

# THE POWER OF TEACHING IN GROWING THE NEXT GENERATION OF CHILEANS

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**SCHOOL OF EDUCATION**  
UNIVERSITY OF MICHIGAN



**TeachingWorks**  
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# PREMISE:

Students must learn to understand, reason, analyze, and critique. They are capable of complex academic work.

This kind of teaching and learning are possible despite the pressures on schools and teachers.

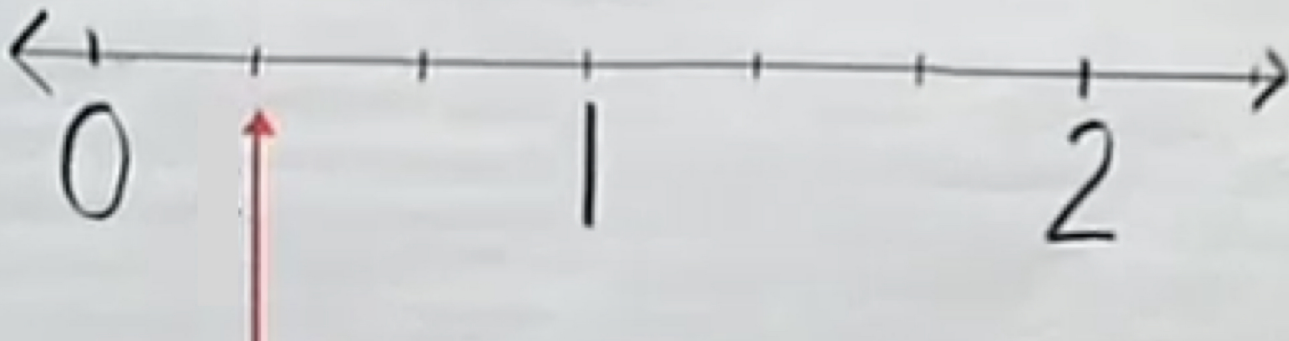
Skillful teaching is necessary for students to learn to do complex academic work.

Teaching must be learned. It is not “natural”

# A MATHEMATICAL TASK

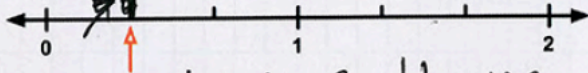
What does this task require of the children?

What number does the orange arrow point to?  
Explain how you figured it out.



LAKEYA

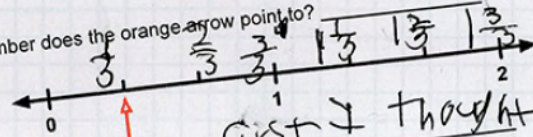
What number does the orange arrow point to?



Explain how you know: because there are equal parts and you are pointing to the second one so it's  $\frac{2}{5}$

JAMARI

What number does the orange arrow point to?

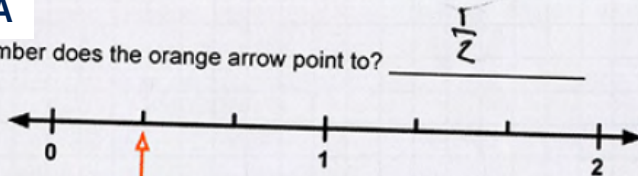


Explain how you know:

first I thought it was  $\frac{1}{2}$  because the zero messed me up

MARIANA

What number does the orange arrow point to?

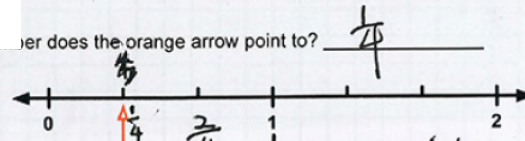


Explain how you know:

How I know it's  $\frac{1}{2}$  is that there is a interval from zero to one there was 2 line between 0 and 1

LARRY

What number does the orange arrow point to?



