

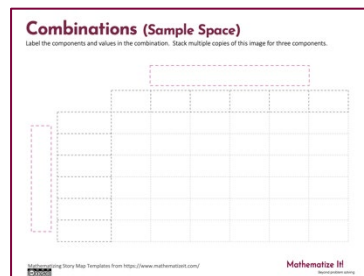
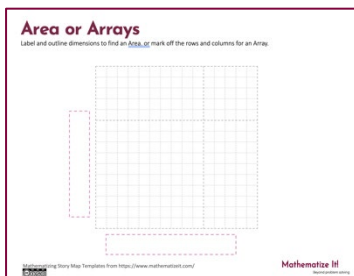
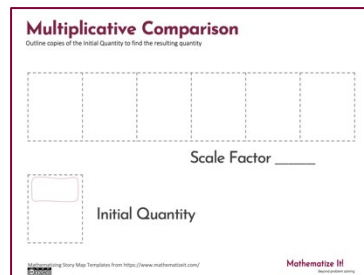
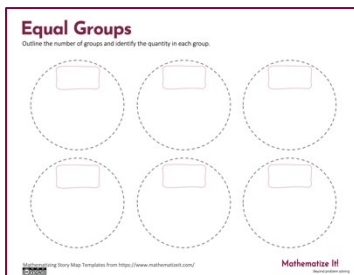
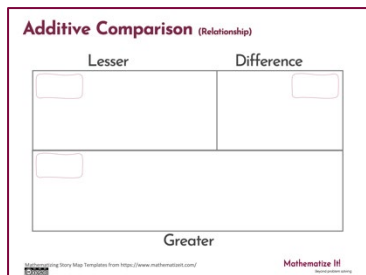
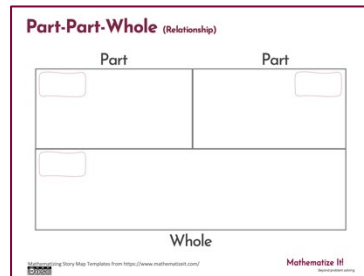
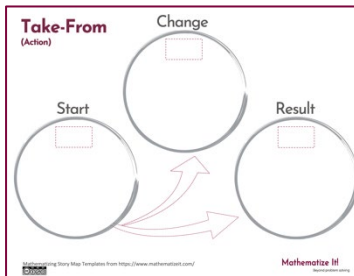
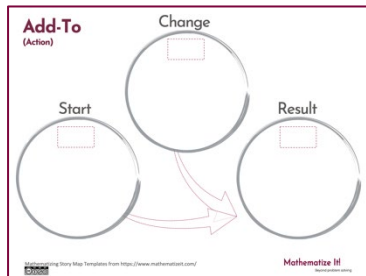
#4 Maya at the Dog Park



Take-From
Result Unknown

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

Mathematizing Story Maps



Mathematize It!

Beyond problem solving



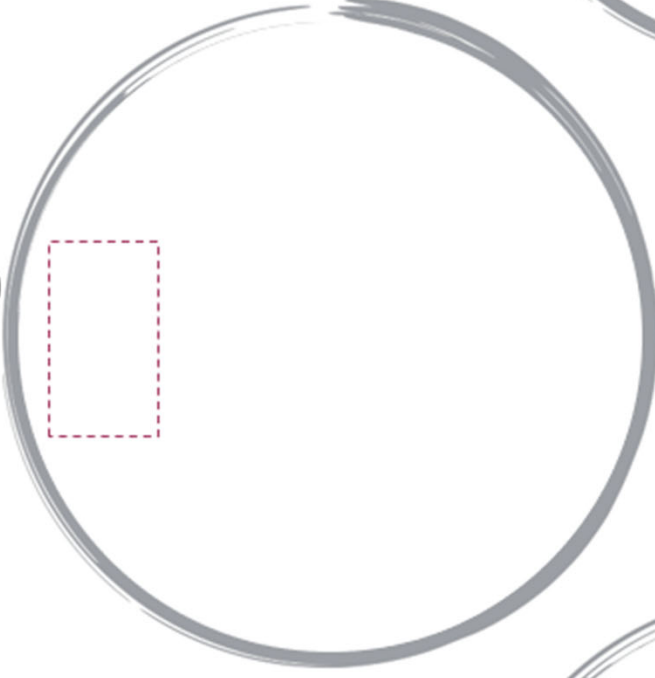
Sara Delano Moore and Kimberly Morrow-Leong

