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STRUCTURE

- Activity Overview & Preparation (10- 15 MIN)
- Introduction (3-5 MIN)
- Activity & Discussion (20-25 MIN)
- Closing (10-15 MIN)

OBJECTIVES

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

- Rethink negative statements about math and revise them to create positive statements about math
- Notice positive attitudes they have about math

MATERIALS

Printout of (or link to) the activity

TIME

45-60 Minutes

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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.

BUILDING CAPACITY

This activity builds on the **Attitudes and Dispositions** module, but does not require module completion. (Module 1, Segment 1)

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.,"Today we are going to work on changing everyday statements into positive math statements"). Regular text is information for facilitation.

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ACTIVITY OVERVIEW

In this activity, caregivers are encouraged to rethink statements that might promote a negative attitude about math and then change the statement so it reflects a more positive attitude about math (while still reflecting the caregivers' feelings.)

KEY TERMS & CONCEPTS

Perseverance: a person's effort to stick with something, even if it's difficult.

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GETTING READY

PREPARATION

10-15 Minutes

If the activity is to be conducted in person, print or prepare digital activity handouts

If the activity is to be conducted using an online tool, like Zoom or Meet, be sure you have the document ready to share when your caregivers join the group

Arrange the caregiver seats in a way that allows caregivers to see a screen or wall where you will show the statements used in the activity

Select the statements that are relevant to the ages of the children your caregivers have at home

Review the activity statements and answer guide so you will be ready to help caregivers respond to the statements (if the caregivers need some support).

Before starting the activity, choose a format to use for this activity. This activity can be done:

- As a group activity, where all caregivers in the group work together to revise statements
- In pairs, where both caregivers review either the same sets of statements or different statements independently, come up with their own ideas and then compare their revised statements.
- Individually, as a worksheet activity to discuss after individual completion ; or through one-on-one conversations

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GETTING READY

INTRODUCTION
3-5 Minutes

Introduce the activity. For example, you might say: **"Today we are going to work on changing everyday statements into positive math statements."**

ACTIVITY & DISCUSSION

Part 1: 20 - 25 Minutes

Provide the caregivers with the worksheet or project the sheet on a screen or wall, based on which format you selected for presentation.

The statements are examples of everyday comments adults might make that a child might overhear. These examples do not involve the child actually engaging in math. Instead, in the scenarios we describe the child overhears and notices how the caregiver reacts to the math in each statement. Modeling math conversations is a great way to demonstrate positive math attitudes.

Present this information with caregivers:

"In this activity, we are looking at examples of everyday comments that adults might make that a child might overhear. This means that some examples are not directly speaking to the child, and none of the examples involve the child doing the math. Instead, we focus on how a caregiver might model thinking about math when the child hears their conversation."

When discussing each statement, discuss how the positive attitude statements reflect a change in the statement and a change in the caregiver's behavior. When caregivers take on a growth mindset, are persistent and try to problem solve, they are modeling skills for their child - and those skills may be important for more than math.

ACTIVITY

ACTIVITY & DISCUSSION

Part 2: 20 - 25 Minutes

Walk the caregivers through one example:
"This activity takes everyday comments that might include negative math statements and helps us flip them to positive statements. Let's do one together first."

"Here's the statement"
Statement: "There are too many measurements. I'll never be able to figure out if this couch will fit in our apartment. Let's just buy something different."

"What is negative about this statement? How does it show a negative math attitude?"
Underlying message: This statement suggests that the math involved in measuring the couch is so difficult that the caregiver gives up; the caregiver even decides not to buy a couch they wanted because it is too hard to figure out if the couch will fit in their home.

"How could you change the original statement (and related behavior) into a positive statement?"
Revised statement: We need to measure carefully to make sure the couch will fit. Let's take it one step at a time and write down each measurement since there are so many measurements to keep track of. It seems like a lot, but we can figure it out.

"How does the new statement (and related behavior) show a positive math attitude?"
Revised message: In its revised form, the statement does accept that the measurements can seem overwhelming, but it does so in a way that immediately breaks up the task into smaller, manageable sections. With this statement, the child has a chance to learn that persistence is important and that sticking with the process can lead to success in using math, even if at first the required math seems overwhelming.

ACTIVITY

ACTIVITY & DISCUSSION

Part 3: 20 - 25 Minutes

After doing an example together, ask caregivers to complete the other examples in the activity and then discuss each one, one at a time. Then revisit the questions together as a group. After caregivers complete the document, consider asking questions as you revisit and work through the examples:

"Have you ever had an experience similar to this statement? How did you respond?"

"Can you share some statements you have had about math and how you might change the now?"

