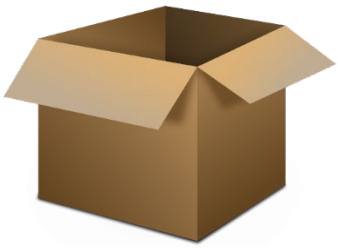
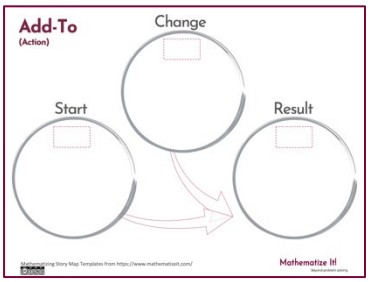
#10 To Make an Important Choice

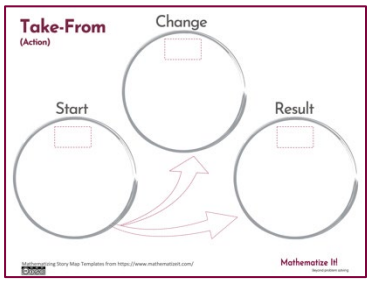


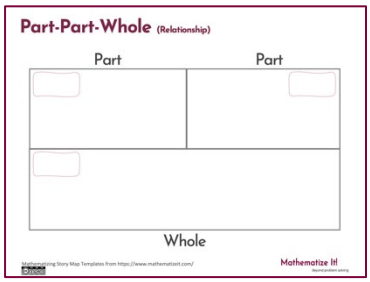
Additive Comparison Difference Unknown

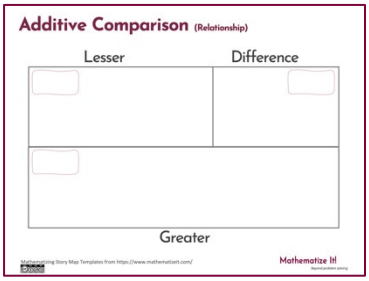
Making sense of word problems with mathematical comprehension & operation sense.

