



Building on Foundations – Virtual

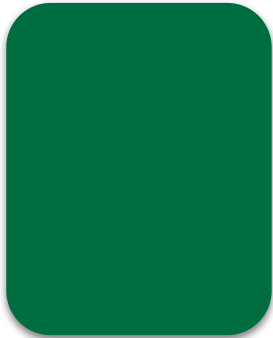
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Welcome!

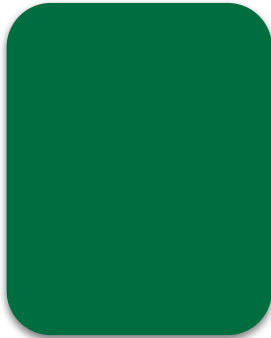
Building on Foundations



Session Facilitators

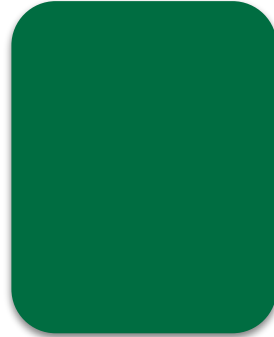


Name



Name

Support

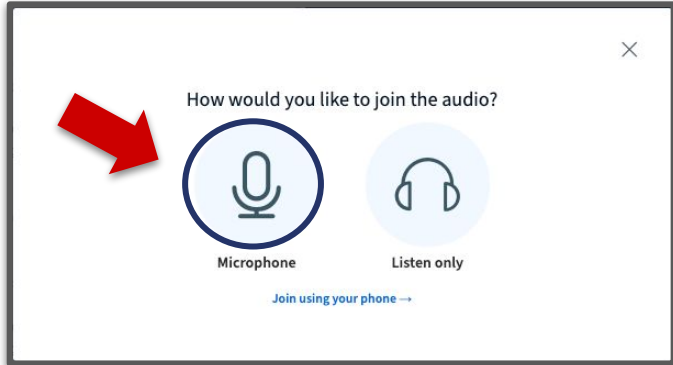


**Regional
Professional
Learning