CLOSING
(10 - 15 Min)

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

- Caregivers can build a positive attitude about math by using positive math attitudes statements instead of negative ones
- Perseverance is part of a positive math attitude
- Modeling attempts to resolve a problem with math is beneficial to children, even if the caregiver doesn't get it correct the first time.
- Children can develop attitudes similar to the one their caregivers model. If caregivers model negative math statements, this might spill over to their children who might then avoid math or think they cannot do math.
- 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, select the statements that are most likely to reflect their caregivers lives. If caregivers have older children, consider using the statement that includes activities that are skills typically used with older children, such as fractions.

TIME & RESOURCES

If you have limited time to share the activity with caregivers, consider selecting the statements that will have the most impact with the caregivers with whom you work.

CAREGIVER NEEDS

If the caregivers 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 who prefer to engage in ways other than reading the materials or who have limited literacy skills, select one topic to review as a group. Prepare a group discussion that does not require the caregivers to read. Instead, you can read the topic page out loud, paraphrase content on a whiteboard in bullets, or use a digital space like a Jamboard to discuss key takeaways for an identified topic. Be sure to prepare these bullets in advance.

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CAREGIVER MATERIALS

Statement: "I don't know if there is a time for that tonight! Your sister has track practice, and we need to get home in time for dinner and bedtime. I'm not sure if we will have time to stop at the library."

Revised Statement:

Statement: " I can't help you with your homework. I was never any good at fractions; go ask your older brother."

Revised Statement:

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CAREGIVER MATERIALS

Statement: "If we want to make pancakes we will need 2 ¾ cups of flour, but I can't find the ¾ cup measuring cup. We only have the ½ cup and a ⅛ cup measuring cup. I don't know how to make that work. It's too much math. We can make pancakes another day."

Revised Statement:

Statement: "I was going to paint two of the walls in the living room, but I can't because I don't know how much paint to buy. The can says it covers 100 square feet, and I don't know how to figure it out. We have to wait for your dad to come home to figure it out."

Revised Statement:

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CAREGIVER MATERIALS

Statement: " We need to catch the 1:00 bus so we get to school on time to pick up your brother; but first we have to stop at the post office to mail a package. It's 12:00, and it takes 10 minutes to walk to the post office and 15 minutes to walk from the post office to the bus stop. We better just leave now because I'm not sure how to figure out how much time we need to get to both places"

Revised Statement:

ACTIVITY 1.2

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ANSWER GUIDE

PART 1: EXAMPLES OF RESPONSES

Statement: "I don't know if there is time for that tonight! Your sister has track practice, and we need to get hoe in time for dinner and bedtime. I'm not sure if we will have time to stop at the library."

Revised Statement: " We have a lot to do tonight, but if we plan our time carefully, maybe we can squeeze in a stop at the library. Let's figure this out: track practice ends at 5:30 and we normally get home at 6:00. We need an hour to fix dinner and eat before bedtime, which is 7:30. That does not give us much time to stop! If you can get in and out of the library in ten minutes, we can plan a dinner that takes a little less time to prepare. Can we pick out books to check out that quickly?":

Goal: To have caregivers model problem solving with their children using math. In this example, when the caregiver uses math as part of the solution the children can help solve the problem and experience their caregivers positive math attitude, and they may feel a sense of accomplishment in problem solving to achieve something they want to do. In the revised statement, the caregivers can rework the response to be consistent with a growth mindset by sharing that the problem might be hard, but if they figure it out they can achieve success.

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ANSWER GUIDE

PART 2 : EXAMPLES OF RESPONSES

Statement: "I can't help you with your homework. I was never any good at fractions; go ask your older brother"

Revised Statement: " I'm not confident about fractions, but I'm willing to try it out with you. We might be able to learn something together. I'll do my best where I can, and if I don't know how to help we can read the textbook or look it up online together to figure it out, and it's okay to ask someone else for help, too.":

Goal: To have caregivers realize that if they are feeling inadequate regarding math skills, they can model a positive growth mindset and an investment in learning by sharing with their child that they don't know the answer, but will do their best to develop new math skills. A child who overhears this circumstance can observe that trying out math that is difficult or challenging is encouraged and part of learning, and that it is okay if math feels difficult. Effort can help us overcome the difficulty.

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ANSWER GUIDE

PART 3 : EXAMPLES OF RESPONSES

Statement: "If we want to make pancakes we will need 2 ¾ cups of flour, but I can't find the ¾ cup measuring cup. We only have the ½ cup and a ⅛ cup measuring cup. I don't know how to make that work. It's too much math. We can make pancakes another day."