Explain how you know:

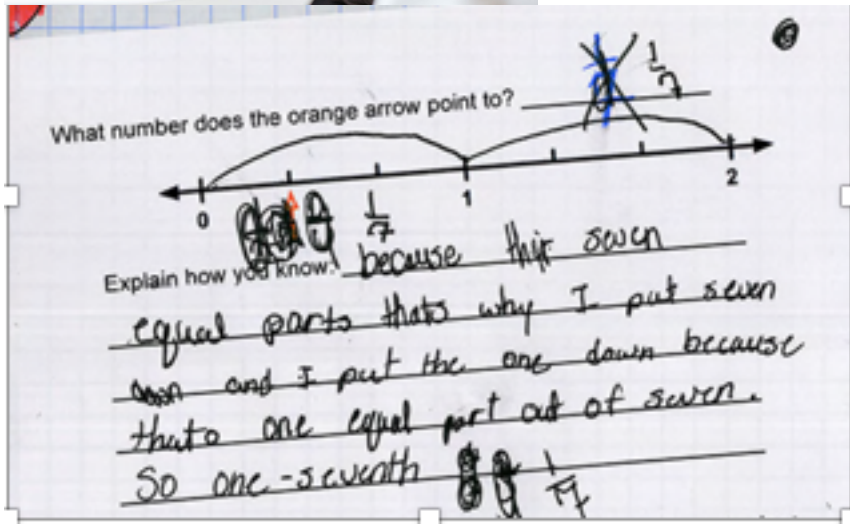
$\frac{1}{4}$  I count it by  $\frac{1}{4}$  and keep going till I got whole

Write a complete sentence with one goal for yourself for our math class today. Give an example of what it looks like to do this really well.

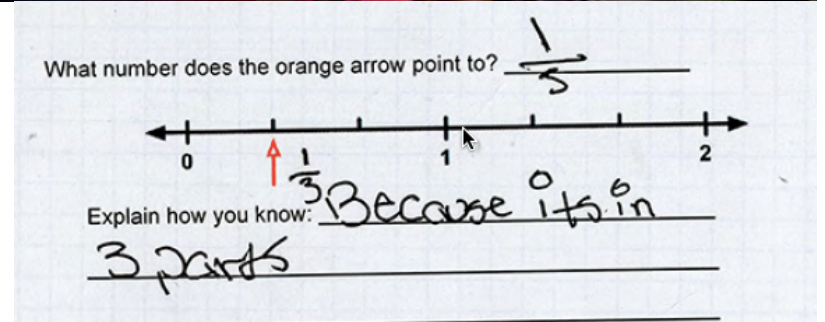
Learn more about the number line.

