fractions
- Ordering of fractions
- Computation of fractions

March 2023
Word-Problem Solving
- Attack strategies
- Schemas

April 2023
Geometry
- Understanding two-dimensional shapes
- Lines and angles
- Understanding three-dimensional shapes
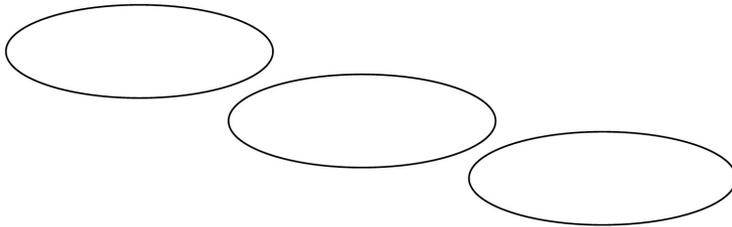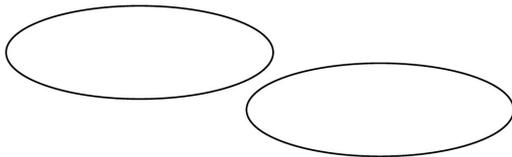
Instructional Platform

MATH

Word Problems

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Instructional Platform

Instructional Delivery

Instructional Strategies

Instructional Platform

INSTRUCTIONAL DELIVERY

Explicit instruction

Precise language

Multiple representations

INSTRUCTIONAL STRATEGIES

Fluency building

Problem solving instruction

MATH

MODELING

Step-by-step explanation

Planned examples

PRACTICE

Guided practice

Independent practice

SUPPORTS

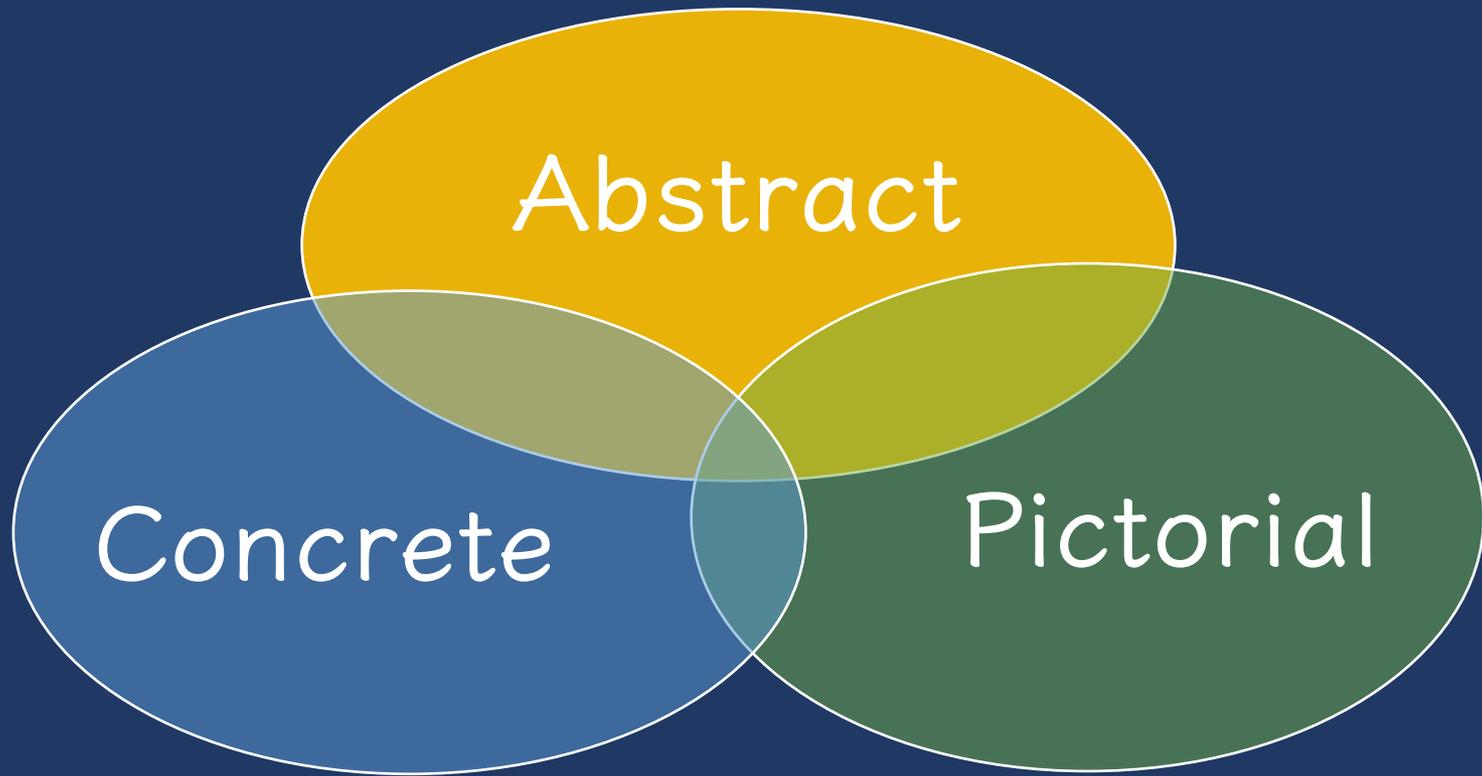Ask high-level and low-level questions

Eliciting frequent responses
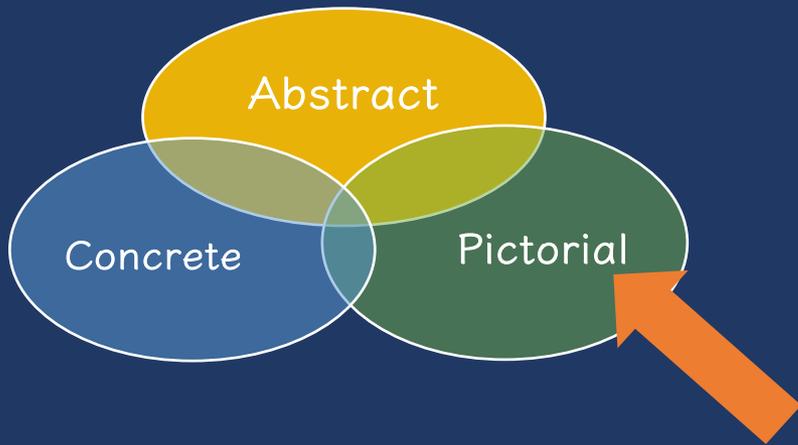
Providing affirmative and corrective feedback

Use formal math language

Use terms precisely

Abstract

Concrete

Pictorial

Virtual Manipulatives

Number & Operations

Place Value

Fractions & Decimals

Integers & Algebra

Geometry

Time & Money

Data & Probability

Extras

Help students see and learn math using different tools!

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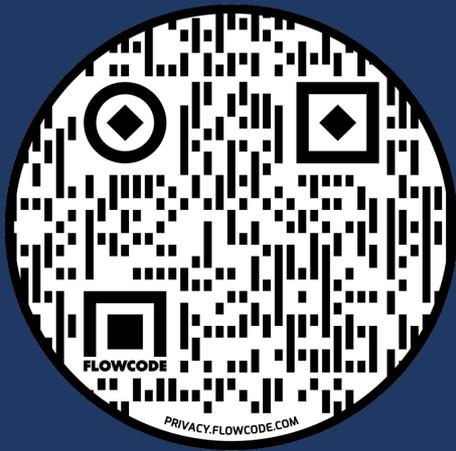
Fractions & Decimals

fraction strips	fraction strips	fraction strips	Cuisenaire rods
fraction circles	geoboard	geoboard	geoboard	pattern blocks
two-color counters	decimal strips	place value disks	percentage strips	

MATH

Addition | Subtraction

Multiplication | Division

Counting

Comparing numbers

Counting coins

Telling time

Identifying equivalent fractions

Knowing multiples

Identifying shapes

Knowing formulas

MATH

Word-Problem Solving

Maya has 120 caramel apples to sell. Each caramel apple is covered with one topping.

- $\frac{1}{5}$ of the caramel apples are covered with peanuts.
- $\frac{1}{3}$ are covered with chocolate chips.
- $\frac{3}{10}$ are covered with coconut.
- The rest are covered with sprinkles.

How many caramel apples are covered with sprinkles?

A 100

B 33

C 25

D 20

Solve the problem

What skills are necessary to solve this problem?

Maya has 120 caramel apples to sell. Each caramel apple is covered with one topping.

- $\frac{1}{5}$ of the caramel apples are covered with peanuts.

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How many caramel apples are covered with sprinkles?

