

Graphing Growth: Practical Strategies for Teaching Adults Algebra, Graphs, and Functions in Everyday life

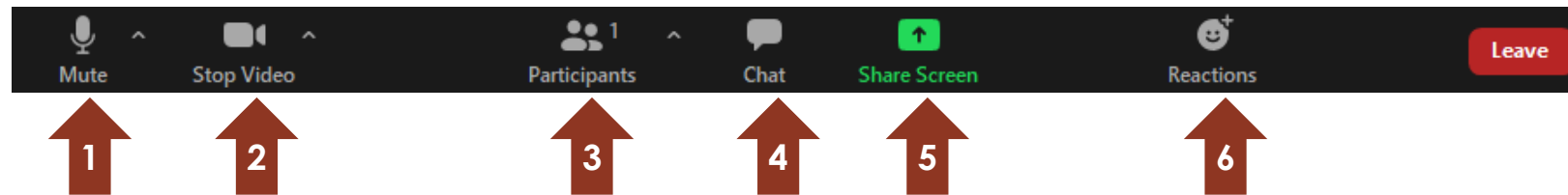
Dr. Brooke Iestas
April 2024

Agenda

- ZOOM Overview
- Introductions
- Developing Algebraic Thinking
- Real-life
 - Jobs
 - Health and Wellness
 - Budgeting
- Questions

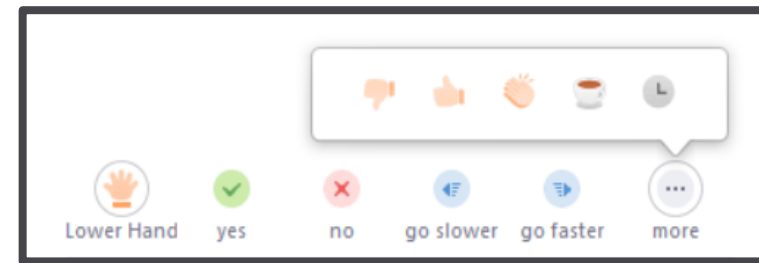
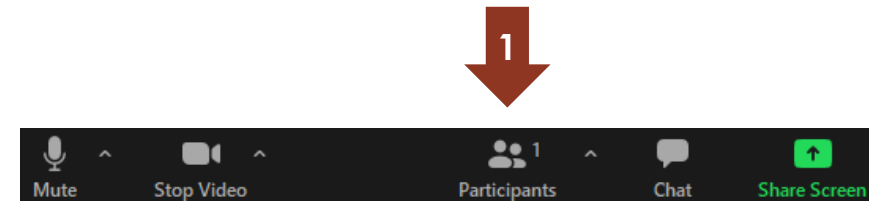
Menu Functions

At the bottom of your screen, you will find the following Attendee Controls:

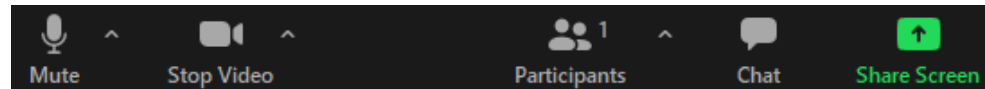


1. **Mute/Unmute** (Mute and unmute your microphone)
2. **Start Video/Stop Video** (Turns your camera on or off)
3. **Participants** (Hover over your name to change it as it's displayed to other participants)
4. **Share Screen** (Share screen – if host allows)
5. **Chat** (Access the Chat window to chat with the other participants)
6. **Leave Meeting** (Leave the meeting while it continues for other participants)

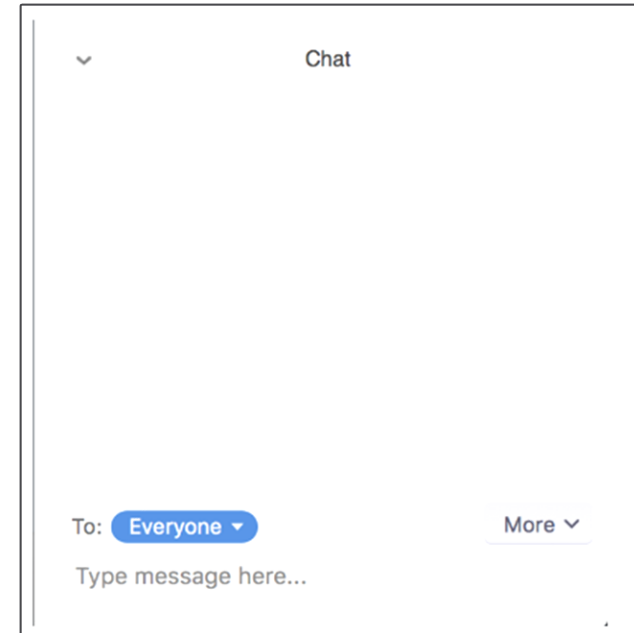
1. The Participants list gives you access to nonverbal feedback icons, which appear beside your name to quickly notify the host.
2. For example, **Raise Hand** simulates a hand raise and places the raise hand icon beside your name. Click on **Lower Hand** once called upon by the facilitator.



