# PICTURING MATH

## STRUCTURE

- Activity Overview & Preparation (5-10 MIN)
- Introduction (2 MIN)
- Activity & Discussion (10-15 MIN)
- Closing (5-10 MIN)

## OBJECTIVES

**At the end of this activity, participants will be able to:**

- Recognize different types of math in their everyday experiences
- Recognize they often do math with their children without knowing they are doing math

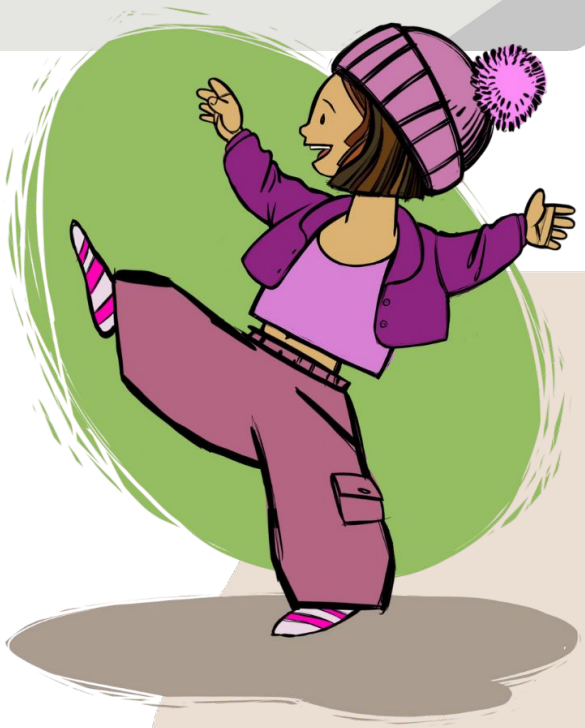
## TIME

**25-50 MINUTES**

This activity helps parents or caregivers become aware of the different mathematical themes present in everyday activities, beyond numbers and simple geometric figures,

## MATERIALS

Set 1 & 2 Images (Pictures of everyday scenes)



## ACTIVITY 2.3

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# GETTING READY

## FACILITATOR NOTES

### ANSWER GUIDE

Use the answer guide to provide caregivers with additional details on responses to the activity prompts. For each image, the answer guide provides sample responses to the question, "Where's the math?"

### BUILDING CAPACITY

This activity builds on the **Math is More than Number** module, but does not require module completion. (Module 2, Segment 2)

### ADAPTATIONS

**Use these ideas to modify the activity based on:**

- child age,
- time and resources available for implementation
- caregiver needs.

### TIPS

**Blue text** indicates something that facilitators might say (e.g.,"**What is happening in the photo**"). Regular text is information for facilitation.

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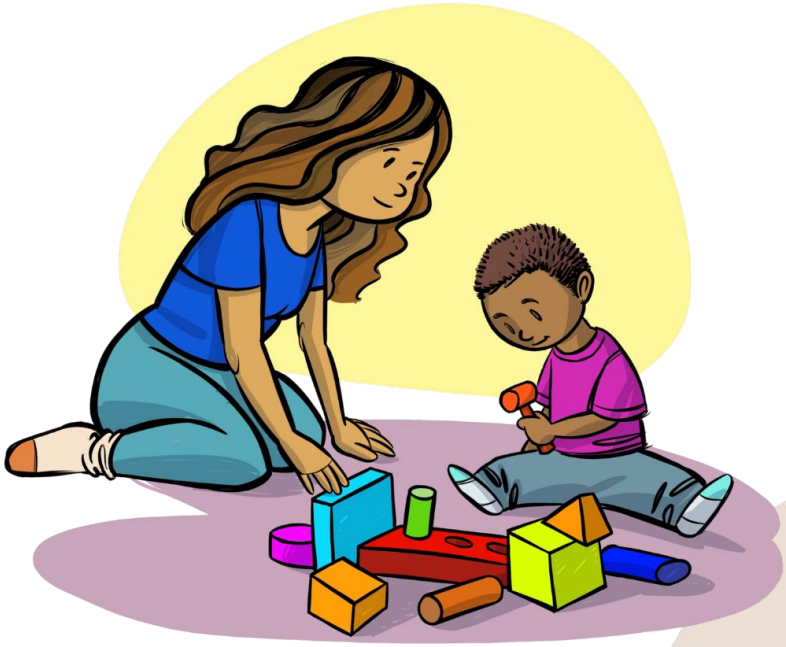
# GETTING READY

## FACILITATOR NOTES

## ACTIVITY OVERVIEW

In this activity, caregivers will look at a set of pictures that portray everyday family life, and you will ask them to discuss where they "see math" in each picture.