Mathematizing Story Map Templates from <https://www.mathematizeit.com/>

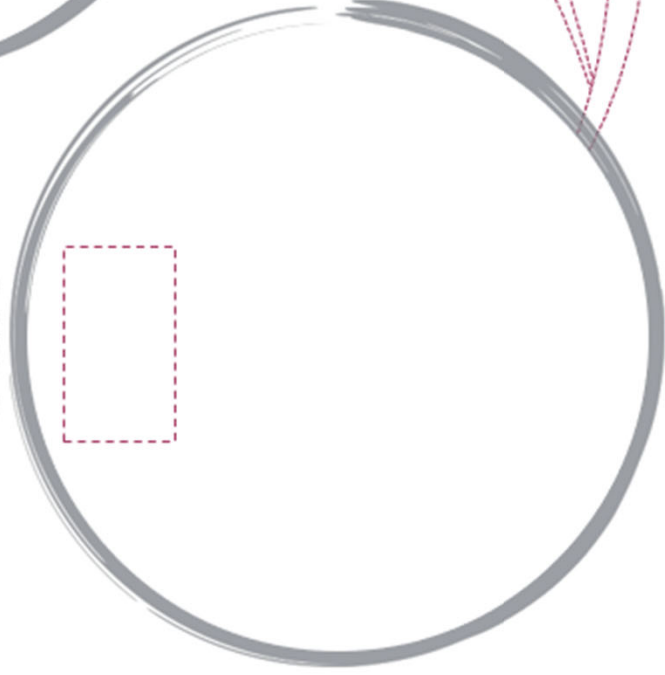
Take-From

(Action)

Change



Start



Result



... 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!

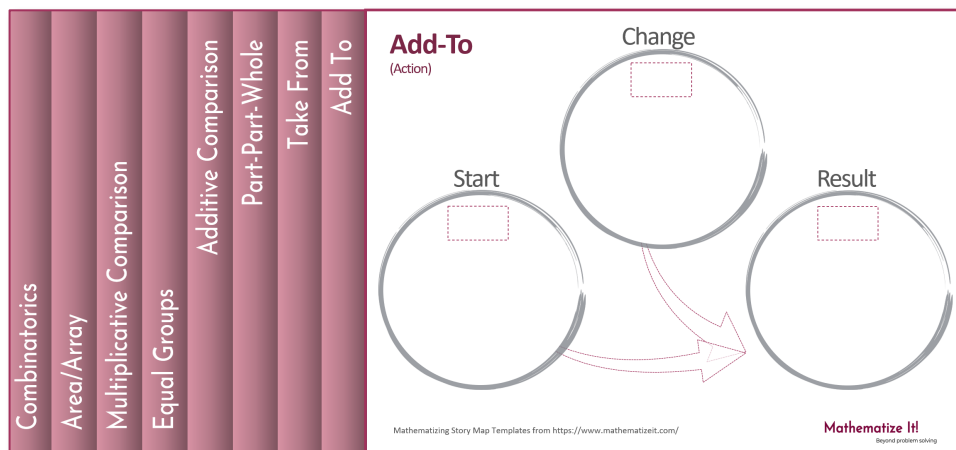
These strategies don't prepare students to formulate and solve **problems that matter** to them.

...
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.



Mathematizing Story Maps by Sara Delano Moore & Kimberly Morrow-Leong

Find more at [mathematizeit.com](https://www.mathematizeit.com)



Mathematize It!

Beyond problem solving

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.



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.



Mathematizing Story Maps by Sara Delano Moore & Kimberly Morrow-Leong

Find more at mathematizeit.com



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Teacher Notes

Mathematizing Story Maps



Maya at the Dog Park

Problem Type

This story supports developing mathematical ideas around the Take From job of subtraction. The Take From situation follows a storyline where there is a beginning value, a change when something leaves, and a resulting value. In this situation, something will happen, and students will act it out on the Mathematizing Story Map.

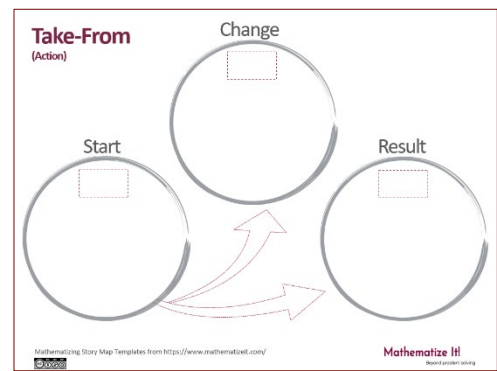
Missing Element

In this story, the result is unknown. Students are typically very comfortable with the Take From, Result Unknown problem situation as they find the resulting quantity after taking the change quantity away.

The Mathematizing Story Map

The Mathematical Story Map provided supports the narrative storyline of Take From situations by providing space to show the starting value, the change leaving the situation, and the resulting value at the end.

As you dig into the story, you and your students might also find opportunities to explore Part-Part-Whole situations as well.



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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Beyond problem solving

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.

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

- *What quantities are in the story? How are they changing?*
- *What can you build or draw to show the storyline of a starting value, a change, and an ending value?*
- *How can the story map help record your thinking?*

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

Encourage students to use manipulatives as they work on the Mathematizing Story Map to show the action 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.