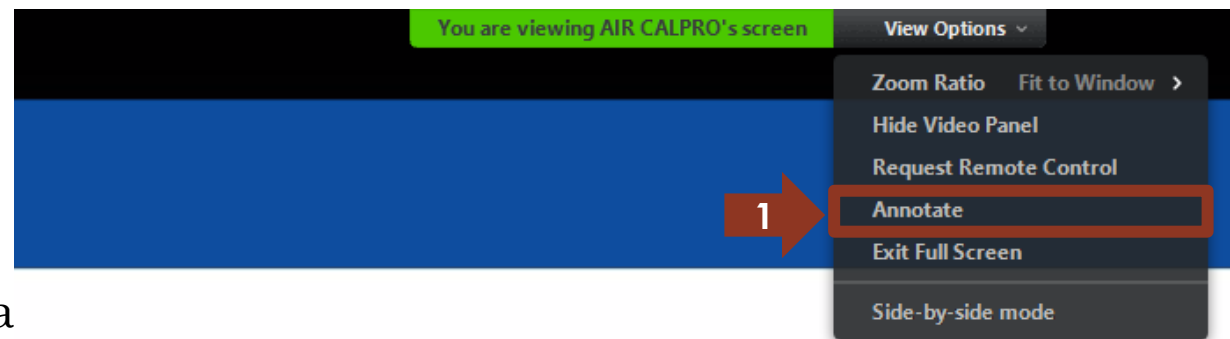
1. While in a meeting, click **Chat** in the meeting controls.



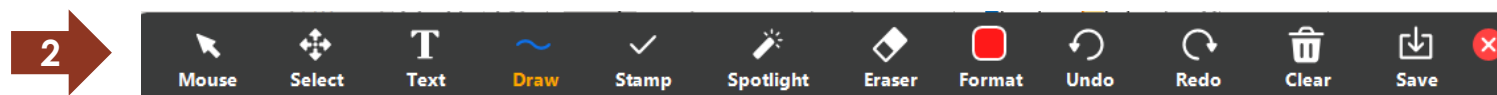
2. You can enter text in the “Type message here” box. Click Enter to send.



1. Select **Annotate** from the “View Options” dropdown list at the top of the page.



2. You can select different wa



If ATTENDING with other colleagues from your site...

- Introduce yourself in the Chat..name and location
- Please type in the Chat box the names of others who are attending but not logged in.
- This will help us keep accurate attendance.



Joining the session with my colleague Jane Smith!

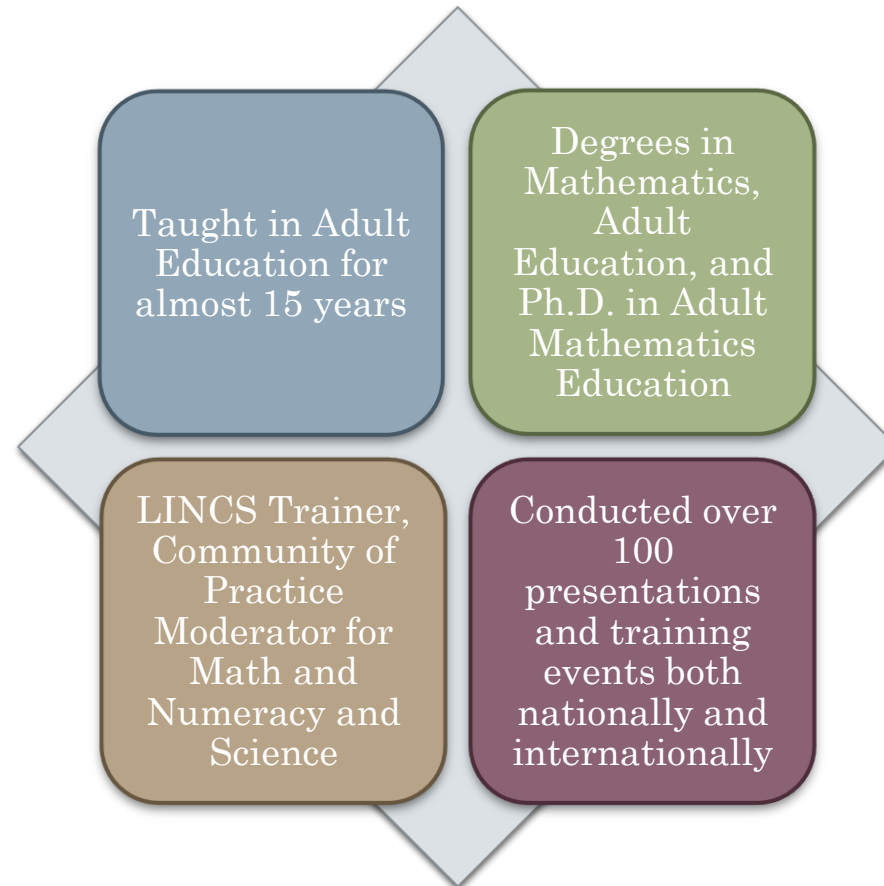
Please mark her attendance!