By highlighting math in regular experiences and settings, caregivers may become more aware of the math that already exists in their child's environment.



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# GETTING READY

## PREPARATION

5-10 Minutes

Choose the set of images you prefer to use for the activity by determining which set you feel more comfortable with. Become familiar with the pictures, and be sure you can "find" the math in each image. Review the Answer Guide provided so you are ready to make suggestions for where the math is in each image.

In this activity, try to focus on discussing several math topics rather than talking about only one or two math topics overall. The more caregivers are familiar with all of the math topics, the more likely they will become comfortable using different math topics in regular conversation with their children.

You may also want to review the brief descriptions of key early math topics available at: https://familymath.stanford.edu/tolkits/

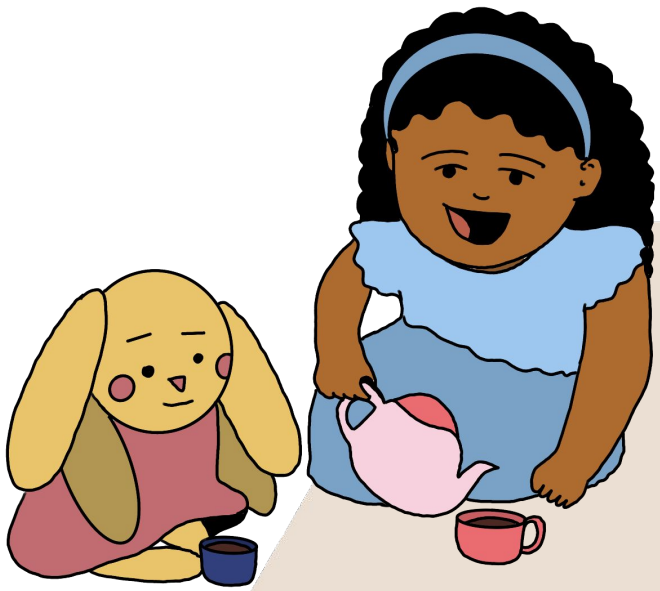
To use this activity with caregivers, set up your environment ahead of time.

If using a projector, arrange caregiver seats so they can see a screen or wall where you will show the everyday images to ask, "Where's the math?"

If you're facilitating this activity virtually, ensure that you have the desired images pulled up, and know how to "screen share" appropriately. Plan for whether you want to "share" your whole screen, or just use one window with the images.

Pre-load the file with the pictures in whatever presentation format you use, so the images are ready to show.

If you are going to use Instagram (#parentscount), have that pulled up in a browser.





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# ACTIVITY

## INTRODUCTION
2 Minutes

Introduce the activity. For example, you might say: **"Today we are going to talk about different math topics and where they show up in everyday experiences."**

Present a list of math topics to the caregivers: "We'll talk more about each math topic as you share your ideas, but for now here is a list of the different math topics that might come up when talking with your child."

- Measurement
- Counting
- Number
- Patterns
- Shapes
- Spatial Relations

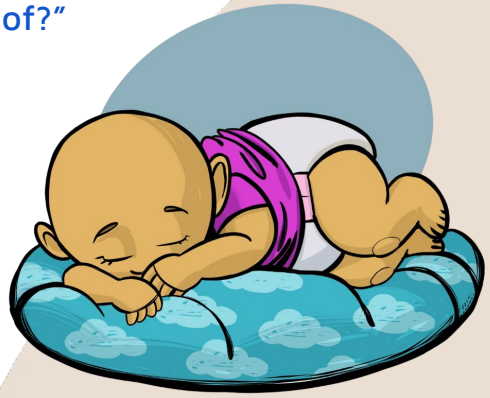
For each math topic, list a few examples. If you are unfamiliar with any of the topics, review the descriptions available at https://familymath.stanford.edu/toolkits/

Remind caregivers they probably use math more than they think they do, and that there are several different math topics, such as adding and subtracting, measurement, shapes, patterns, number, and space and location. Caregivers (and children) often do math without realizing it, and the math they use includes topics other than numbers and naming simple shapes.