Coordinator**

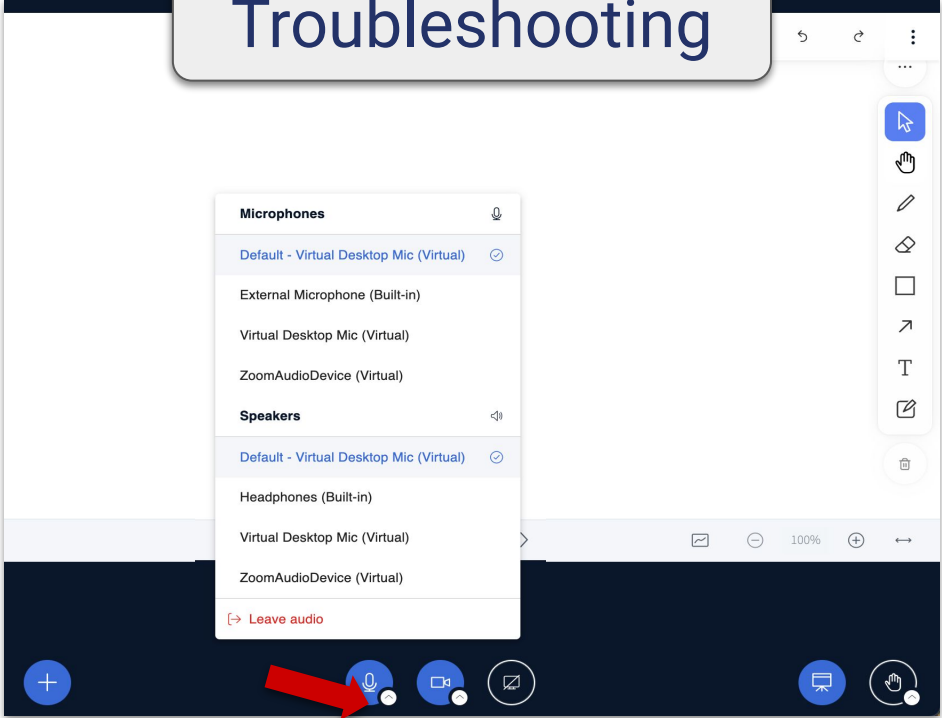
Tech Tip



Audio



Troubleshooting

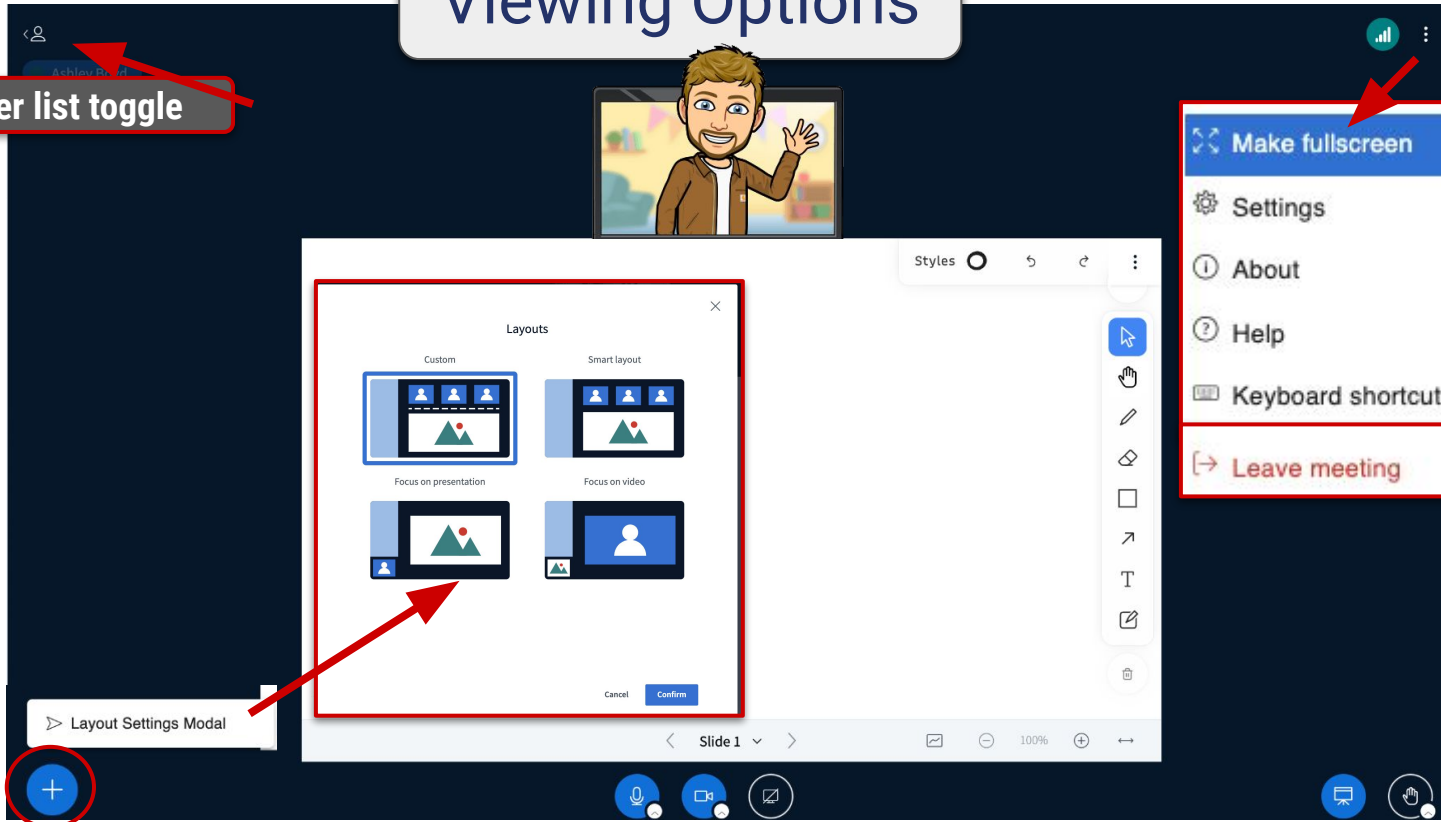


Tech Tip

Viewing Options



User list toggle



> Layout Settings Modal

Opening

Outcomes



Participants will...

Consider how the mathematical storyline provides opportunities to foster curiosity, make connections, and deepen understanding.