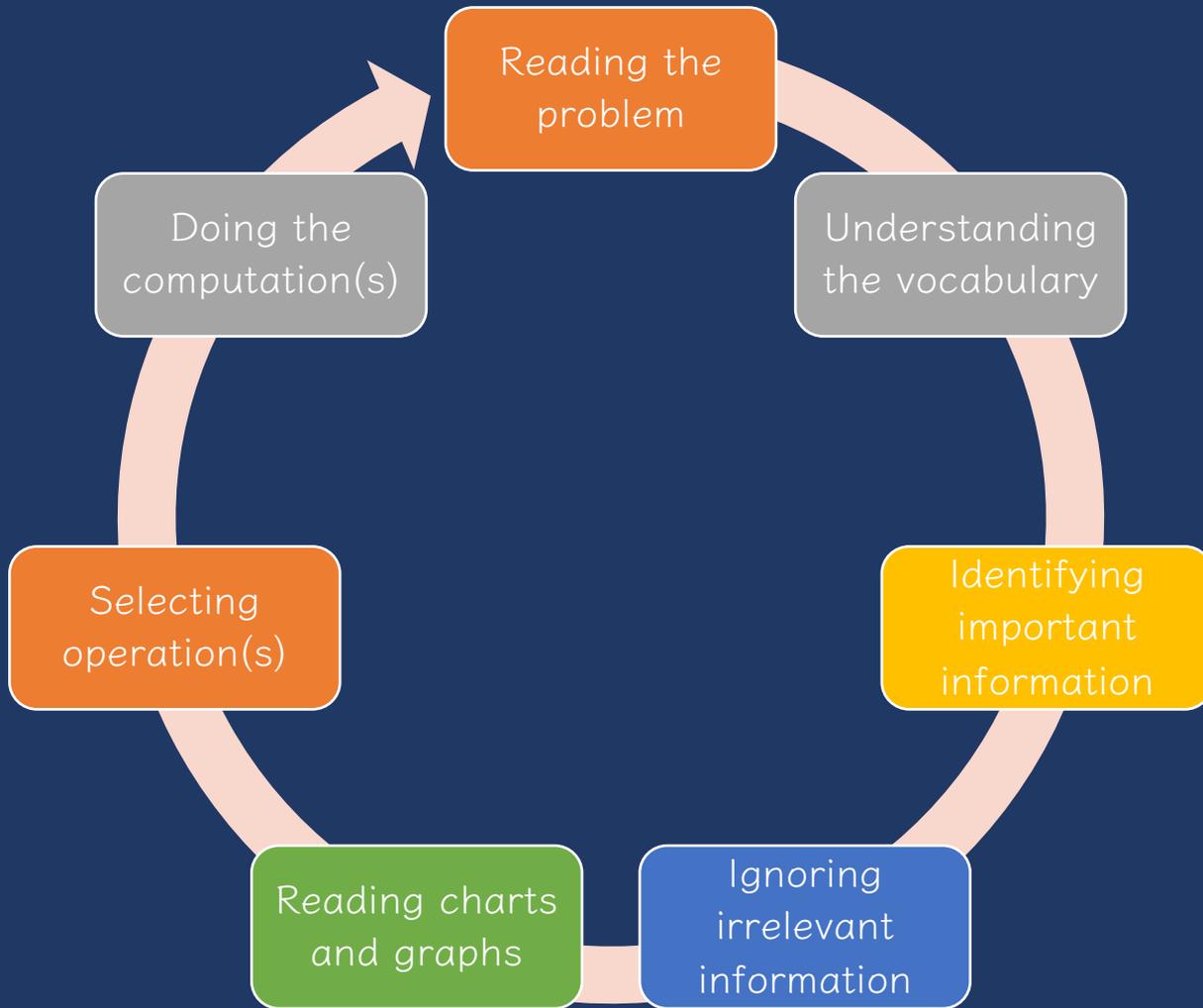**A** 100

B 33

C 25

D 20

How would you solve this problem?

What skills are necessary to solve this problem?