Training Goals

- Participants will grow in their knowledge of algebraic thinking and algebraic concepts
- Participants will learn strategies for creating opportunities to acquire algebraic thinking using real-life scenarios.

Presenter, Dr. Brooke Istas

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du



Two Hats today...

- You will be wearing two hats today...
- First, I want you to engage each activity from a student view – you as the student
- Second, we will reflect with our teacher hat.

Developing Algebraic Thinking

- What is Algebra?
- Is it something you use?



What is the vocabulary used in Algebra?

- Variables
- Coefficient
- Terms
- Slope
- Formulas
- Integers
- Slope – Intercept Form
- Linear/Non-Linear
- Functions
- Graphs
- Polynomials
- Factoring
- Properties – Commutative, Associative, etc.
- Exponent
- and so much more....

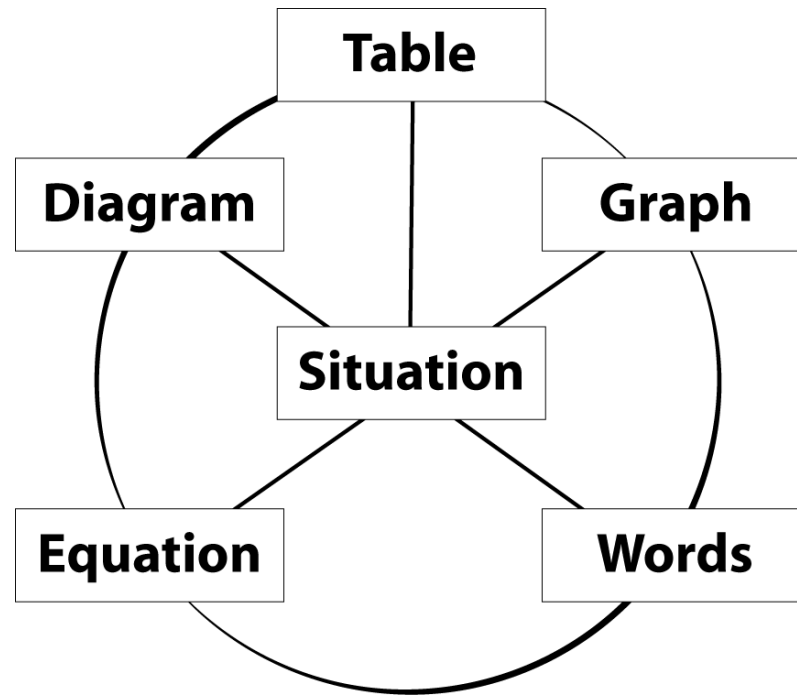
Current Research on Algebraic Thinking

Four areas of algebraic reasoning activity:

- **Patterns and functions**
 - Seeking patterns and relationships between variables
- **Modeling**
 - Looking at a formula or algebraic expression and viewing it in terms of the phenomenon it represents
- **Language and representation**
 - Using and connecting pictures, words, tables, graphs, and literal symbols
- **Structure and syntax**
 - Building on generalized arithmetic, making general statements about numbers, the grammar

Adapted from Teachers Investigating Adult Numeracy (TIAN). © 2008 by Center for Literacy Studies, University of Tennessee and TERC.

A Modeling Approach Keeps the Situation Central



(From *Seeking Patterns, Building Rules: Algebraic Thinking [EMPower series]*. Teacher book, p. xxi.)