Purposefully use the embedded resources to plan for sharing math authority with students.

Reflect on past year(s) of teaching CPM curriculum and consider ways to enhance your collaborative classroom.

Develop an action plan to support your ongoing professional learning.

Agenda

Building on Foundations



- Opening & Icebreaker
- Mathematical Storyline
- Sharing Math Authority
- Creating Collaborative Classrooms
- Closure

Welcome

Working Agreements

Click on your name and set your status to thumbs up if you are ready to begin.



Be willing to take **risks**.

Have a **visionary** mindset.

Stay **engaged**.

Explore and reflect on your **beliefs**.

Give **grace** to others and yourself.

Change takes time, effort, and support!

Opening

Research Connections
CPM Implementation Progress Tool



Slide 2



The three pillars represent researched best practice in math education around which the CPM program is designed.

Collaborative Learning

Research says students learn ideas more deeply when they discuss ideas with classmates.

Problem-Based Learning

Research says students learn ideas more usefully for other arenas when they learn by attacking problems.

Mixed, Spaced Practice

Research says students learn ideas more permanently when they are required to engage and re-engage with those ideas for months or even years.



Building on Foundations

Agenda

Building on Foundations



- Opening & Icebreaker
- Mathematical Storyline
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- Closure

Icebreaker

The Joy of Teaching



**PERSONALIZE WITH PICTURES
TO REPRESENT YOUR TEACHING
STORIES.**

Icebreaker

The Joy of Teaching



Why/how did you
become a teacher?

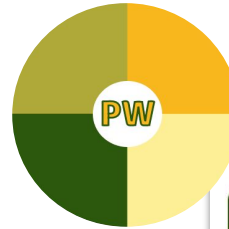
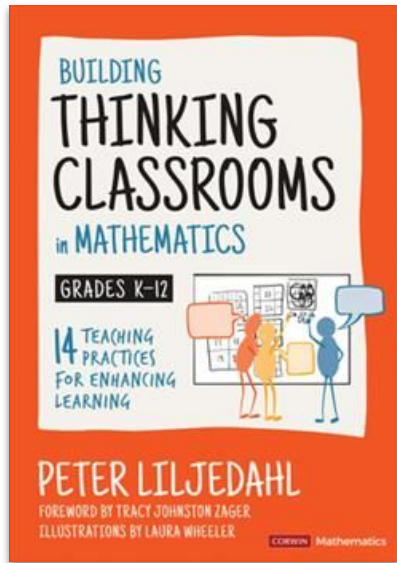


Collaborative Classrooms

Visibly Random Teams



Let's practice collaboration with new teams!



RESULT

Team 1	Team 2
Team 3	Team 4

<https://pickerwheel.com/tools/random-team-generator/>

Agenda

Building on Foundations



Building on Assessment



Mixed, Spaced Practice

Research says students learn ideas more permanently when they are required to engage and re-engage with those ideas for months or even years.

- Opening & Icebreaker
- Mathematical Storyline
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- Creating Collaborative Classrooms
- Closure

Outcome: Consider how the mathematical storyline provides opportunities to foster curiosity, make connections, and deepen understanding.

Mathematical Storyline

Does the sequence of events matter?



Slide 3



Think of a story using the illustrations.



Mathematical Storyline

Does the sequence of events matter? – Debrief



(The Mathematics Teacher, Dietiker, November 2016)

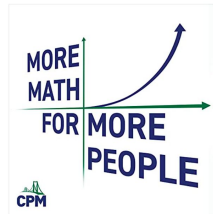
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Mathematical Storyline

Mathematical Story Defined



“Seeing how mathematics unfolds, connecting a beginning to an ending, so that somebody who is experiencing it can kind of sense a storyline and predict where it’s going.”



Episode 13: Where Joel and Misty Make a new friend with Dr. Leslie Dietiker and talk about Mathematical Storylines

Mathematical Storyline

Experience a Mathematical Story: CC1 Lesson 7.2.2



Slide 4



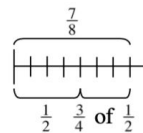
METHODS AND MEANINGS

MATH NOTES

Method 1: Using diagrams

To divide any number by a fraction using a diagram, create a model of the situation using rectangles, a linear model, or some visual representation of it. Then break that model into the fractional parts named.