MA+H

Word-Problem Solving

```
┌─────────────────┐
│                 │
│                 │
└─────────────────┘

┌──────────────┐        ┌──────────────┐
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│              │        │              │
└──────────────┘        └──────────────┘

┌──────────────┐        ┌──────────────┐
│              │        │              │
│              │        │              │
└──────────────┘        └──────────────┘

┌──────────────┐   ┌──────────────┐
│              │   │              │
│              │   │              │
└──────────────┘   └──────────────┘
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Teaching Problem Solving

Reading the problem

Understanding the vocabulary

Identifying important information

Ignoring irrelevant information

Reading charts and graphs

Selecting operation(s)

Doing the computation(s)

M∆+H

Ineffective Strategies

1.Keywords tied to operations

Lincoln had 8 pencils **fewer** than Roscoe. If Roscoe had 18 pencils, how many pencils did Lincoln have?

Lincoln had 8 pencils **fewer** than Roscoe. If Lincoln had 18 pencils, how many pencils did Roscoe have?

Description of Single-Step Word Problems (n = 132)											
	Occurrence of schema		Any keyword		Schema-specific keywords[a]		Multiple keywords[a]		Keyword(s) led to correct solution[a]	
Schema	n	%	n	%	n	%	n	%	n	%
Total	27	20.5	26	96.3	23	88.5	5	19.2	21	80.8
Difference	17	12.9	17	100.0	14	82.4	2	11.8	12	70.6
Change	11	8.3	7	63.6	5	71.4	5	71.4	2	28.6
Equal groups	29	22.0	26	89.7	22	84.6	18	69.2	8	30.8
Comparison	10	7.6	9	90.0	9	100.0	4	44.4	5	55.6
Ratios or proportions	29	22.0	23	79.3	9	39.1	9	39.1	6	26.1
Product of measures	9	6.8	9	100.0	8	88.9	1	11.1	5	55.6

[a]When a problem featured a keyword.

Description of Multi-Step Word Problems (n = 84)

Schema	Occurrence of schema[a]		Any keyword		Keyword(s) led to correct solution[b]	
	n	%	*n*	%	*n*	%
Total	40	47.6	39	97.5	3	7.7
Difference	11	13.1	11	100.0	1	9.1
Change	21	23.8	19	95.0	1	5.3
Equal groups	49	58.3	48	98.0	1	2.1
Comparison	7	8.3	7	100.0	0	0.0
Ratios or proportions	22	25.0	16	76.2	1	6.3
Product of measures	7	8.3	7	100.0	2	28.6

[a]Sum across schemas does not equal 100 because each word problem featured more than one schema.

[b]When a problem featured a keyword.

Mr. Rivera's taxable income is $20 each hour before taxes are taken out.
Mr. Rivera worked a total of 40 hours each week for 50 weeks.

What is the dollar amount, to the nearest dollar, taken out for taxes based on Mr. Rivera's taxable income?

Jessica rented 1 video game and 3 movies for a total of $11.50.

- The video game cost $4.75 to rent.
- The movies cost the same amount each to rent.

What amount, in dollars, did Jessica pay to rent each movie?

The temperature of a substance decreased by 24°C per minute for 3 minutes. What was the overall change of the temperature of the substance?

Keywords are important to identify and understand

Keywords are the mathematical vocabulary that help an students understand what the story is about and what they need to do

Talk about keywords ("What does *more than* tell you about?")

But, *do not* tie a keyword to a specific operation!
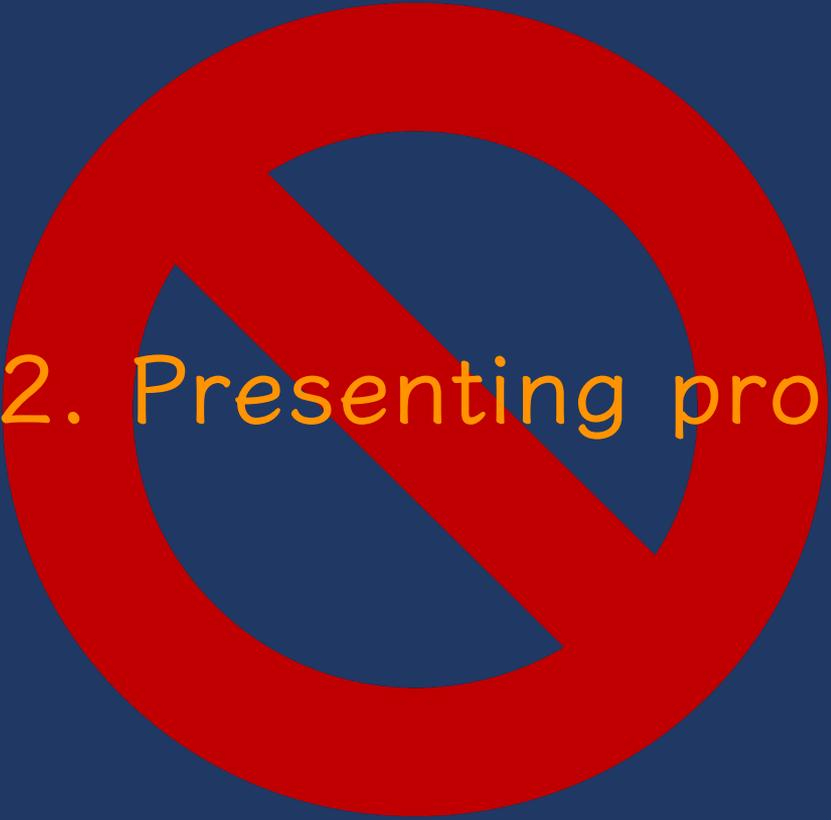
2. Presenting problems by operation

MA+H

Addition Word Problems

Name: _____ Date: _____

Solve the word problems. Show your work.

1. Noah had 12 books. He got 5 more b_____ did Noah have in all?

2. Bonnie found 8 rocks on he_____ backyard. How many rock_____

3. Edward had 5 toy cars_____ toy cars. How _____ cars did Edward have _____

4. Mariela collected 11 fe_____ she found 3 more feathers. How many feathers di_____ all?

5. LaMonte made 14 cookies_____ more cookies. How many cookies did LaM_____

education.com

DIVISION WORD PROBLEMS

1. Zookeeper Al w_____ monkey at the zoo an equal number of ban_____ monkeys in the zoo and 567 bananas. How ma_____ ach monkey get? And How many are left ove_____ elf?

2. Betty has 427 oranges_____ ck them up equally in 23 boxes. How many ora_____ ox and how much does she have left over?

_____ing has 1376 p_____ er. She wants to _____ to scrap p_____ r 32 students. How _____ l each p_____ many extra pages will _____

4. _____ scrap paper. He instead wants t_____ es each but forgets to check if that_____ dents. Will there be enough _____ w much more scrap paper does he

Effective Strategies

Teach an attack strategy

Teach about schemas

Maya has 120 caramel apples to sell. Each caramel apple is covered with one topping.

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- $\frac{3}{10}$ are covered with coconut.

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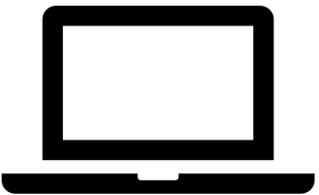
What was your process for working through this problem?

MATH

Attack Strategy

SOLVE

Study the problem.
Organize the facts.
Line up the plan.
Verify the plan with computation.
Examine the answer.

R-CUBES

Read the problem.
Circle key numbers.
Underline the question.
Box action words.
Evaluate steps.
Solve and check.

UPS√

UNDERSTAND
Read and explain.

PLAN
How will you solve the problem?

SOLVE
Set up and do the math!

√**CHECK**
Does your answer make sense?

M A + H

RIDE

Read the problem.

Identify the relevant information.