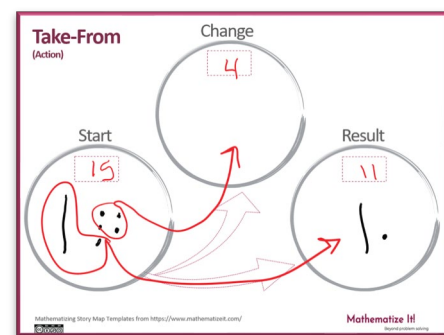
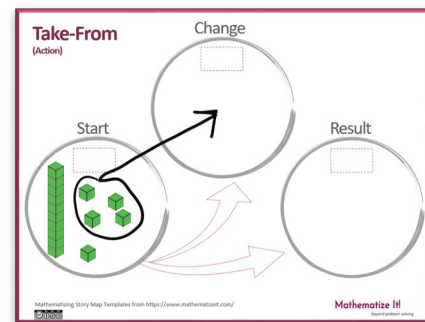
Encourage students to use manipulatives and visuals to show their thinking about the math in the story. Students should translate their work from manipulatives and sketches to the mathematical story map.

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.

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

To focus on the story, create a [numberless word problem](#). Remove the numbers from the story as the class



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 in the story? How are they changing?*
- *What can you build or draw to show the storyline of a starting value, a change, and an ending value?*
- *How can the story map help record your thinking?*

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 subtraction is doing in these situations:
 - *What is the action in each problem? What quantity is leaving the situation as a change?*
 - *How does the story map show the change in the situation?*
 - *Where is each part of the story (beginning, change, and end) shown on the map?*
 - *What number sentence(s) can you write to show what is happening in the story map?*
- 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.



Mathematizing Story Maps by Sara Delano Moore & Kimberly Morrow-Leong

Find more at mathematizeit.com



Mathematize It!

Beyond problem solving

Maya at the Dog Park 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.

It was time to microchip the puppies at the shelter. The chips make it easier to find the family if a dog runs away. There were 12 puppies to receive chips today. The team finished with 7 before lunch, sending them back to the play area when they were done. How many puppies still needed to receive chips after lunch?

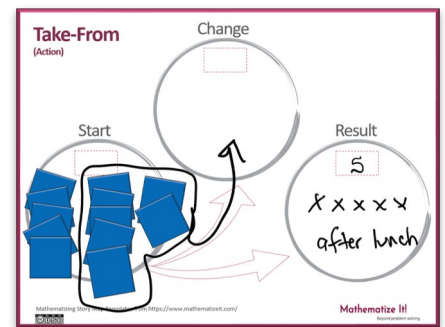
Puppies are hungry! The shelter stores puppy food in 10 cup containers and it takes 2 cups to feed the group each meal. Maya helped fill the containers before breakfast. How much was left in the container after the puppies ate breakfast and lunch?

Some of the dogs at the dog park come from the doggie daycare nearby. There were 9 dogs at the park and then it was time for the dogs from daycare to leave. Once those 5 dogs left, how many dogs were left to play at the dog park?

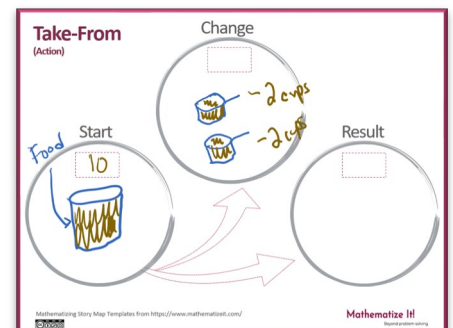
Maya at the Dog Park Practice Problems

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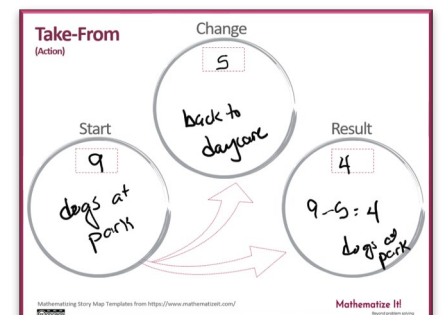
It was time to microchip the puppies at the shelter. The chips make it easier to find the family if a dog runs away. There were 12 puppies to receive chips today. The team finished with 7 before lunch, sending them back to the play area when they were done. How many puppies still needed to receive chips after lunch?



Puppies are hungry! The shelter stores puppy food in 10 cup containers and it takes 2 cups to feed the group each meal. Maya helped fill the containers before breakfast. How much was left in the container after the puppies ate breakfast and lunch?



Some of the dogs at the dog park come from the doggie daycare nearby. There were 9 dogs at the park and then it was time for the dogs from daycare to leave. Once those 5 dogs left, how many dogs were left to play at the dog park?



Take From Situations, Result Unknown

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Beyond problem solving