## ACTIVITY & DISCUSSION
**Part 1:** 10-15 Minutes

Present each image in the caregiver handout, one at a time. State the prompt for each image, such as, "A child has some toy cars. Where's the math?"

Ask caregivers to discuss what kinds of math could be going on in this situation. Each image is an example of math in everyday routines; the goal is to focus on a variety of different early math topics for each image. You can say something like, "Let's focus on the math topics in this picture. What different math topics can you think of?"

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# ACTIVITY

**Prompts for each image are:**

"A caregiver and infant are looking up at a mobile together. Where's the math?"

"A child has some toy cars. Where's the math?"

"A caregiver and child are doing laundry at the laundromat. Where's the math?"

"A caregiver and child are playing with blocks. Where's the math?"

"A caregiver and child are brushing the child's teeth. Where's the math?"

"A caregiver and child are riding on a city bus together. Where's the math?"

Help the caregivers to discuss their ideas for talking about math.

"How might you talk about math with your child in this picture?"

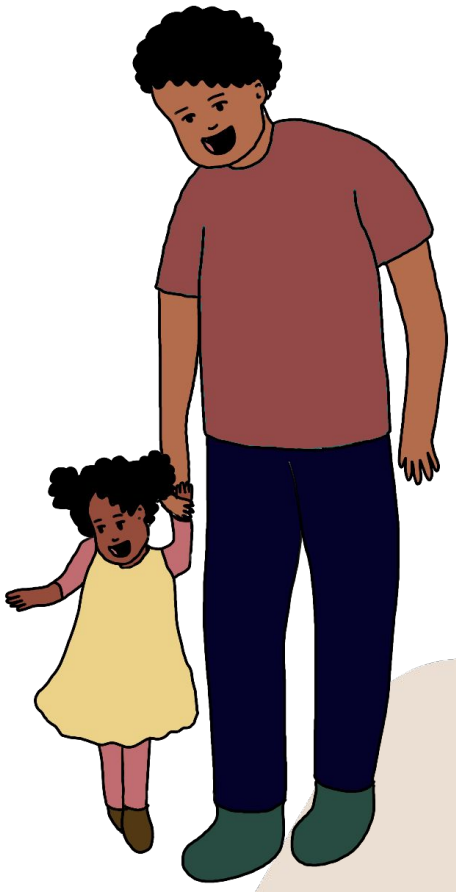
"What might you point out?"

"What questions might you ask your child?"

"What might your child do or say in this situation that you would expand on?"

You can follow up with one of the example items by saying, "I'll give you an example..."

Ask the families to think of math topic areas for each picture. "What might you point out to begin a conversation about math?" If they are stuck and can't think of any ideas, make suggestions using the Answer Guide.





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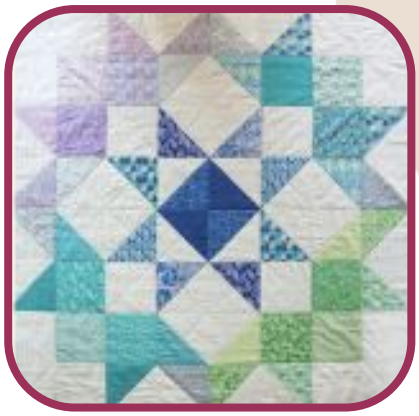
# ACTIVITY

## ACTIVITY & DISCUSSION

### Part 2: 10-15 Minutes

Another extension of this activity is to have families use their own photos by going through pictures on their phone, or other personal pictures, to find the math. For example, the Family Support Professional could display Instagram #parentscount to show everyday images like those below, and discuss what math is in each image.



As you carry out the activity, be sure to stop on each picture long enough to discuss it. Hurrying through the pictures may cause missed opportunities to find the math.

As caregivers discuss the images, notice and reinforce any examples the caregivers provide that are from their own experiences. For example, if a caregiver says, "When I change my child's diaper I like to count her fingers and toes, and I talk about where things are — I say things like, 'The wipes are next to the diapers.
The diapers are on a shelf over the trash can.'"