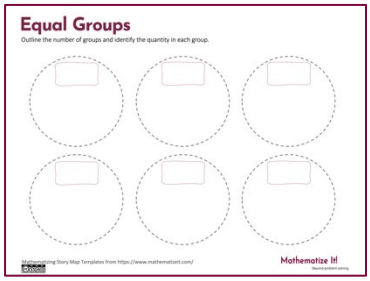
Mathematizing Story Maps

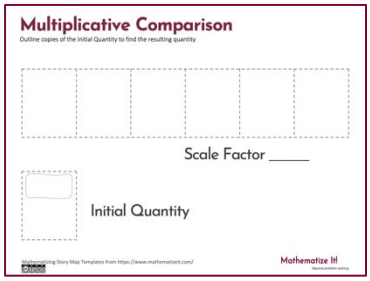


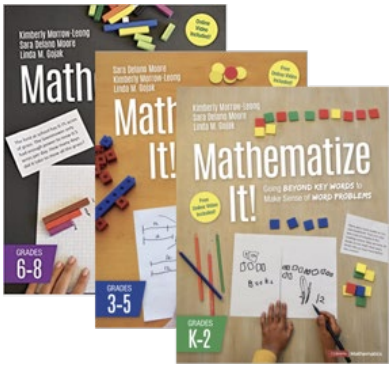


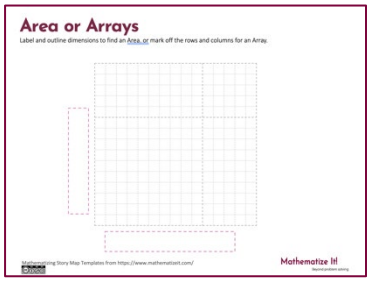


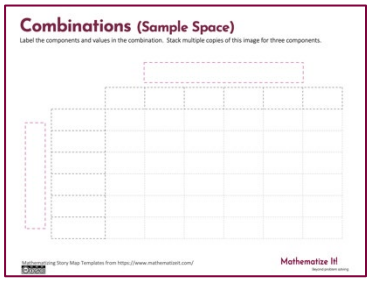










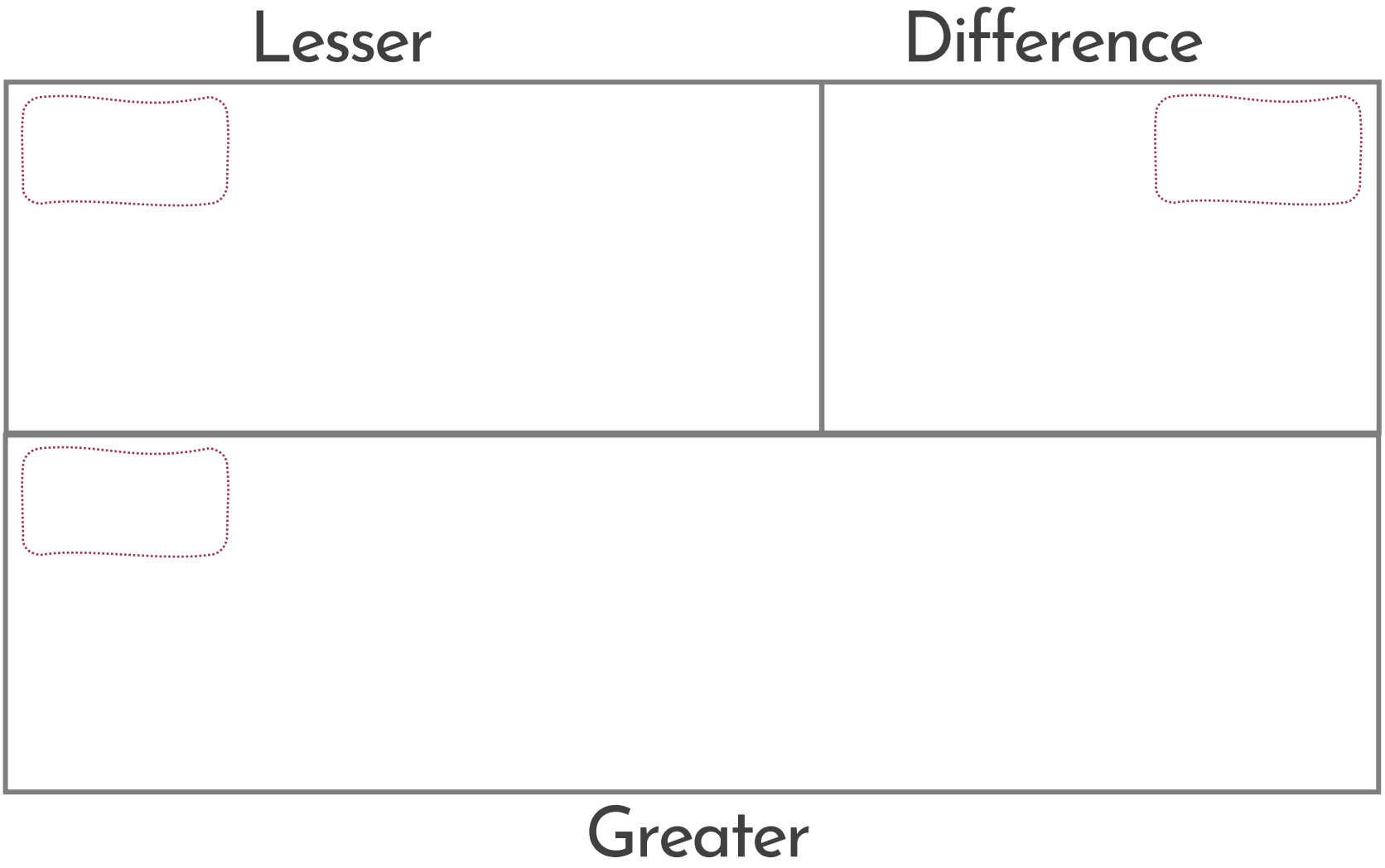


Mathematize It!

Beyond problem solving

Sara Delano Moore and Kimberly Morrow-Leong
Mathematizing Story Map Templates from https://www.mathematizeit.com/

Additive Comparison (Relationship)



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Mathematize It!
Beyond problem solving

Mathematizing Story Maps

How do your students approach word problems?

Key words don't always help. What are we supposed to underline in CUBES anyway?

Sometimes it feels like students just pick an operation and they don't know why!