Algebraic Thinking

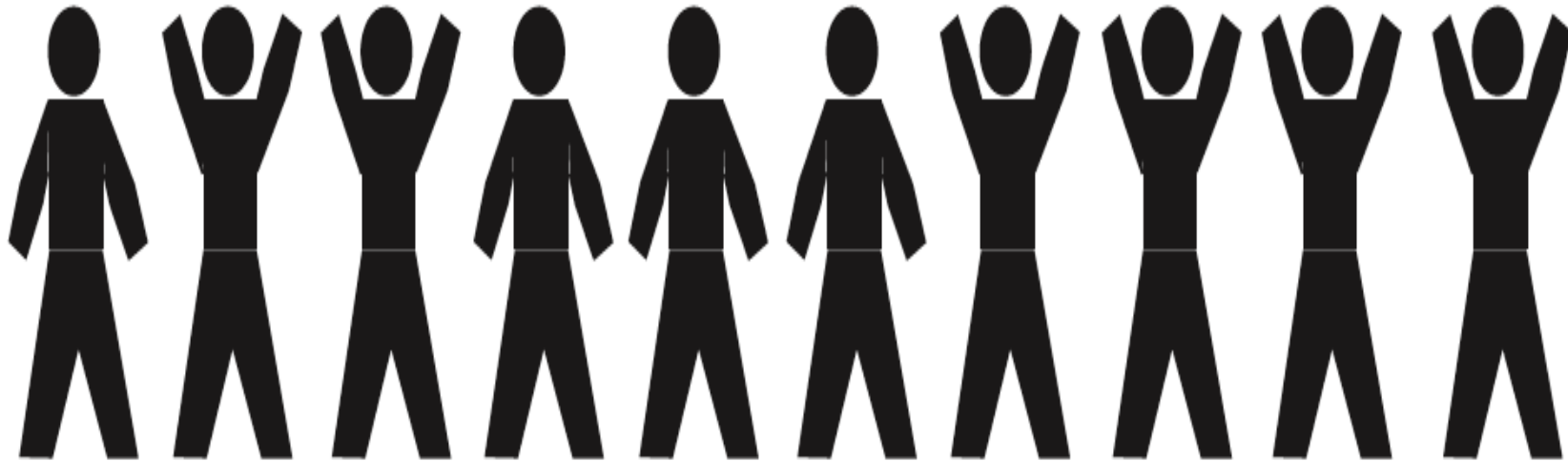
- Looking for structure to make sense of situations
- Generalizing beyond the specific by using symbols for variable quantities
- Representing relationships systematically with tables, graphs and equations
- Reasoning logically to address/solve new problems

Algebraic Thinking in Adult Education

Recommendations:

- Integrate elements of algebra early into all levels of arithmetic instruction
- Emphasize modeling in formal algebra instruction

Stick Figures



Algebrafy Arithmetic

1. Structure and patterns are components of adults relearning arithmetic.
2. Reteaching and relearning arithmetic should anticipate formal algebra.

Cups



Stacked Cups



Cups

- How tall would 8 cups be?
- How tall would 50 cups be?
- How many cups could I stack in my cupboard that is 14 inches high?
- In words, describe your rule for determining the height of any cups.
- In symbols, describe your rule for determining the height of any number of cups.





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Reflection (Teacher Hat)

- Thoughts about the activity?
- What skills did you use?

Job Offers: Who is right?

What a great week for Armand! He was offered both a part-time jobs for which he had applied. Now he needs to decide which one to take. He told his partner, Cheri, that LaserLink offered to pay him \$200/week whereas QuinStar's offer was to pay \$150/week plus a \$2000 sign-on bonus that he would get before he even started working.

"I am going to take the QuinStar job," he said, "because I do not intend to have to hold a second job for more than a year."

Cheri replied, "I don't know Armand. I think you are being foolish. In a year, you would have more money at LaserLink. I bet you would make more money at LaserLink in six months!"

"No way! I will prove it to you." Armand shouted.

Who is right, Armand or Cheri?

Would they ever be the same?

- Make a table and a graph to solve the problem. Start with whichever one you choose, but make both.
- Then write a rule in words and/or symbols to show how much money Armand would have to make at LaserLink for any number of weeks he worked.
- Write a rule in words/or symbols to show how much money Armand would make at QuinStar for any number of weeks he worked.
- Describe what you notice by answer these questions about the situations:
 - What stays the same?
 - What changes?
 - What stands out to you?

Other ideas..