For example, to divide $\frac{7}{8} \div \frac{1}{2}$, you can draw the diagram at right to visualize how many $\frac{1}{2}$ -sized pieces fit into $\frac{7}{8}$. The diagram shows that one $\frac{1}{2}$ fits one time, with $\frac{3}{8}$ of a whole left. Since $\frac{3}{8}$ is $\frac{3}{4}$ of $\frac{1}{2}$, you can see that $1\frac{3}{4}$ $\frac{1}{2}$ -sized pieces fit into $\frac{7}{8}$, so $\frac{7}{8} \div \frac{1}{2} = 1\frac{3}{4}$.



Alternately, you could think of $\frac{7}{8}$ as the quantity that you have and $\frac{1}{2}$ as the size of the group that you want, such as having $\frac{7}{8}$ ounces of chocolate and needing $\frac{1}{2}$ ounce for each cake recipe. How many cakes could you make? In this case, the diagram at right might be useful. The diagram shows $\frac{7}{8}$ being divided into groups of $\frac{1}{2}$. The leftover $\frac{3}{8}$ ounces creates another $\frac{3}{4}$ of a group, so again, $\frac{7}{8} \div \frac{1}{2} = 1\frac{3}{4}$.



Method 2: Using Common Denominators

To divide a number by a fraction using common denominators, express both numbers as fractions with the same denominator. Then divide the first numerator by the second. An example is shown at right.

$$\begin{aligned}\frac{2}{5} \div \frac{3}{10} &= \frac{4}{10} \div \frac{3}{10} \\ &= 4 \div 3 \\ &= \frac{4}{3} = 1\frac{1}{3}\end{aligned}$$

7-53. Calculate each of the following products. [Homework Help](#)

a. $\frac{1}{8} \cdot \frac{8}{1}$

b. $\frac{3}{4} \cdot \frac{4}{3}$

c. $\frac{2}{3} \cdot \frac{3}{2}$

d. $7 \cdot \frac{1}{7}$

e. What do the products in parts (a) through (d) have in common?



Mathematical Storyline

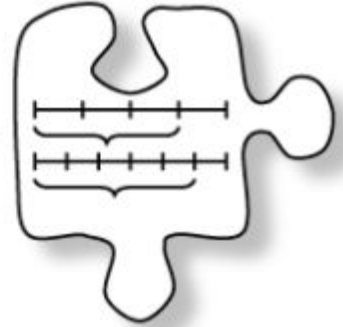
Experience a Mathematical Story



7.2.3 How can I divide?

.....

Division with Fractions and Decimals



This lesson will bring you more division strategies! You will continue your work with dividing fractions to include a new strategy for dividing by fractions. You will also extend your knowledge to division of decimals.

Mathematical Storyline

Experience a Mathematical Story



Slide 6



Your Task:

Examine the problems and consider the mathematical storyline.

Change the order of the problems.

1. How does the sequence foster curiosity for students?
2. How does changing the sequence affect the story?

Find the missing number in each puzzle.

i. $6 \cdot \underline{\quad} = 1$

ii. $4 \cdot \underline{\quad} = 1$

iii. $\frac{2}{3} \cdot \underline{\quad} = 1$

Malik was working on the division problem $5 \div \frac{3}{4}$.

Copy the expression and simplify it.

Cheryl used the problem $\frac{1}{6} \div \frac{3}{4}$.

Copy and complete Cheryl's calculation.



Whiparound

Mathematical Storyline

Experience a Mathematical Story: CC1 Lesson 7.2.3



Math Goal: Divide fractions using the Giant One strategy.

Success criteria for the task:

- + Teams know there is a storyline within the lesson.
- + Teams understand the intentional design.
- + Teams analyze how leveraging this design supports the mathematics progression.

Tech Tip



Share Screen

Take presenter

Share your screen

Team Room Routines

- Join with microphone + Webcam (encouraged)
- Share your ideas
- Offer support to team
- Private chat facilitator for support

Mathematical Storyline

Debrief the Storyline



Share Out

How does the authors' chosen sequence provide opportunities for surprise and intrigue?

What are the mathematical characters, settings, and actions?

Where/What was the "aha" of this lesson?

Mathematical Storyline

Definition

“Enacting a sequence so that it offers dramatic conflict can also offer students a memorable experience and, since it increases student attention, lead to more learning by students (Egan 1989).”