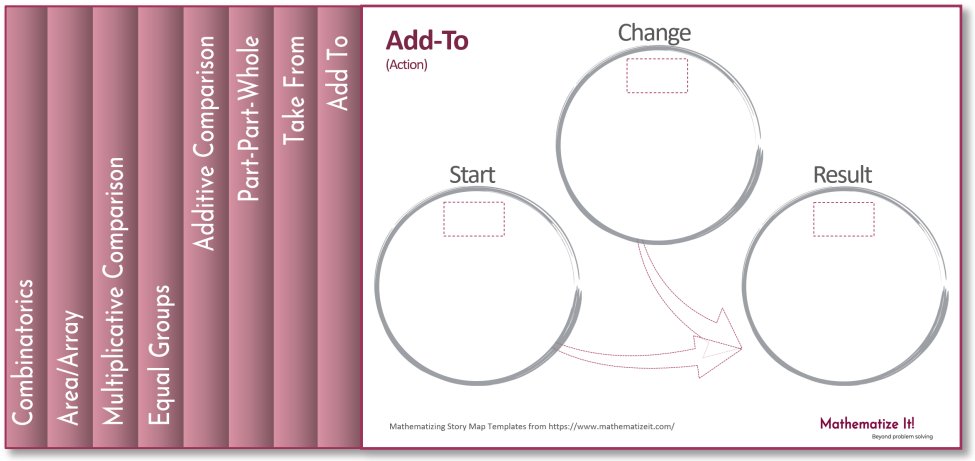
These strategies don't prepare students to formulate and solve problems that matter to them.

Prepare students to DO math!

Teacher Background

Mathematizing Story Maps encourage students to model with mathematics and find the math in their everyday lives. Opening stories are written to engage students first in thinking about the story and then about the mathematics.

Mathematizing Story Maps help students understand what the four familiar operations (+ − × ÷) can do. The more students know about how we use subtraction or when we use division, the more skills they will have to match a strategy to a problem.



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How to teach the Mathematizing Story Maps

1. **Read the story**
   a. Think about how your students might respond. What's familiar? What's not?
   b. What mathematics is seen in the story? How might students represent their thinking?
2. **Choose tools you have and that students know.**
   a. What manipulatives might your students use to represent the mathematics in the story? Consider counters, base ten materials, fraction tools, or more!
   b. What visual representations might your students know (ten frames, number tracks, number lines, grid paper, etc.)
3. **Choose a Mathematizing Story Map**
   We share a mathematizing story map for each of 8 categories of problem situations.

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Mathematizing Story Maps help students act out or represent what is happening in a problem and make sense of it.

•••

What will students do?

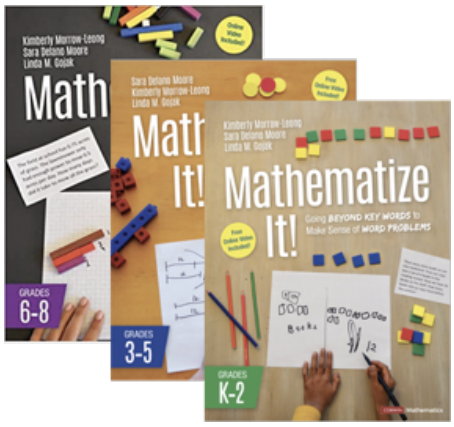
Most word problems (story problems) students encounter support their calculation skills. We need to build their understanding of how to use math to solve real problems.

- Find the story behind every mathematical problem situation
- Use one of 8 Mathematizing Story Maps to act it out or show
- Represent the story and choose an operation (+ − × ÷) that matches the story.
- Resist answer-getting. We pay attention to the process of solving problems

What's included?

Each mathematizing story map lesson includes:

- Teaching notes on 8 categories of problem situations.
- Teaching notes for the Mathematizing Story Maps
- A set of questions to pose that focus students on the mathematizing story.

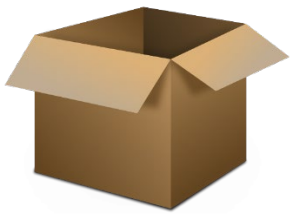


To read more about problem situations and the four operations, check out the *Mathematize It!* book series.