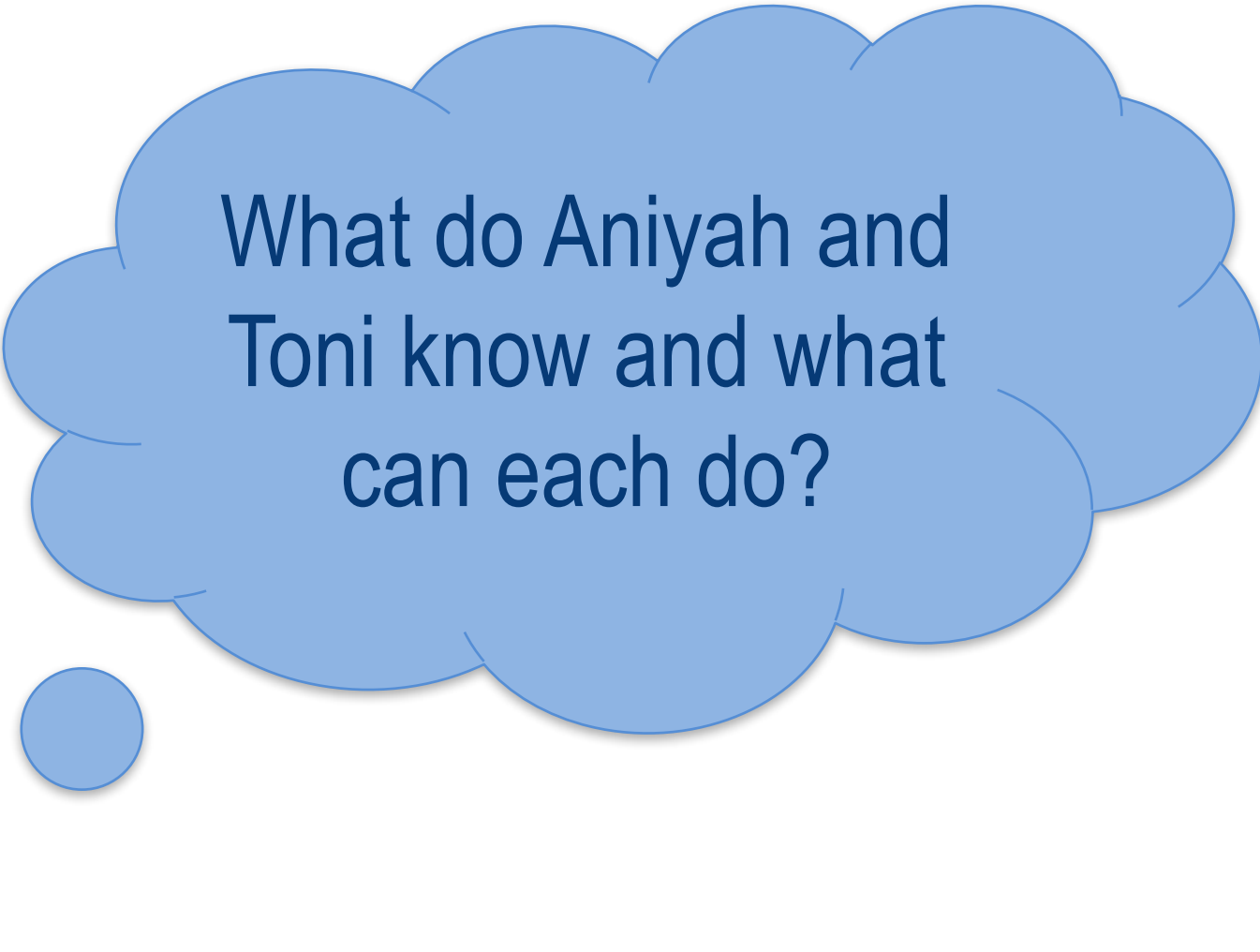


# ANIYAH



# TONI





What do Aniyah and  
Toni know and what  
can each do?



What does **Aniyah** know and  
what can she do?

What does **Toni** know and  
what is she able to do?



# WHAT DO MANY PEOPLE THINK ABOUT ANIYAH AND TONI?

## ANIYAH

- She has the wrong answer:  $1/7$

## TONI

- She is playing with her hair and trying to get attention
- She is trying to embarrass Aniyah



# WHAT *DO* ANIYAH AND TONI KNOW AND WHAT CAN EACH DO?

## ANIYAH

- Uses the definition for a fraction to explain
  - She identifies the “whole”
  - She makes sure the intervals are equal
  - She counts intervals and not tick marks
  - She knows how to write “one-seventh”
- Produces a mathematically well-structured explanation
- Presents her ideas clearly

## TONI

- Listens closely to a classmate’s presentation
- Uses the definition for a fraction to ask
  - How Aniyah decided on 7 parts
- Asks a pointed mathematical question

# HOW MIGHT THE TEACHER RESPOND TO EACH GIRL?

## ANIYAH

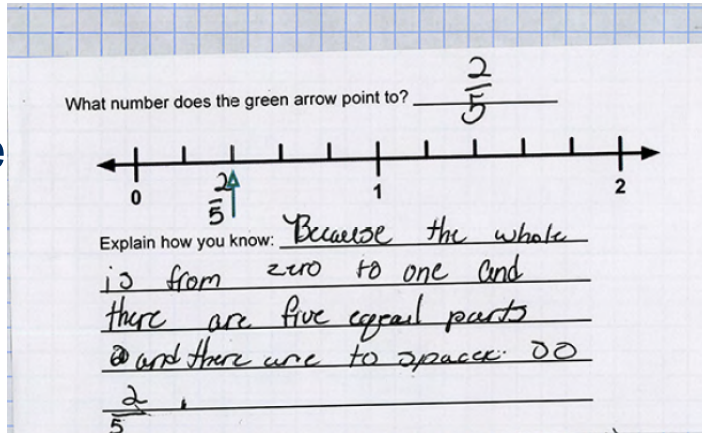
1. “Remember that when we work with number lines, the whole is the interval from 0 to 1.”
2. Ask the class whether they disagree or agree with Amiyah
3. Ask the class to ask questions of Aniyah and not agree/disagree