Determine the operation and unit for the answer.

Enter the correct numbers and calculate, then check the answer.

RIDGES

Read the problem.
I know statement.
Draw a picture.
Goal statement.
Equation development.
Solve the equation.

MATH

STAR

Stop and read the problem carefully.

Think about your plan and the strategy you will use.

Act. Follow your plan and solve the problem.

Review your answer.

RICE

Read and record the problem.

Illustrate your thinking.

Compute.

Explain your thinking.

MA+H

SUPER

Slowly read the story problem twice.
Underline the question and circle the numbers you need.
Picture it. Draw the scenario to show what is happening.
Explain the problem with a number sentence.
Rewrite the answer in a sentence.

SHINES

Slowly and carefully read the problem.
Highlight or underline key information.
Identify the question by drawing a circle around it.
Now solve the problem. Show your work.
Examine your work for precision, accuracy, and clarity.
Share your answer by writing a sentence.

MATH

SOLVE

Study the problem.

Organize the facts.

Line up the plan.

Verify the plan with computation.

Examine the answer.

R-CUBES

Read the problem.
Circle key numbers.
Underline the question.
Box action words.
Evaluate steps.
Solve and check.

MATH

Share your favorite attack strategy.

Describe how you will use the attack strategy in your teaching,

Teach an attack strategy

Teach about schemas

Total

Difference

Change

Equal Groups

Comparison

Ratios/Proportions

MATH

Additive Word Problems

Meanings of Addition

Meanings of Subtraction

Parts put together into a total

Danielle saw 4 cardinals and 5 blue jays. How many birds did Danielle see?

Start with a set, add the other set, count sum

$$2 + 3 = 5$$
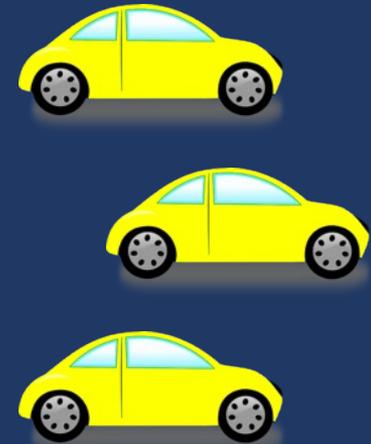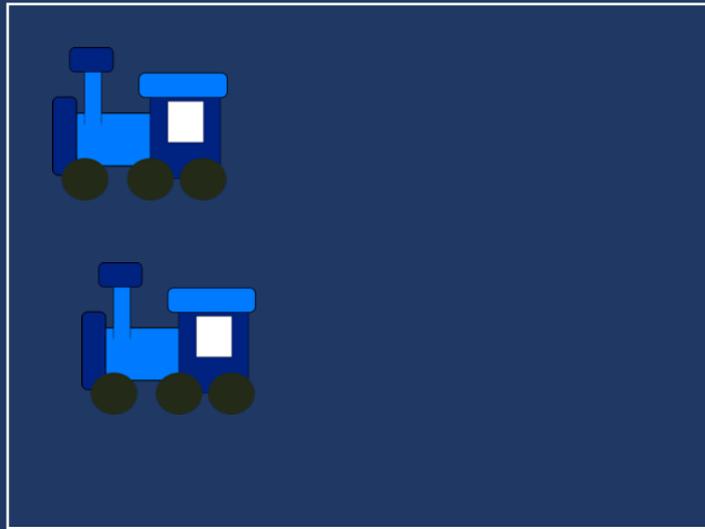
An amount that **increases** or decreases

Nicki had $4. Then they earned $5 for cleaning their room. How much money does Nicki have now?

6 + 7 = __

Share a Total story.

Share a Change/Join story.

MATH

Start with a set, take away from that set, count difference
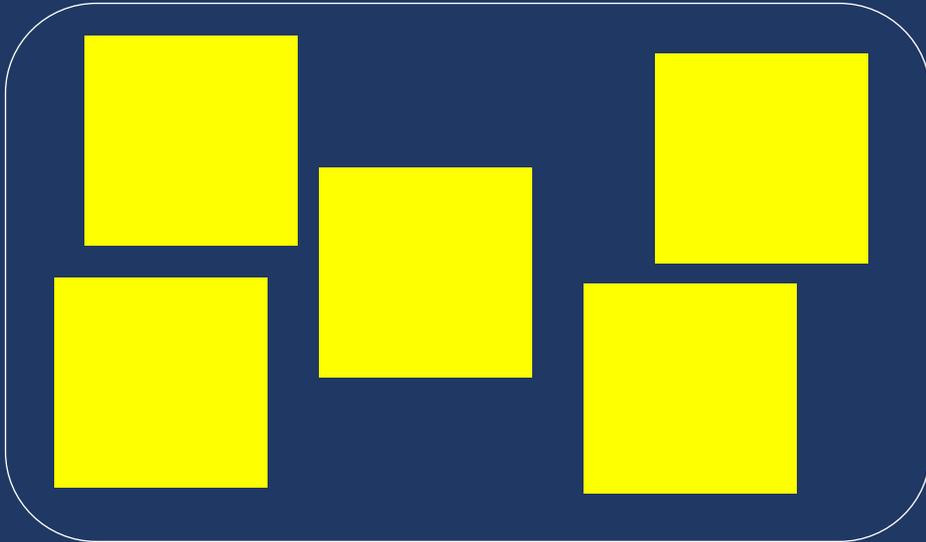
$$5 - 3 = 2$$

Change

An amount that increases or **decreases**

Lisa had 9 cookies. Then they ate 2 of the cookies. How many cookies does Lisa have now?
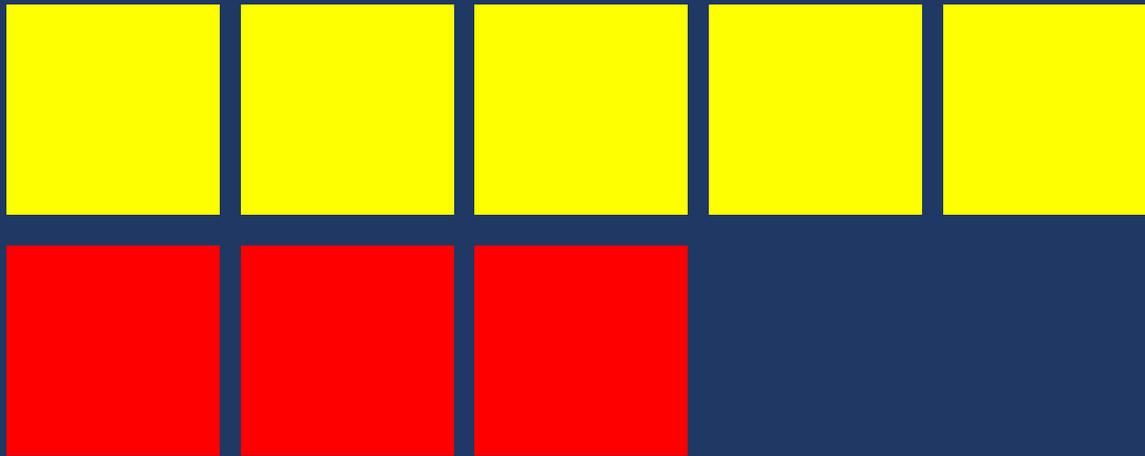
Difference

Greater and less amounts compared for a difference

Molly has 9 pencils. Lauren has 4 pencils. How many more pencils does Molly have? (How many fewer does Lauren have? What's the difference between Molly's and Lauren's pencils?)

14 − 8 = __

Share a Change/Separate story.

Share a Difference story.

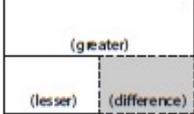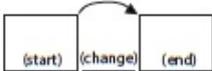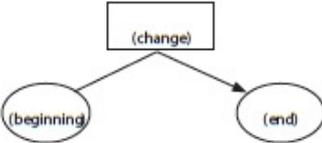| Schema and Definition	Equations and Graphic Organizers	Examples			Variations
Total (Combine; Part-part-whole) Parts combined for a sum	P1 + P2 = T (part + part = total) [diagram: (total) / (part) (part)]	Sum unknown: Lyle has 11 red apples and 18 green apples. How many apples does Lyle have altogether?	Part unknown: Lyle has 29 red and green apples. If 11 of the apples are red, how many green apples does Lyle have?		More than two parts: Lyle has 34 apples. Of the apples, 11 are red, 18 are green, and the rest are yellow. How many yellow apples does Lyle have?
Difference (Compare) Sets compared for a difference	B − s = D (bigger − smaller = difference) G − L = D (greater − less = difference) [diagrams: (bigger) (smaller) (difference); (greater) (lesser) (difference)]	Difference unknown: Sasha wrote 85 words in her essay, and Tabitha wrote 110 words. How many fewer words did Sasha write than Tabitha?	Bigger/greater unknown: Tabitha wrote 25 more words than Sasha. If Sasha wrote 85 words, how many words did Tabitha write?	Smaller/lesser unknown: Tabitha wrote 110 words in her essay. Sasha wrote 25 words fewer than Tabitha. How many words did Sasha write?	(None)
Change (Join; Separate) An amount that increases or decreases	ST +/− C = E (start +/− change = end) [diagrams: (start) (change) (end); (change) / (beginning) (end)]	End (increase) unknown: Jorge had $52. Then, he earned $16 babysitting. How much money does Jorge have now? End (decrease) unknown: Jorge had $52. Then, he spent $29 at the ballpark. How much money does Jorge have now?	Change (increase) unknown: Jorge had $52. Then, he earned some money babysitting. Now, Jorge has $68. How much did Jorge earn babysitting? Change (decrease) unknown: Jorge had $52 but spent some money when he went to the ballpark. Now, Jorge has $23. How much did Jorge spend at the ballpark?	Start (increase) unknown: Jorge has some money, and then he earned $16 for babysitting. Now, Jorge has $68. How much money did he have to start with? Start (decrease) unknown: Jorge had some money. Then, he spent $29 at the ballpark and has $23 left. How much money did Jorge have before going to the ballpark?	Multiple changes: Jorge had $78. He stopped and bought a pair of shoes for $42 and then he spent $12 at the grocery. How much money does Jorge have now?

Total

Additive Word Problems

A.
Ali delivered 12 boxes of cookies on Friday and 25 boxes of cookies on Saturday. How many boxes of cookies did Ali deliver?

B.