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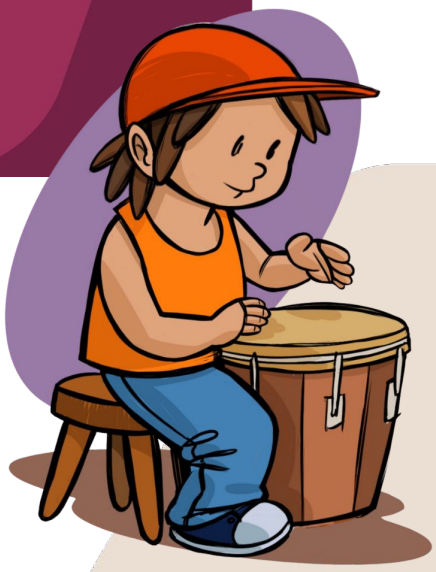
# ACTIVITY

## CLOSING
### ( 5- 10 Min )

Incorporate these key takeaways in how you close the session with caregivers. You can state them as written, or paraphrase them based on the caregiver's experiences:

- Many different kinds of math occur in everyday experiences.
- Caregivers can find opportunities in their everyday experiences to include conversations about different math topics with their children.
- Caregivers often do math with their children without knowing they are doing math. Notice the math, and talk about it. This helps the child learn math vocabulary which may then support mathematical thinking.

To help solidify learning, ask families to share one thing they learned about early math from this activity.

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# ADAPTATIONS

## CHILD'S AGE

Consider the ages of the children in the families you work with. If the children are very young, such as younger than 3, consider how their caregivers' math talk might differ compared to what a caregiver may say to an older child. Help caregivers reflect on when to ask their children questions, and when modeling and labeling can be used.

Highlight for caregivers that providing content just a bit harder than what they think their child can do is ideal, because they can scaffold their children's success. Scaffolding can appear as caregivers help their children "reach" difficult content by talking about it, or by providing clues, to guide a child's understanding.

If caregivers have older children (4 and older) they might adapt the math talk to include more complex questions or skills about various topics, like thinking about mental rotation of shapes, and simple problem solving with math.

## TIME & RESOURCES

If you have limited time to share the activity with caregivers, consider selecting just 1 to 3 images and using the time to expand on topics within each image.

This activity can be modified for use with the features available on Zoom, Canvas, or other synchronous or asynchronous meeting platforms. All images in the caregiver materials can be projected using "screen sharing."

Alternatively, you may use individual video clips of caregivers engaged in typical daily activities,and use the discussion questions with these videos.


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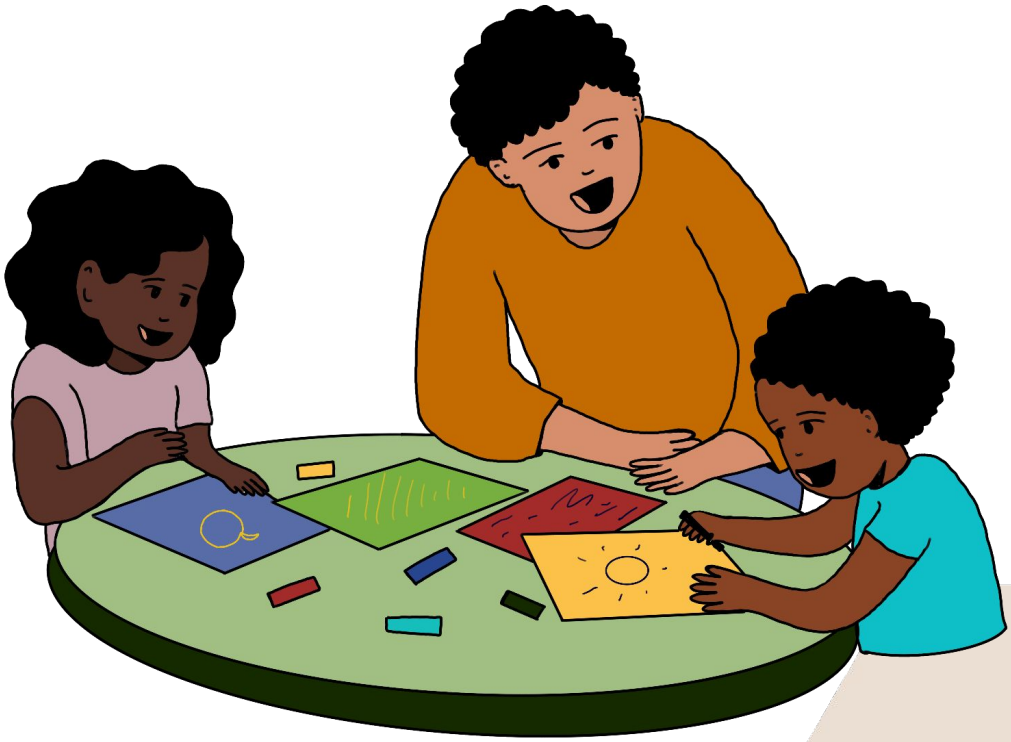
# ADAPTATIONS