## TONI

1. “Toni, when you’re ready to participate appropriately by not playing with your hair and laughing, and have a question to ask, I will come back to you.”
2. “You need to be a better listener, Toni. Aniyah already explained why she picked one-seventh. Who else has a real question for Aniyah?”
3. Acknowledge publicly the importance of Toni’s question: “That is a very good question.”

## ANIYAH

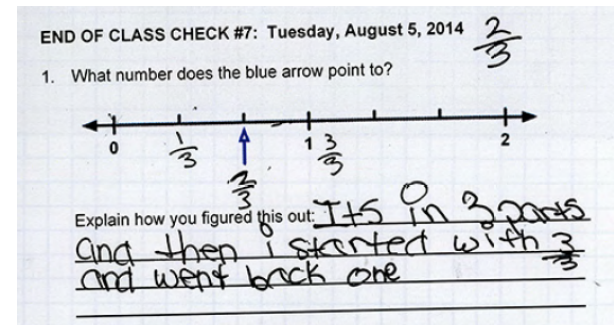
- Identified the “whole” as 0 to 1 on the number line



I did well on my goal today because my goal was to to share my ideas with the class and I did I went up to the board and share my idea with the Class on Fractions.

## TONI

- Modeled at the board a complete explanation of how to understand and identify a fraction on the line



## THE OTHER CHILDREN

- Developed a depth of understanding of fractions as numbers on the line and how to explain them
- Saw Black girls' brilliance

# TEACHING: INVISIBLE AND VISIBLE

## INVISIBLE WORK

- Reaching students' circles

Eliciting and interpreting students' thinking

Building respectful relationships with and among students

Modeling and explaining content

## VISIBLE WORK

Leading group discussions

Establishing norms and routines for classroom discourse and work



- How many different three-digit numbers can you make using the digits 4, 5, and 6, and using each digit exactly once?
- Show all the three-digit numbers you found.
- How do you know you found them all?

# TASKS MATTER

- How many different three-digit numbers can you make using the digits 4, 5, and 6, and using each digit exactly once?
  - Show all the three-digit numbers you found.
  - How do you know you found them all?
- The exact wording of the problem
  - The staging of what students are asked to do
  - Broad access, high “ceiling”
  - Using the task interactively in class

# VIEWING FOCUS

1. What are the students learning? What is complex about this? Why is it important?
2. What is the work of teaching to help the students learn this?

# VIEWING FOCUS

## STUDENTS' LEARNING

- To analyze what a problem is asking
- To interpret a mathematics problem by identifying the “conditions”
- To listen to and use others' ideas

## WORK OF TEACHING

- Choosing a problem for a particular goal
- Using a repertoire of moves to lead the discussion
  - “What is a wrong answer?”
  - Supporting students to explain
- Engaging all the students
- Strategically positioning students as competent



# THE POWER OF TEACHING IN DEVELOPING YOUNG PEOPLE

- Teaching is complex work that requires a special blend of knowledge and skill.
- Teaching involves knowing, reasoning, and skill.
- It is a risky strategy for a country to rely on individual creativity, experience on the job, or “born” talent.

# HIGH-LEVERAGE PRACTICES<sup>1</sup>

## PRÁCTICAS GENERATIVAS

- Explaining and modeling content
- Leading a discussion
- Eliciting and interpreting students' thinking
- Establishing norms and routines
- Building respectful relationships with students
- Selecting tasks and materials
- Assessing students' understanding
- Providing oral and written feedback
- Working collaboratively with families

<sup>1</sup>*TeachingWorks and the University of Michigan School of Education*

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# THANK YOU!

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Slides will be available on my website  
([deborahloewenbergball.com](http://deborahloewenbergball.com))

Google Deborah Ball