Revised Statement: "Let's figure out how to make these pancakes! We just have two measuring tools, but I think we can figure it out. Let's start with 2 cups. To get 2 cups we can use the ½ cup four times. Let's try it. One-half cup, and one-half cup is two halves, or one whole cup. Now let's do that again to get to 2 cups. Then we need to get the ¾ cup, and I know that 1.8 of a cup is half of 1.4 cup. We need ¾ cup, so we will need six of these (the ⅛ cup). [Or, we can use the ½ cup because that is the same as 2/4.] Can you help me count as we put them in? Now we have our 2 ¾ cups, so we can make pancakes. Sometimes we have to be creative with what we have and use math to help us get the amount we need!":

Goal: To have caregivers show that there are many ways to achieve the same value with different measurements. In this case, we often rely on our baking tools that are traditionally available in ¼ cup increments, but we can still achieve our goal with other tools if we use math and take it one step at a time. Preschoolers who observe this interaction begin to understand that having a positive attitude regarding figuring out how to achieve a goal through math can lead to a successful outcome (in this case, pancakes). Even if they do not understand fractions, the child in this examples sees their caregiver use fractions to solve the problem.

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ANSWER GUIDE

PART 4 : EXAMPLES OF RESPONSES

Statement: "I was going to paint two of the walls in the living room, but I can't because I don't know how much paint to buy. The can says it covers 100 square feet, and I don't know how to figure it out. We have to wait for your dad to come home to figure it out."

Revised Statement: "I'm overwhelmed by having to figure out square feet, but I'll try. Okay, the paint can says it covers 100 square feet, so I need to figure out how many square feet the two living room walls are. Let's measure the walls. Hey, the room is square, because all the sides are the same length: 12 feet per side. But the walls are not squares, because they are 9 feet high. Let's draw it."

So, to figure out the square feet of two walls, I multiple 12 by 9 feet.

12 times 9 is 108 square feet. There are two walls to paint, so I need to multiply it by 2. I need to paint 108 square feet on each wall. That's 216 square feet! I need three cans, for one coat of paint, since each can covers 100 square feet."

BONUS: "This wall has a very big window, so we can subtract that from our total. The window is 6 feet long and 5 feet high. 6 times 5 is 30. Hey, 216 - 30 is 186 feet! That means three cans will be enough paint, if we only need one coat of paint.

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ANSWER GUIDE

PART 4.5 : EXAMPLES OF RESPONSES

We need to paint the ceiling, too, but it's a different color. We'll paint it white. How many square feet on the ceiling? Each side of the room is 12 feet long, so that means each side of the ceiling is 12 feet. So 12 x 12 is 144. Will one can of white paint be enough?

Goal: In this example, what seems like an overwhelming task becomes more manageable by explaining that square feet can be figure out using basic multiplication. By modeling that it is worth making an effort and that it is okay to ask for help, we show our children that learning process allows for mistakes and sometimes requires thinking out loud.

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ANSWER GUIDE

PART 5 : EXAMPLES OF RESPONSES

Statement: "We need to catch the 1:00 bus so we get to school on time to pick up your brother; but first we have to stop at the post office to get our mail. It's 12:00, and it takes 10 minutes to walk to the post office and 15 minutes to walk from the post office to the bus stop."

Revised Statement: "I want to be sure we pick up your brother on time, so let's figure out how long it will take to do our errands. Okay, first we have to go to the post office, and that's a 10 minute walk and we'll probably spend about 5 minutes there grabbing our mail. So 10 minutes and 5 minutes - that's 15 minutes we need for our first errand. Then we need 15 minutes to walk to the bus stop. So, 15 plus 15 is 30 minutes. It will take us 30 minutes to do our walking and errands. It's 12:00 now, so that means we need to leave here at 12:30 to be at the bus stop on time. Sometimes things take longer than we think though, so let's give ourselves 10 ezra minutes. We will leave at 12:20. We have a little more time to play before we have to leave":

Goal: In this example, the caregiver decides to leave as early as possible because they are resistant to figuring out how much time is actually needed. By not doing the math, they end up leaving much earlier than they need to and send the message that the convenience of not doing any math is worth the inconvenience of being too early or too late. Instead, when modeling how to determine the amount of time needed, the caregiver shows the preschooler that the small burden of doing the math is worth the extra tie they reveal for additional play.

Note: We don't expect preschoolers to be able to do the math that the adult is doing. But the preschooler may view their caregiver as a positive math-using model in this revised scenario.

ACTIVITIES FOR FAMILY SUPPORT PROFESSIONALS:
EXPLORING EARLY MATHEMATICS

"Flipping the Script" 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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