During the discussion, you can use a white board, a digital space like a jamboard, or share a Google document to keep track of caregivers' ideas. Close out the activity by sharing with participants the list of brainstormed ideas.

## CAREGIVER NEEDS

If the caregivers you work with require accommodations to participate, be sure to support their needs by:

- Offering closed captioning
- Providing all materials in caregivers' native language (with translations when relevant)
- For caregivers with limited literacy skills, be sure to provide audio (you can record audio files or read materials aloud) and engage in discussion rather than requiring reading.





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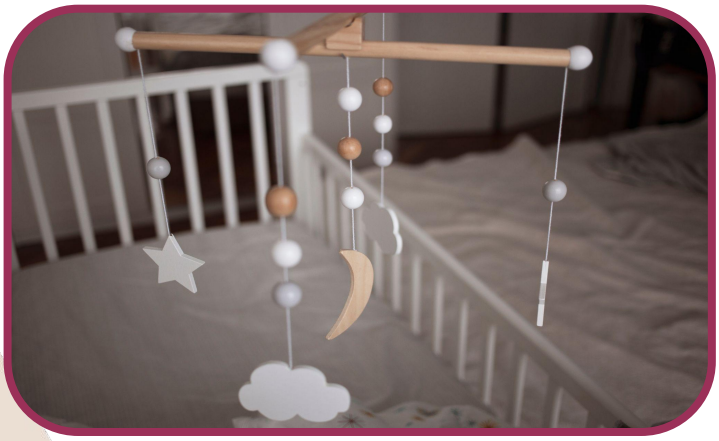
# CAREGIVER MATERIALS

## SET 1



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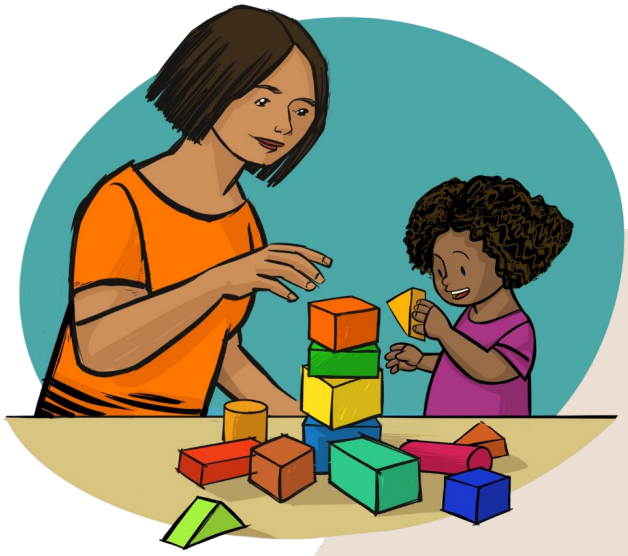
# CAREGIVER MATERIALS

## SET 1 (CONTINUED)



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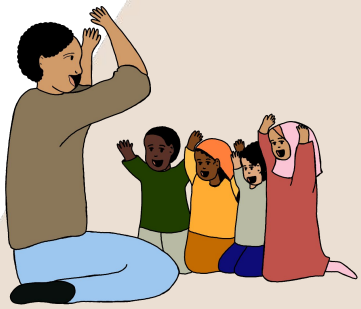
# CAREGIVER MATERIALS