In March and April, it rained a total of 11.4 inches. If it rained 3.9 inches in March, how many inches did it rain in April?

C.
Sam mows lawns and made $560 last week. She made $95 on Monday, $135 on Tuesday, and $70 on Wednesday. How much did Sam make on Thursday and Friday?

NOTES ABOUT TOTAL PROBLEMS:

Total

Parts put together into a **total**

Dina saw **3** canoes and **8** kayaks. How many boats did Dina see?

Dina saw **11** boats. If **3** of the boats were canoes, how many were kayaks?

Dina saw **11** boats. **8** of the boats were kayaks, how many were canoes?
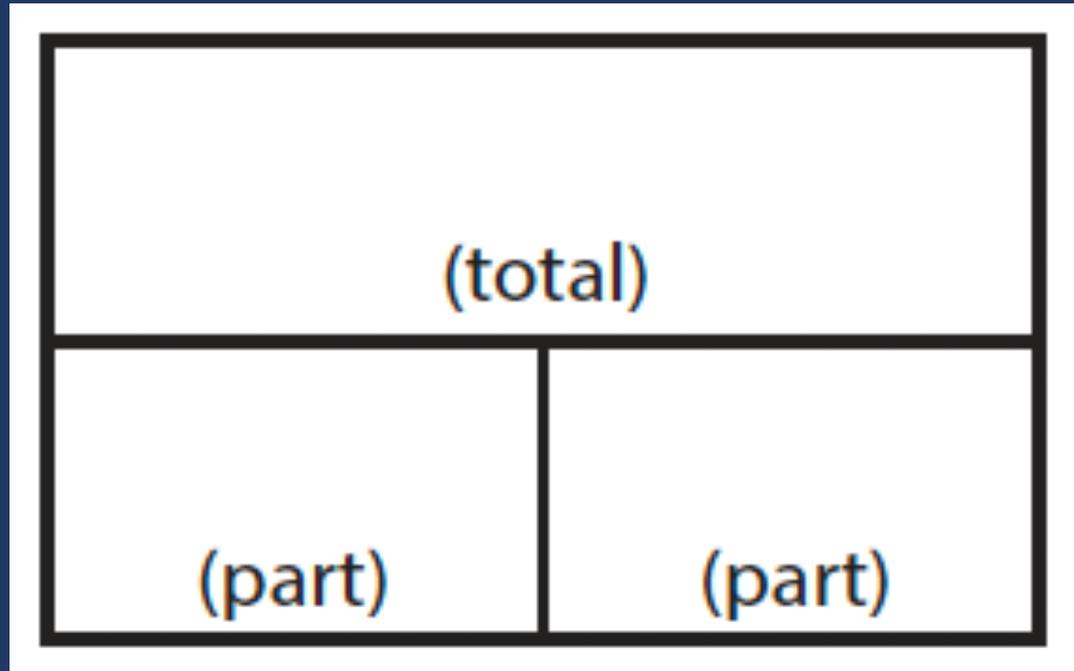
Total

Part

Part

MATH

Total

"Are parts put together for a total?"

P1   +   P2   =   T

Total

Additive Word Problems

A.
Ali delivered 12 boxes of cookies on Friday and 25 boxes of cookies on Saturday. How many boxes of cookies did Ali deliver?

B.
In March and April, it rained a total of 11.4 inches. If it rained 3.9 inches in March, how many inches did it rain in April?

C.
Sam mows lawns and made $560 last week. She made $95 on Monday, $135 on Tuesday, and $70 on Wednesday. How much did Sam make on Thursday and Friday?

NOTES ABOUT TOTAL PROBLEMS:

Total

Write a Total problem.

MATH

Difference

Compare

Greater and **lesser** amounts compared for a **difference**

Bethany has **10** pencils. Grant has **4** pencils. How many more pencils does Bethany have?

Bethany has **6** more pencils than Grant. If Grant has **4** pencils, how many does Bethany have?

Grant has **6** fewer pencils than Bethany. Bethany has **10** pencils. How many pencils does Grant have?

Difference

Greater amount

Lesser amount

MA+H

Total

"Are parts put together for a total?"

Difference

"Are amounts compared for a difference?"

MATH

$$G - L = D$$

(bigger)

(difference)

(smaller)

(greater)

(lesser)   (difference)

M A + H

Difference

Additive Word Problems

D.
Audrey has 162 wooden beads and 95 glass beads. What is the difference between Audrey's wooden beads and glass beads?

E.
Damian's dog eats 9 1/2 cups of dog food each week. Monte's dog eats 4 1/4 cups less each week than Damian's dog. How much does Monte's dog eat in a week?

F.
The temperature in Norfolk was 12 degrees warmer than in Roanoke where the temperature was 79 degrees. It was 86 degrees in Marion. What was the temperature in Norfolk?

NOTES ABOUT DIFFERENCE PROBLEMS:

M A + H

Write a Difference problem.

An amount that **increases** or decreases

Maura had 6 notebooks. Then, she bought 3 notebooks. How many notebooks does Maura have now?

Maura had 6 notebooks. Then, she bought a few more notebooks. Now, Maura has 9 notebooks. How many notebooks did she buy?

Maura had some notebooks. Then, she bought 3 notebooks. Now, Maura has 9 notebooks. How many notebooks did she have to start with?

End amount

Change amount

Start amount

MATH

Change Separate

An amount that increases or **decreases**

Adia baked 20 cookies. Then, she ate 3 of the cookies. How many cookies does Adia have now?

Adia baked 20 cookies. Then, she ate some of the cookies. Now, she has 17 cookies. How many cookies did Adia eat?

Adia baked some cookies. She ate 3 of the cookies and has 17 cookies left. How many cookies did Adia bake?

End amount

Change amount

Start amount

Total

"Are parts put together for a total?"

Difference

"Are amounts compared for a difference?"

Change

"Does an amount increase or decrease?"

MATH

ST   +/−   C   =   E
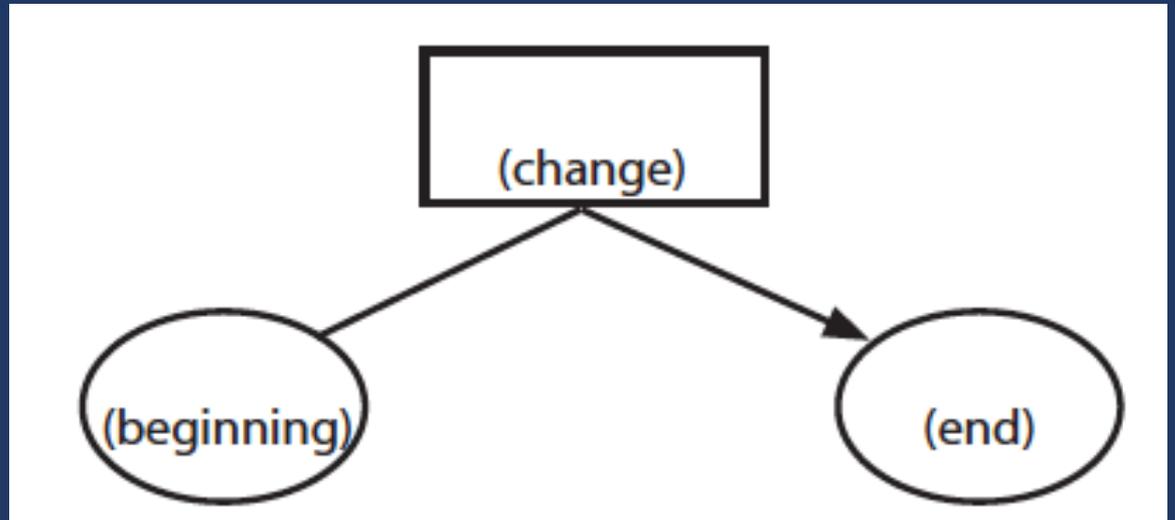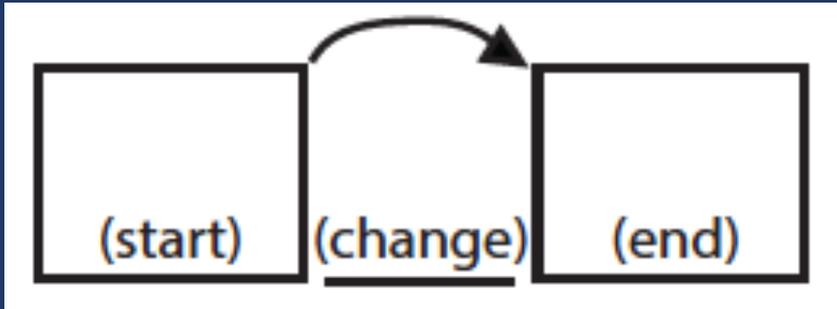
Change

Additive Word Problems

G.
A plant was 3 3/4 inches tall at the beginning of June. By the end of July, the plant was 9 1/8 inches tall. How many inches did the plant grow in 2 months?

H.
Martina has some money in her bank account. Then, she spent $135.69 and has a balance of -$24.80. How much money did Martina have to begin with?

I.
Hui saved $70 in January. In February, she spent $64 of the money she saved. She saved $92 more in March. How much has Hui saved by the end of March?

NOTES ABOUT CHANGE PROBLEMS:

Change

Write a Change problem.

Schema Check!

Pablo goes to a stamp show where he can share, buy, and sell stamps.

26. Part A

The first day, Pablo starts with 744 stamps. He buys 27 stamps from his friend. He then sells 139 stamps.

What is the total number of stamps that Pablo has after the first day of the stamp show?

Grade 3 PARCC

Difference

The graph below shows the number of pounds of plastic the Keller family recycled for five months.

Recycled Plastic

March   April   May   June   July
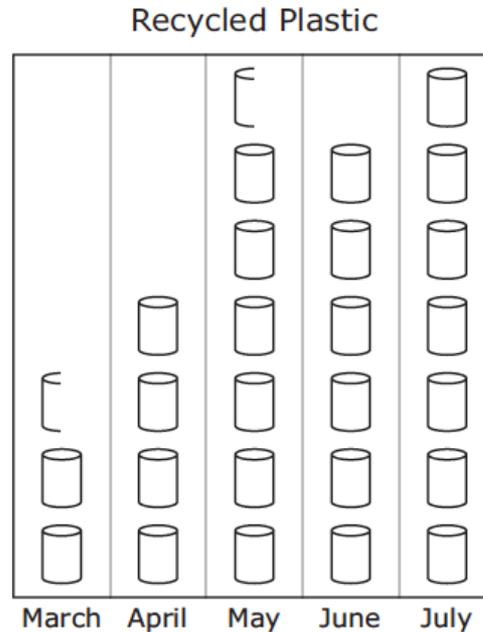
Each ⬭ means 20 pounds.

Based on the graph, how many more pounds of plastic did the family recycle in July than in April?

Mr. Conley delivers packages. The bar graph shows the total number of packages he delivered on five days last week.

Package Delivery

10. Part A

What is the total number of packages Mr. Conley delivered on Monday and Tuesday?

Ⓐ   300

Ⓑ   340

Ⓒ   350

Ⓓ   360

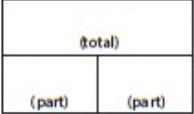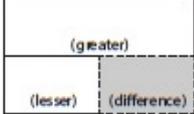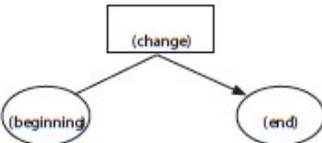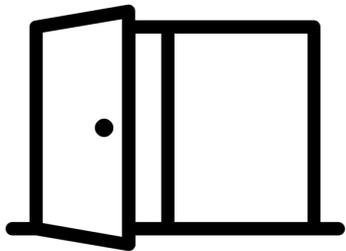| Schema and Definition	Equations and Graphic Organizers	Examples			Variations