BY NC SA

Teacher Notes
Mathematizing Story Maps

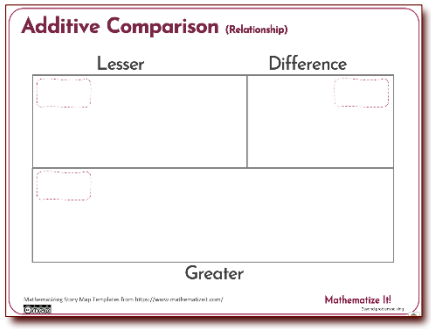
To Make an Important Choice



Problem Type
This story supports developing mathematical ideas around the Additive Comparison job of addition. These problem situations describe two quantities with a constant difference. There is no action in these problems; rather, the relationship between the two quantities, one with a greater value and one with a lesser value is important. Students can represent the two quantities and the difference between them on the Mathematizing Story Map.

Missing Element
In this story, the difference between the two quantities is unknown. Students know the two quantities being compared. They are challenged to find the difference between them.

The Mathematizing Story Map
The Mathematical Story Map provided supports the Additive Comparison job of addition by showing the lesser quantity and the difference on the upper row of the bar model and using the longer lower bar to show the greater quantity.



Addition & Subtraction Problem Situations

Action Situations	Add To	Result Unknown	Change Unknown	Start Unknown
	Take From	Result Unknown	Change Unknown	Start Unknown
Relationship Situations	Part-Part Whole	Total Unknown	One Part Unknown	Both Parts Unknown
	Additive Comparison	Difference Unknown	Greater Quantity Unknown	Lesser Quantity Unknown

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Day 1

Read the story at least once with your class. Talk about the story and support your students as they make sense of the events in the story as you would for any narrative.

You may wish to use the Three Reads Strategy (p.15) to support student understanding of the text itself.

Then encourage students to find the mathematics in the story with questions like these:

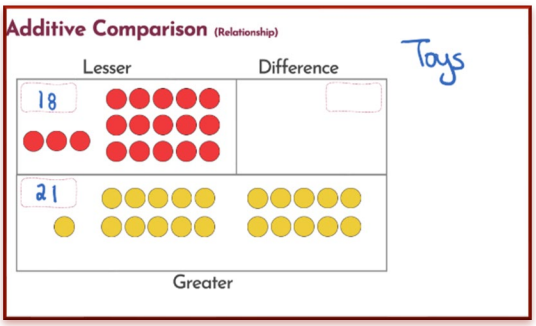
- *What quantities are being compared? How do you know?*
- *What quantity is greater? Which is lesser?*
- *What are you trying to figure out in this problem?*

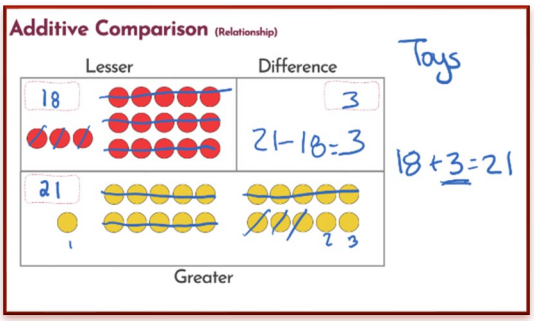
If students start calculating numbers right away, particularly if they are "number-plucking" or randomly doing calculations, refocus their attention on the relationship in the story.

To focus on the story, create a numberless word problem. Remove the numbers from the story as the class discusses it.

Encourage students to use manipulatives as they work on the Mathematizing Story Map to show the relationship that is in the story. Label the quantities and their units. Before ending for the day, give students the opportunity to record their thinking on paper.

Encourage students to use manipulatives and visuals to show their thinking about the math in the story. Students should translate their work from manipulatives and sketches to the mathematical story map.





Day 2

Reread the story and use the Mathematizing Story Map to retell it and act it out. Ask your students to translate their actions on the Mathematizing Story Map into an equation. Each student should be able to connect the elements of the story map to the narrative. Discuss the ***quantities*** in the story and what strategies students might use to find an answer to the question they have asked. Ask students to consider other mathematical stories (or variations on the current story) they can see in this narrative.

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Day 3

Use the mathematizing story map to support solving the word problems provided. Take time for reading comprehension (does the story make sense?) before mathematical comprehension (what is happening in the story?) These questions can help students develop mathematical comprehension.