## SET 2



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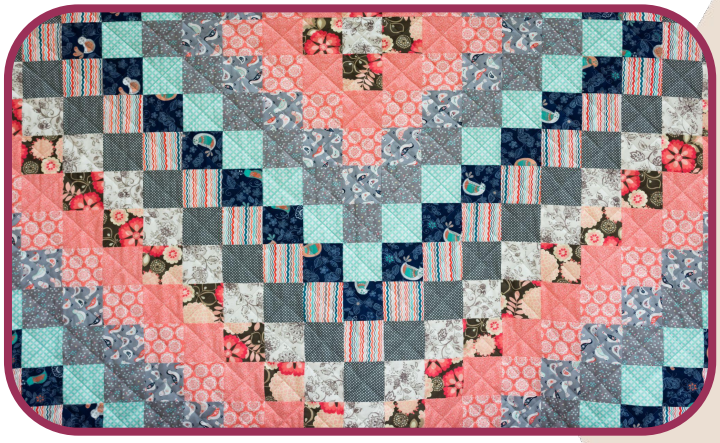
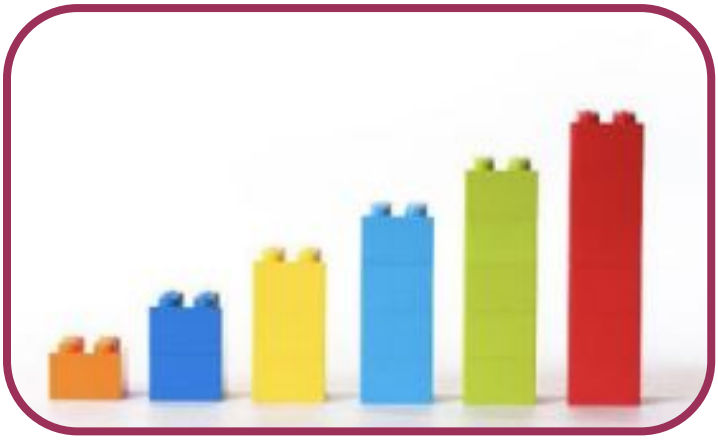
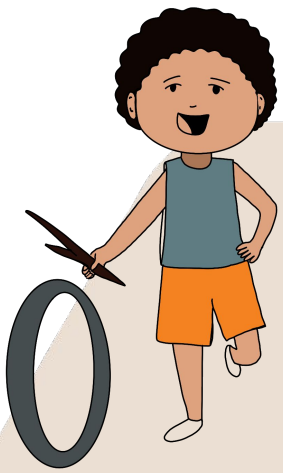
# CAREGIVER MATERIALS

## SET 2 (CONTINUED)







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EVERYONE SUCCEEDS

# ANSWER GUIDE

## SET 1 EXAMPLES

"A caregiver and infant are looking up at a mobile together. Where's the math?"

- A caregiver might say, "Look at how the shapes move! This one is up high and this one is down low, it is closer to you." or "Here is the moon, it's a crescent shape. There are stars, too. The stars are behind the moon."

"A child has toy cars. Where's the math?"

- A caregiver might say, "The cars are all lined up. Which car is first?" or "Which is the longest?" or "Are there enough parking spaces for all the cars?" or "If we line up the cars, how many cars long is the road to the blue and white tents? Let's measure it!"

"A caregiver and child are doing laundry at the laundromat. Where's the math?"

- A caregiver might say, "I need eight coins to turn on the washer. Let's count them as you put them in." or "Let's fold the shirt so it fits inside our basket."

"A caregiver and child are playing with blocks. Where's the math?"

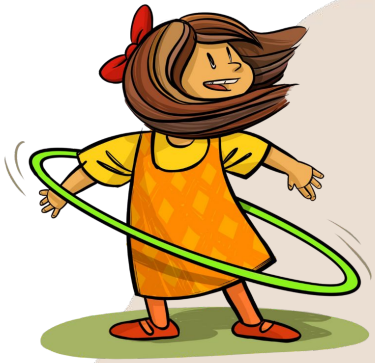
- A caregiver might say, "You are stacking the blocks! Will the tower still stand if it is taller than three blocks?" or "I see you put a red block next to the blue triangle. Do you have enough blocks to make a pattern with them?"

"A caregiver and child are brushing the child's teeth. Where's the math?"

- A caregiver might say, "You have 1 minute left. Let's brush your front teeth. Now, your back teeth. Next, your top teeth. Finally, your bottom teeth."

"A caregiver and child are riding on a city bus together. Where's the math?"