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Difference (Compare) Sets compared for a difference	B – s = D (bigger – smaller = difference) G – L = D (greater – less = difference) (bigger) (difference) (smaller) (greater) (lesser) (difference)	Difference unknown: Sasha wrote 85 words in her essay, and Tabitha wrote 110 words. How many fewer words did Sasha write than Tabitha?	Bigger/greater unknown: Tabitha wrote 25 more words than Sasha. If Sasha wrote 85 words, how many words did Tabitha write?	Smaller/lesser unknown: Tabitha wrote 110 words in her essay. Sasha wrote 25 words fewer than Tabitha. How many words did Sasha write?	(None)
Change (Join; Separate) An amount that increases or decreases	ST +/– C = E (start +/– change = end) (start) (change) (end) (change) (beginning) (end)	End (increase) unknown: Jorge had $52. Then, he earned $16 babysitting. How much money does Jorge have now? End (decrease) unknown: Jorge had $52. Then, he spent $29 at the ballpark. How much money does Jorge have now?	Change (increase) unknown: Jorge had $52. Then, he earned some money babysitting. Now, Jorge has $68. How much did Jorge earn babysitting? Change (decrease) unknown: Jorge had $52 but spent some money when he went to the ballpark. Now, Jorge has $23. How much did Jorge spend at the ballpark?	Start (increase) unknown: Jorge has some money, and then he earned $16 for babysitting. Now, Jorge has $68. How much money did he have to start with? Start (decrease) unknown: Jorge had some money. Then, he spent $29 at the ballpark and has $23 left. How much money did Jorge have before going to the ballpark?	Multiple changes: Jorge had $78. He stopped and bought a pair of shoes for $42 and then he spent $12 at the grocery. How much money does Jorge have now?

MA+H

Total

Difference

Change

Which of these schemas would be important to teach?

How do you plan to teach the schemas to your students?

What additional information or materials do you need?

MATH

Multiplicative Word Problems

Meanings of Multiplication

Meanings of Division

Show the groups, show the amount for each group, count product

$$3 \times 2 = 6$$
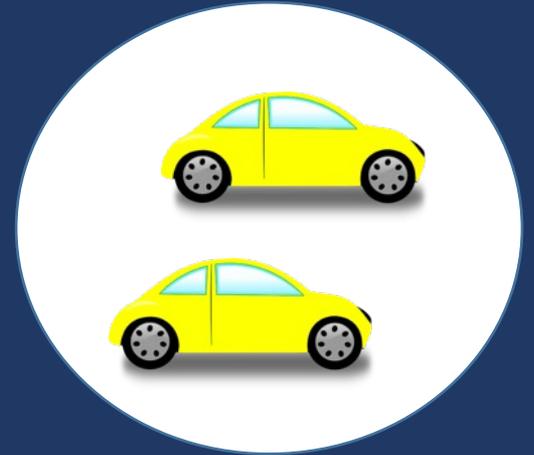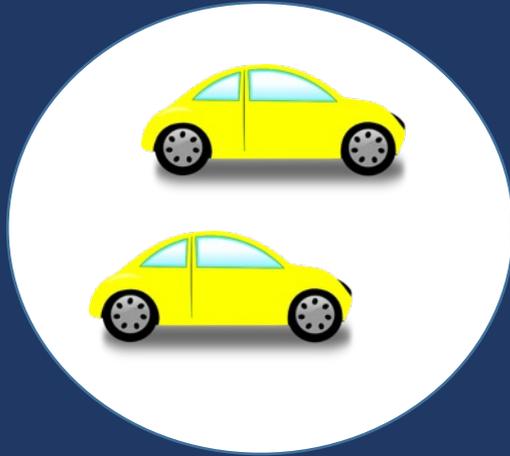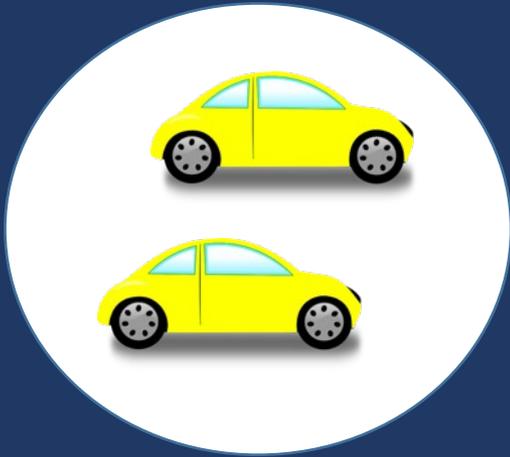
Show the groups, show the amount for each group, count product

$$3 \times 2 = 6$$
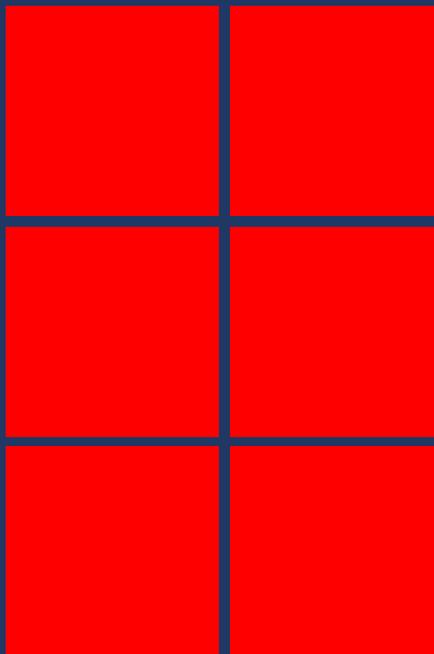
Equal Groups

Groups multiplied by number in each group for a product

Elizabeth has 2 boxes of crayons. There are 12 crayons in each box. How many crayons does Elizabeth have altogether?

Show a set, then multiply the set

$$3 \times 2 = 6$$

Set multiplied by a number of times for a product

Eric picked 6 apples. Maureen picked 2 times as many apples as Eric. How many apples did Maureen pick?

$$4 \times 3 = \underline{}$$

Share an Equal Groups story.

Share a Comparison story.

MATH
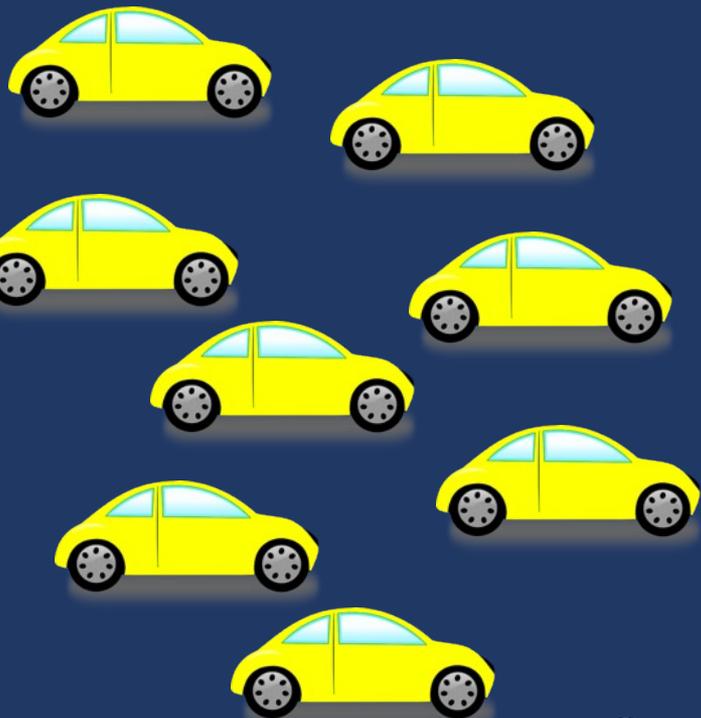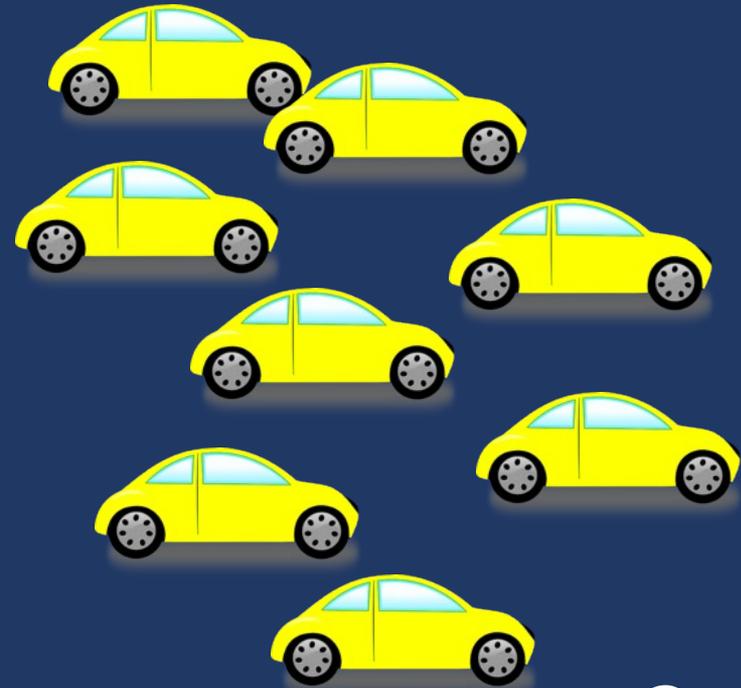
Equal Groups

Groups multiplied by number in each group for a product

Shannon has 12 apples. She wants to share them equally among her 2 friends. How many apples will each friend receive?

Tara has 12 apples. She put them into bags containing 6 apples each. How many bags did Tara use?

$$15 \div 5 = \_\_$$

Share a Partitive story.

Share a Quotative story.

MATH

Total

Difference

Change

Equal Groups

Comparison

Ratios/Proportions

MATH

Schema and Definition	Graphic Organizers	Examples				Variations
Equal Groups (Vary) A number of equal sets or units	□ × ○ = △ (groups/ units) (number/ rate) (product)	**Product unknown:** Maria bought 5 cartons of eggs with 12 eggs in each carton. How many eggs did Maria buy?	**Groups unknown:** Maria bought 60 eggs. The eggs were sold in cartons with 12 eggs each. How many cartons of eggs did Maria buy?	**Number unknown:** Maria bought 5 cartons of eggs for a total of 60 eggs. How many eggs were in each carton?		**With rate:** Maria bought 5 cartons of eggs. Each carton cost $2.95. How much did Maria spend on eggs?
Comparison One set as a multiple or part of another set	□ × ○ = △ (set) (multiplier/ part) (product)	**Product unknown:** Malik picked 7 flowers. Danica picked 3 times as many flowers. How many flowers did Danica pick?	**Set unknown:** Danica picked 3 times as many flowers as Malik. If Danica picked 21 flowers, how many flowers did Malik pick?	**Times unknown:** Malik picked 7 flowers. Danica picked 21 flowers. How many times more flowers did Danica pick?		**With fraction:** Malik picked 25 red and yellow flowers. If 1/5 of the flowers were yellow, how many were red?
Proportions	IF THEN ○ ○ COMPARED □ / □ = ○ RATIO BASE	**Subject unknown:** Sally typed 56 words in 2 minutes. How many words could Sally type in 7 minutes? **Base unknown:** Justin baked cookies and brownies. The ratio of cookies to brownies was 3:5. If he baked 15 cookies, how many brownies did he bake?	**Object unknown:** Sally typed 56 words in 2 minutes. How many minutes would it take Sally to type 192 words? **Compared unknown:** Justin baked cookies and brownies. The ratio of cookies to brownies was 3:5. If he baked 25 brownies, how many cookies did he bake?		**Ratio unknown:** Justin baked 15 cookies and 25 brownies. What's the ratio of cookies to brownies?	**With percentage:** Watson received an 80% on his science quiz. If the test had 40 questions, how many questions did Watson answer correctly? **With unit rate:** Paula bought 5 boxes of markers. She spent $9.75. What is the price of one box of markers?