- Armand has earned \$14000 working at Laserlink. How many weeks has he worked?
- Armand has earned \$10400 at Quinstar. How many weeks has he worked.

Reflection (Teacher Hat)

- Thoughts about the activity?
- What skills did you use?

GED Practice

 Formula Sheet

 Calculator Reference

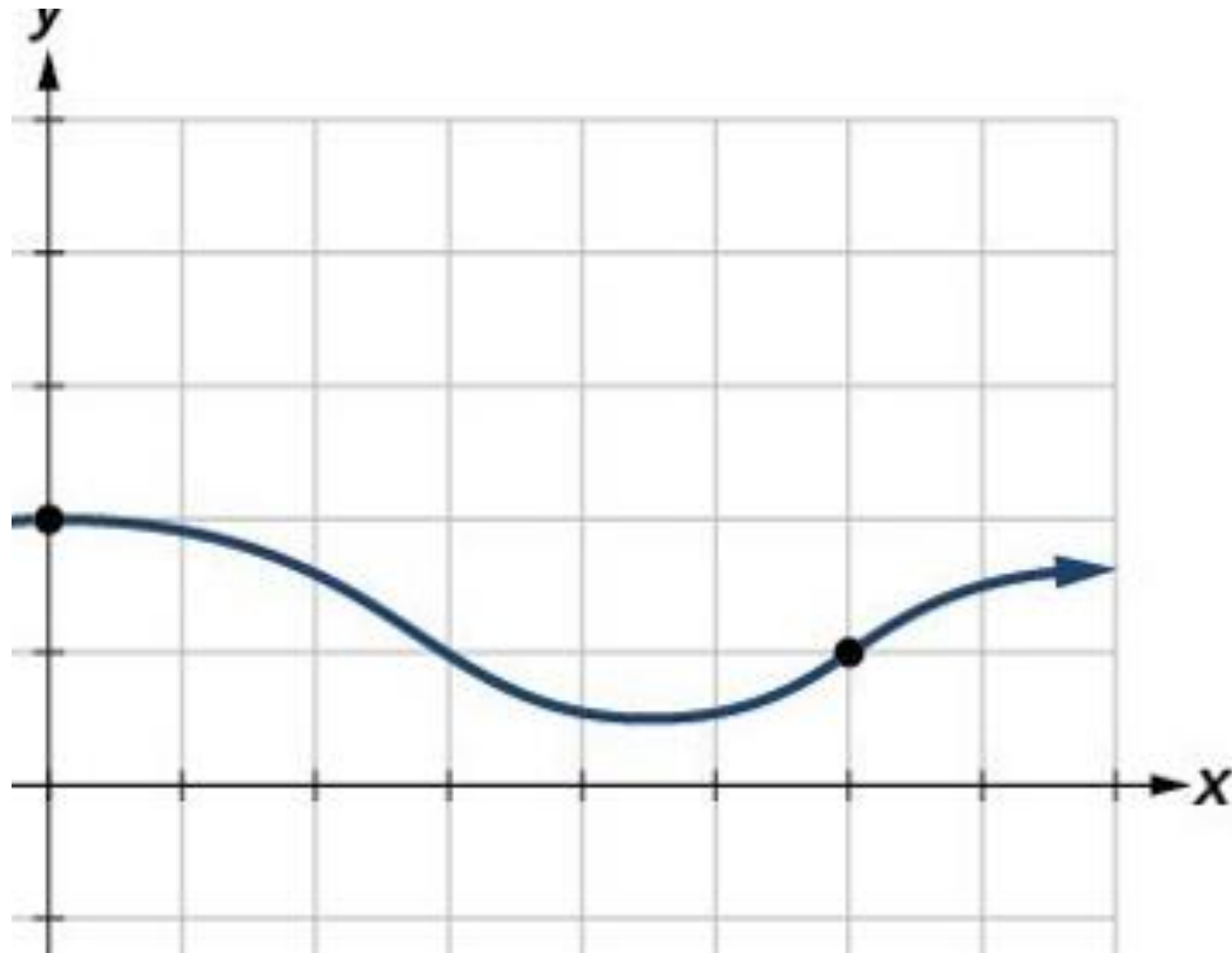
Dominic earns \$285 per week plus an 8% commission rate on all his sales. If Dominic sells \$4,213 worth of merchandise in one week, how much will his total earnings for the week be?

- A. \$337.04
- B. \$359.84
- C. \$513.00
- D. \$622.04

Story-telling is a
great way to teach...

GRAPHS!!!!

Tell me a story



Wrap up and Final Thoughts

Questions?

Thank you