- A caregiver might say, "Let's count the stops until we get to our bus stop." or "Look at this window. It has one pane of glass on top and two panes of glass at the bottom. Which pane of glass is the biggest?"

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# ANSWER GUIDE

## SET 2 EXAMPLES

1) **Pizza**: shape of whole; shape of each piece (not triangles because of curved side!); counting (how many pieces); equality (is each piece the same size? If so, each piece is one fourth of the pizza); position (toppings; layers); quantity (which topping has the most pieces)

2) **Shell**: discuss relative sizes of each section; identify pattern (it is a growing pattern, not an alternating pattern)

3) **Wood**: shapes (cylinders), counting, relative size, spatial relations

4) **Vegetables**: spatial relations, counting; measurement (weight, length)

5) **Watermelon**: shapes, counting, relative size, equality

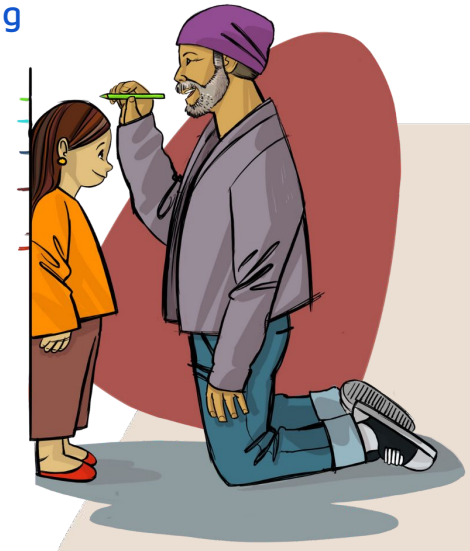
6) **Boots**: relative size, order, pairs, counting, patterns

7) **Quilt**: patterns, shapes, counting, size, spatial relations, symmetry

8) **Ice cube tray**: counting, spatial relations (rows), shapes, volume (which cube hole is more full), relative size

9) **Legos**: shapes, spatial relations, counting, relative size, equality

10) **Leaf vein**: patterns, relative size, position, counting

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# ACTIVITIES FOR FAMILY SUPPORT PROFESSIONALS:
# EXPLORING EARLY MATHEMATICS

"Everyone Succeeds" was developed for Family Support Professionals to use with the families they serve. All activities are available at no cost, on the Institute of Child Development Math and Numeracy Lab website, for private use with families and caregivers. These materials may not be reproduced or distributed for any for-profit effort without explicit permission from lead developers, Drs. Wackerle-Hollman and Mazzocco.

**Module 1: How Attitudes and Dispositions May Affect Early Math**

- Activity 1.1 Everyone Succeeds
- Activity 1.2 Flipping the Script
- Activity 1.3 Mathitudes
- Activity 1.4 Learning from Math Mistakes
- Activity 1.5 Comments, Questions, and Conversations (CQC's)
- Activity 1.6 Attitude Adjustments
- Activity 1.7 We Are All Math People

**Module 2: Math is Numbers and More: Exploring Early Math Topics**

- Activity 2.1 Math Kaleidoscope
- Activity 2.2 Early Math Topics
- Activity 2.3 Picturing Math
- Activity 2.4 Measuring Up!
- Activity 2.5 Toddlers Under Construction

**Module 3: Finding Math in Everyday Life**

- Activity 3.1 Early Math Success Stories
- Activity 3.2 Math Snacks
- Activity 3.3 Becoming a Math Detective
- Activity 3.4 Make a Statement with Math
- Activity 3.5 Everyday Math in Action
- Activity 3.6 Routines Roadmap

These activities were developed by the Math and Numeracy Lab, directed by Michèle Mazzocco, Institute of Child Development (ICD), in collaboration with Alisha Wackerle-Hollman, Director of the IGDIlab, Department of Educational Psychology, both at the University of Minnesota. Contributors include ICD doctoral students Sarah E. Pan and Jasmine R. Ernst. This work was supported by Heising-Simons Foundation DREME Network Awards 2018-0670 and 2020-1777. We thank members of the Math and Numeracy Lab that contributed to this work, family support professionals who provided feedback or welcomed us (and our activities) into their classrooms, and our community partner consultants who provided insight on language selection and delivered illustrations to make this work meaningful to the Latine and Somali communities.

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