Material collected from: Jitendra, DiPipi, & Perron-Jones, 2002; Jitendra & Star, 2011; Jitendra et al., 2007; Van de Walle et al., 2013; Xin, Jitendra, & Deatline-Buchman, 2005; Xin &

M A T H

Equal Groups

Groups multiplied by number in each group for a product

Nicole has 2 boxes of crayons. There are 12 crayons in each box. How many crayons does Nicole have altogether?

| Product |

Nicole has 24 crayons. They want to place them equally into 2 boxes. How many crayons will Nicole place in each box?

| Number in each group |

Nicole has 24 crayons. They put them into boxes with 12 crayons each. How many boxes did Nicole use?

| Groups |

Equal Groups

"Are there groups with an equal number in each group?"

Equal Groups

$$GR \times N(E) = P$$
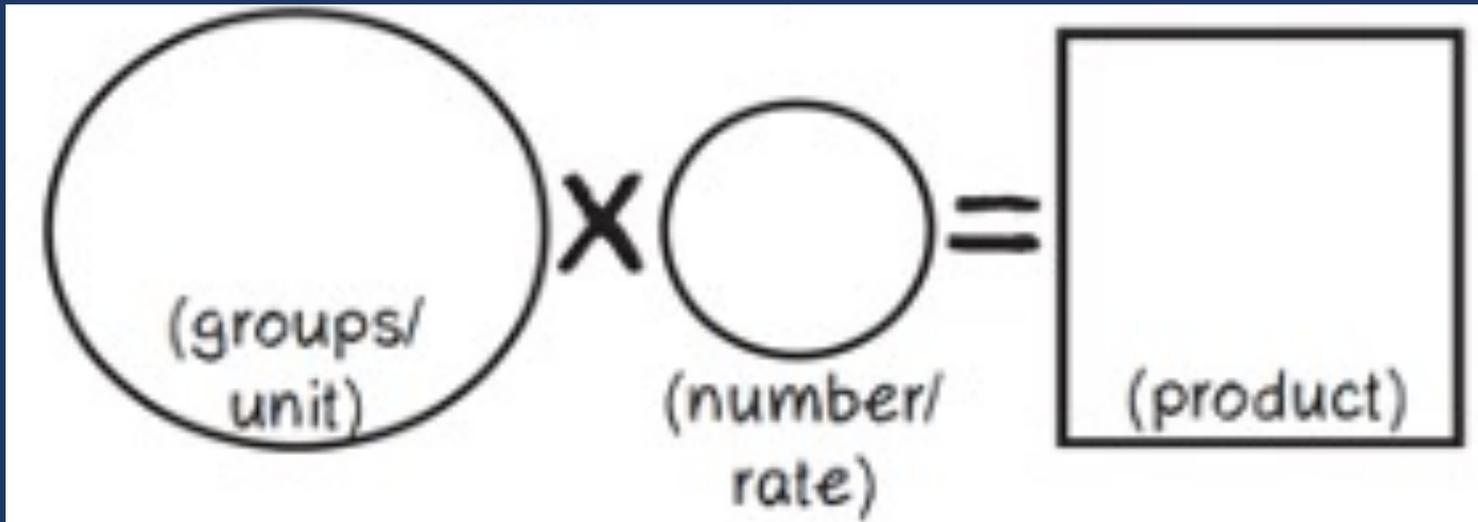
Equal Groups

Multiplicative Word Problems

A.
Lola baked 6 pies. For each pie, Lola used 5 apples. How many apples did Lola use?

B.
Jane bought 112 light bulbs. The light bulbs come in packs of 4. How many packs of light bulbs did Jane buy?

C.
Zachary has 3 feet of string. He makes braclets, and each bracelet needs 5 1/4 inches of string. How many bracelets could Zachary make?

NOTES ABOUT EQUAL GROUPS PROBLEMS:

Equal Groups

Write an Equal Groups problem.

MATH

Comparison

Set multiplied by a number of times for a product

Courtney ran 6 minutes. Michelle ran 4 times longer than Courtney. How many minutes did Michelle run?

Set

Number of times

Product

Equal Groups

"Are there groups with an equal number in each group?"

Comparison

"Is a set compared a number of times?"

S × T = P
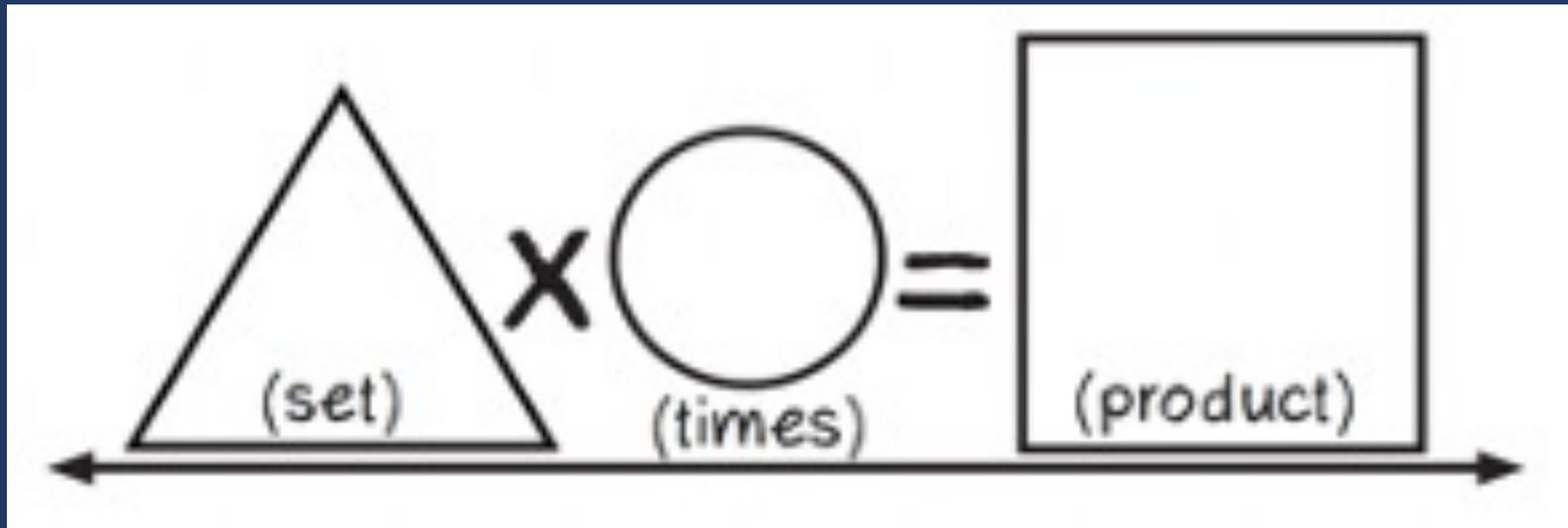
Comparison

Multiplicative Word Problems

D.
Enrique has 2 times as many pencils as Ava. Ava has 6 pencils. How many pencils does Enrique have?

E.
Susan has 7 times as many books as Mo. Mo has 18 books. How many books Susan has?

NOTES ABOUT COMPARISON PROBLEMS:

F.
Sally typed 56 words in 2 minutes. At this rate, how many words could Sally type in 7 minutes?

G.
An airplane's altitude changed -378 feet over 7 minutes. What was the mean change of altitude in feet per minute?

Write a Comparison problem.

Ratios/Proportions

Description of relationships among quantities

Julie baked cookies and brownies. The ratio of cookies to brownies was 3:5. If she baked 25 brownies, how many cookies did she bake?

Shelly typed 56 words in 2 minutes. At this rate, how many words could Shelly type in 7 minutes?

Xin et al. (2005)

Equal Groups

"Are there groups with an equal number in each group?"

Comparison

"Is a set compared a number of times?"

Ratios/Proportions

"Are there relationships among quantities - if this, then this?"

MATH

Ratios/Proportions

Xin et al. (2005)
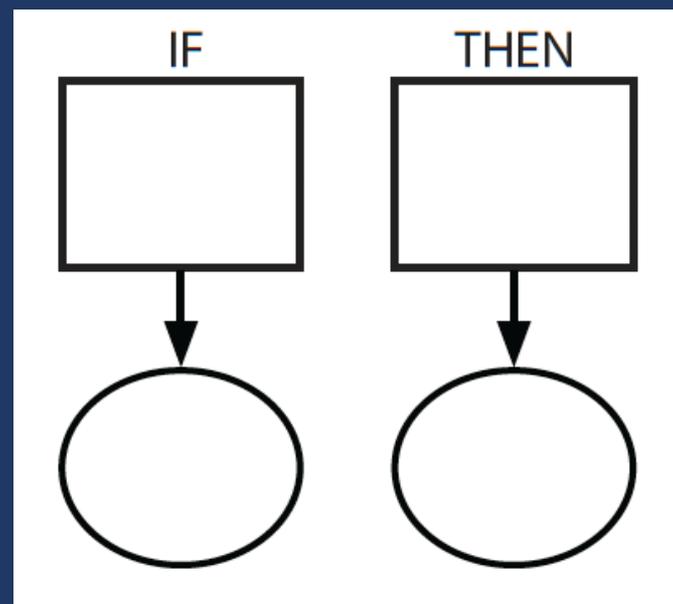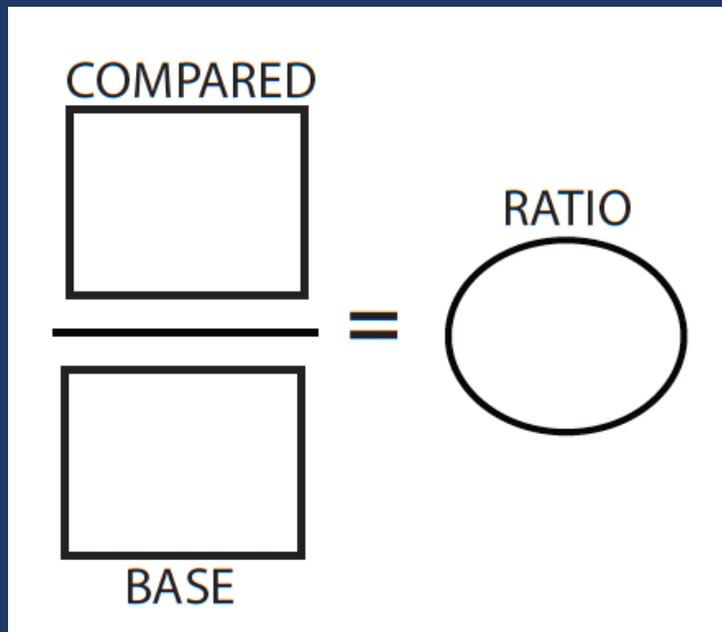
Ratios/Proportions

Multiplicative Word Problems

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NOTES ABOUT COMPARISON PROBLEMS:

F.
Sally typed 56 words in 2 minutes. At this rate, how many words could Sally type in 7 minutes?

G.
An airplane's altitude changed -378 feet over 7 minutes. What was the mean change of altitude in feet per minute?

M A T H

Write a Ratios or Proportions problem.

Schema Check!

Equal Groups

Mr. Kowolski ordered 35 boxes of granola bars. Each box contained 24 granola bars.

What is the total number of granola bars Mr. Kowolski ordered?

Ratios/Proportions

A company makes 625 cell phone cases each day. How many cell phone cases does the company make in 31 days?

Comparison

Danielle's full-grown dog weighs 10 times as much as her puppy. The puppy weighs 9 pounds.

Enter the number of pounds the full-grown dog weighs.

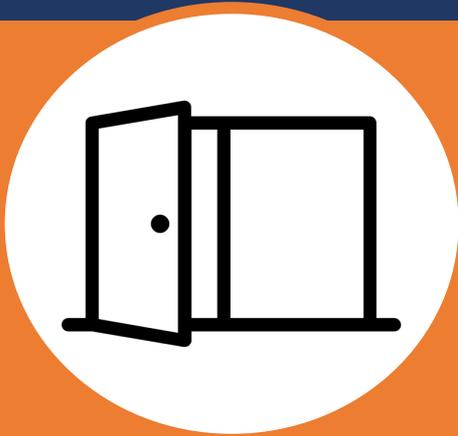| Schema and Definition	Graphic Organizers	Examples				Variations
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Material collected from: *Jitendra, Di'Pipi, & Perron-Jones, 2002; Jitendra & Star, 2011; Jitendra et al., 2007; Hurrelle-Walker et al., 2012; Xin, Jitendra, & Deatline-Buchman, 2005; Xin &...*

M A+H

Equal Groups

Comparison

Ratio/ Proportion

Which of these schemas would be important to teach?

How do you plan to teach the schemas to your students?

What additional information or materials do you need?

Total

Difference

Change

Equal Groups

Comparison

Ratios/Proportions

Total	Difference	Change	Equal Groups	Comparison	Ratio/ Proportion

Josh ran 18 miles last week. He ran twice as many miles this week. How many miles did he run this week?

MATH

Total	Difference	Change	Equal Groups	Comparison	Ratio/Proportion

Mary earned $4.25 completing chores on Tuesday. Mary then earned $12.50 vacuuming for her mom on Friday. How much did Mary make in all?

MATH

| Total | Difference | Change | Equal Groups | Comparison | Ratio/ Proportion |

The turtle moved 2 ft every 3 minutes. How far did the turtle move in 14 minutes?

M A T H

Total	Difference	Change	Equal Groups	Comparison	Ratio/ Proportion