- *What quantities are being compared? How do you know?*
- *What quantity is greater? Which is lesser?*
- *What are you trying to figure out in this problem?*

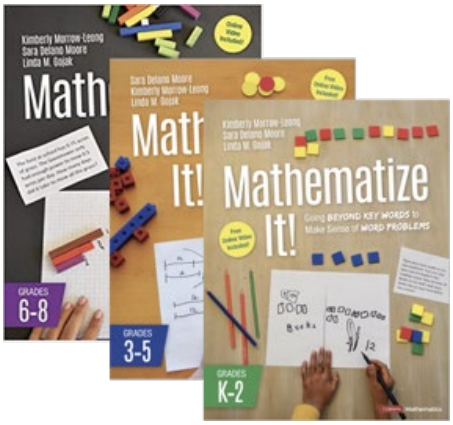
Encourage your students to use manipulatives and visuals to show their thinking about the math happening in each problem. Students should translate their work from manipulatives and sketches to the mathematical story map.

Days 4-5

Choose one or more of these options to continue developing student thinking.

- Continue working on the problems provided, focusing on the story map as a tool to develop mathematical comprehension and operation sense.
- Lead a discussion among students focusing on how the story map fits the narrative and problems provided. Use these questions to focus thinking on the job Additive Comparison is doing in these situations:
    - *What quantities are being compared? How do you know?*
    - *Where does the difference between the quantities appear on the Mathematizing Story Map? Where are the quantities being compared represented?*
    - *How does the language in the problem help you know to compare quantities?*
    - *What number sentence(s) can you write to show these relationships?*
- Ask students to develop new narratives or problems, either from scratch or as extensions of the current storyline, which can also be told using the same mathematical story map. Encourage students to explain the underlying connections which make the mathematics similar even if the story contexts are not the same.

To read more about problem situations and the four operations, check out the ***Mathematize It!*** book series.



Mathematize It!
Beyond problem solving

To Make an Important Choice Practice Problems

Use objects, pictures, numbers, and words to describe what is happening in each problem. Use a mathematizing story map to record your thinking.

Lolo is headed home to visit his family and Alisa is helping him pack. Alisa thinks it will be cold so she says to pack 3 coats. Lolo thinks one will be enough. How many more coats does Alisa want to pack?

Alisa's family is packing care packages. One box weighs 8 pounds and the other box weighs 11 pounds. How much lighter is the 8 pound box?

Limar's father came home from the market with 5 pieces of fruit. Last week he bought 12 but there weren't as many choices this week. How many more pieces of fruit did he buy last week than this week?

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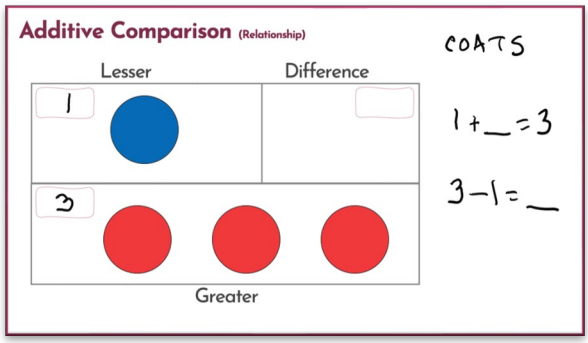

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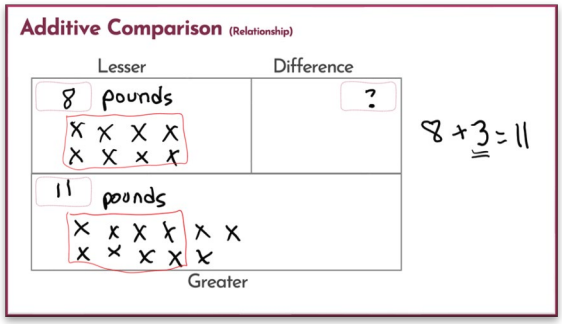

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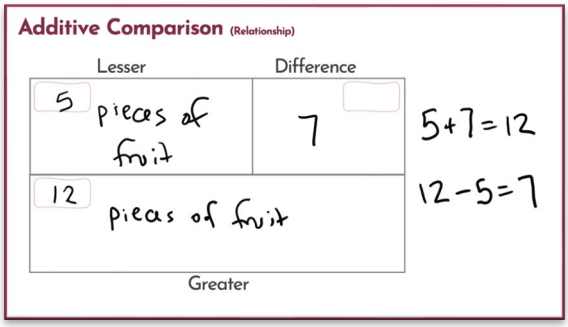

Additive Comparison Situations, Difference Unknown

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