Joe and Steph are collecting RSVPs for their event. They received 129 RSVPs last week and 65 this week. Today, 17 people said they could no longer attend. How many guests will be attending the event?

MATH

| Total | Difference | Change | Equal Groups | Comparison | Ratio/Proportion |

Adam bought 30 gallons of gas for $96. What was the cost per gallon?

MATH

| Total | Difference | Change | Equal Groups | Comparison | Ratio/ Proportion |

Samone earned $6 more dollars babysitting than David. The Clarkes paid David $14 for babysitting their twin sons. How much money did Samone earn?

Teach an attack strategy

Teach about schemas

Word-Problem Solving

Maya has 120 caramel apples to sell. Each caramel apple is covered with one topping.

- $\frac{1}{5}$ of the caramel apples are covered with peanuts.
- $\frac{1}{3}$ are covered with chocolate chips.
- $\frac{3}{10}$ are covered with coconut.
- The rest are covered with sprinkles.

How many caramel apples are covered with sprinkles?

A 100

B 33

C 25

D 20

Solve the problem

What skills are necessary to solve this problem?

Revisit this problem. Discuss the schemas in the problem.

MA+H

If needed, number the graph.

U
- **U**nderstand by reading
- **U**nderline the label

P
- (**P**arentheses) needed numbers
- **P**ut the numbers in order

S
- **S**chema(s)

Total   **E**qual **G**roups
Difference **E**qual **S**hares
Change

- **S**olve

✓²
- **C**heck the number answer
- **C**heck the label answer

MA+H

Multi-Step Problems

A.
Leslie had 3 pizzas. Each pizza was cut into 8 pieces. Leslie ate 2 pieces. How many pieces were left?

B.
Mr. Kahn gave away 8 blue balloons and 6 red balloons. He gave away 3 times the number of white balloons as red balloons. What was the total number of balloons Mr. Kahn gave away?

C.
An egg farm packages 264 total cartons of eggs each month. The farm has 3 different sizes of cartons.
The small carton hold 8 eggs, and 1/6 of the total cartons are small.
The medium carton holds 12 eggs, and 2/3 of the total cartons are medium.
The large carton holds 18 eggs, and the rest of the total cartons are large.

Determine how many each size of carton is needed each month. Then determine how many eggs are needed to fill the 264 cartons.

Teach an attack strategy

Teach about schemas

Instructional Platform

INSTRUCTIONAL DELIVERY

Explicit instruction

Precise language

Multiple representations

INSTRUCTIONAL STRATEGIES

Fluency building

Problem solving instruction

MA+H

Pirate Math Equation Quest
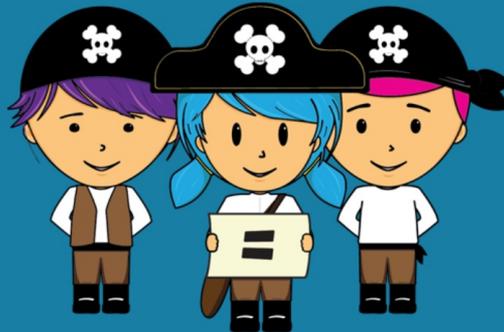
About   Research   Individual   Small Group   STAAR   Videos
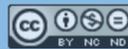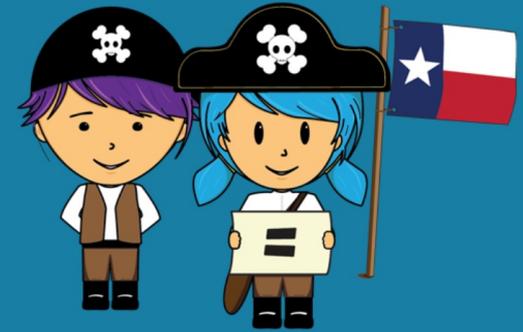
Welcome to Pirate Math Equation Quest!

Individual Word-Problem Intervention

Small-Group Word-Problem Intervention

Small-Group Word-Problem Intervention for STAAR

MATH

National Center on
INTENSIVE INTERVENTION
at American Institutes for Research ■

Search

Intensive Intervention ▾ | Tools Charts ▾ | Implementation Support ▾ | Intervention Materials ▾ | Information For... ▾

MODULE 5: INTENSIVE MATHEMATICS INTERVENTION: INSTRUCTIONAL STRATEGIES

Intensive Intervention in Mathematics Course Content

NCII, through a collaboration with the University of Connecticut, developed a set of course content focused on developing educators' skills in designing and delivering intensive mathematics instruction. This content is designed to support faculty and professional development providers with instructing pre-service and in-service educators who are developing and/or refining their implementation of intensive mathematics intervention.
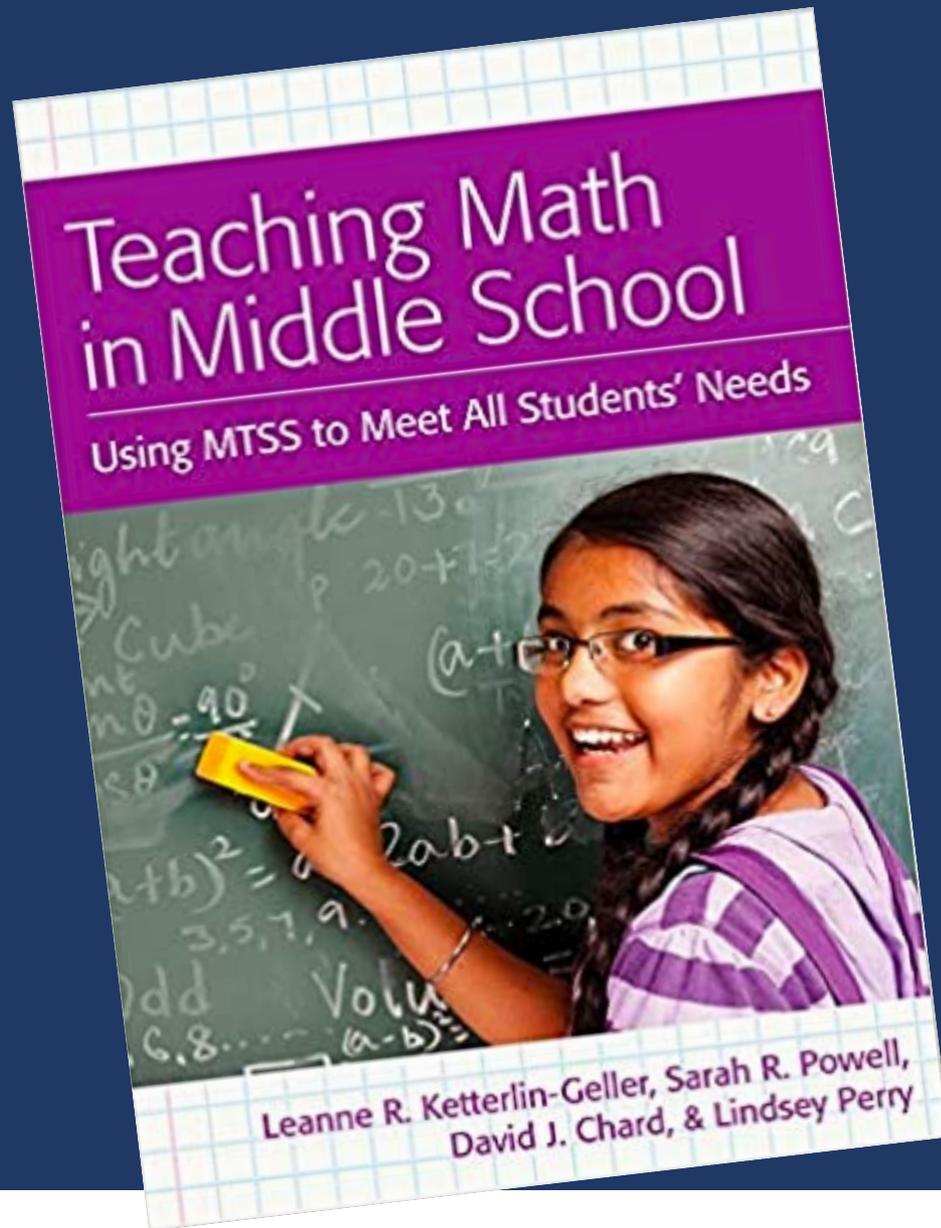
Intensive instruction was recently identified as a high-leverage practice in special education ⬚ , and DBI is a research based approach to delivering intensive instruction across content areas (NCII, 2013). This course provides learners with an opportunity to extend their understanding of intensive instruction through in-depth exposure to DBI in mathematics, complete with exemplars from actual classroom teachers.

NCII, through a collaboration with the University of Connecticut and the National Center on Leadership in Intensive Intervention⬚ and with support from the CEEDAR Center⬚ , developed course content focused on enhancing educators' skills in intensive mathematics intervention. The course includes eight modules that can support faculty and professional development providers with instructing pre-service and in-service educators who are learning to implement intensive mathematics intervention through data-based individualization (DBI). The content in this course complements concepts covered in the Features of Explicit Instruction Course and so we suggest that users complete both courses.

M·A+H

November 2022
Operations
- Addition and subtraction concepts
- Multiplication and division concepts
- Computation with addition, subtraction, multiplication, and division

January 2023
Fractions
- Length, area, and set models
- Comparison of fractions
- Ordering of fractions
- Computation of fractions

March 2023
Word-Problem Solving
- Attack strategies
- Schemas

April 2023
Geometry
- Understanding two-dimensional shapes
- Lines and angles
- Understanding three-dimensional shapes

M A + H

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