Mathematics Teacher, November 2016



MATHEMATICAL STORYLINE

- Introduction
- Discussion Post (Mathematical Storyline)
- More Math for More People - Dr. Leslie Dietiker and Mathematical Storylines
- Mathematical Storyline Scenarios
 - Scenario A: Productive Struggle
 - Restricted** Not available unless: You belong to Group A
 - Scenario B: Structure and Organization
 - Restricted** Not available unless any of:
 - You belong to Group B
 - The activity Scenario A: Productive Struggle is marked complete
- Lesson Planning
- Action Plan (Mixed, Space Practice)
- Activity 1 Completed

Agenda

Building on Foundations



Building on Discourse



Problem-Based Learning

Research says students learn ideas more usefully for other arenas when they learn by attacking problems.

- Opening & Icebreaker
- Mathematical Storyline
- Sharing Math Authority
- Creating Collaborative Classrooms
- Closure

Outcome: Purposefully use the embedded resources to plan for sharing math authority with students.



CPM's Equity Principles

The goal of teaching is to help all students transition from dependent to independent learners.

Relationships are of vital importance.

Student uniqueness is an asset, not a deficit.

Reflection is a crucial part of growth.

Sharing Math Authority

Research Connection

CPM Implementation Progress Tool



Slide 7



SECTION TWO: Features of desired student learning when the pillars are in place.

Collaborative Learning

Students read and make sense of problems together.

Students are able to listen to the ideas of others and communicate their own ideas both in teams and during whole class discussions.

Students listen carefully to the thinking of others and respond with clarifying questions or extensions of their own.

Students engage in productive mathematical discourse, justifying answers, creating viable arguments, and critiquing the reasoning of others.

Problem-Based Learning

Student thinking at varied depths of conceptual understanding are openly shared and valued.

Students demonstrate and value both conceptual and procedural knowledge.

Students look for, compare, and connect multiple models and solution strategies.

Students recognize that incorrect work can be a stepping stone to learning and are willing to share and investigate their thinking.

Mixed, Spaced Practice

Students work through lessons at an appropriate pace.

Students understand that mastery takes time, effort, and support.

Students are aware of learning targets and periodically self-assess their progress towards those targets.

Students solidify learning as they work on Review & Preview problem sets daily as intended.

1. Review these evidence statements.
2. Set your status with how you feel as you reflect on your own classroom.








Two Stars and a Wish

What is going well?

What is a challenge?

Two Stars and a Wish	
Star	
Star	
Wish	

Sharing Math Authority

Resources Concept Map



Chapter Opening

Lesson Plan Structure: Launch

Establish mathematics goals to focus learning

Suggested Lesson Plan
(Lesson → Teacher Notes)

Lesson Mathcast
(Lesson → Teacher Notes)

Implement tasks that promote reasoning and problem solving

Build procedural fluency from conceptual understanding

Facilitate meaningful mathematical discourse

Pose purposeful questions

Use and connect mathematical representations

Elicit and use evidence of student thinking

Support productive struggle in learning mathematics

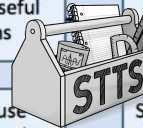
Lesson Plan Structure: Closure

Chapter Closure

Student centered moves

Lesson Plan Structure: Explore

Classroom/Team Expectations



Sharing Math Authority

Resources Concept Map



Slide 9



Facilitator: Universal Access, Pocket Questions



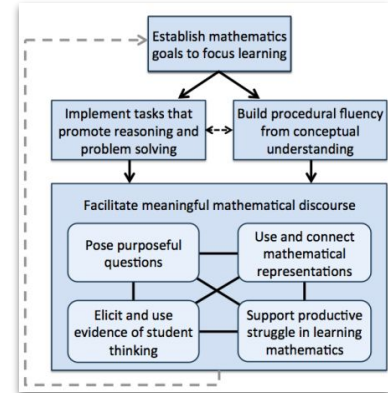
Resource Manager: Skill Builders, Math Notes



Recorder/Reporter: Teambuilders/Icebreakers, Homework Help



Task Manager: Team Roles, Checkpoints



Explore your assigned resources. Consider the following questions. (4 min)

- + *How do these resources support sharing math authority?*
- + *What connections do you see to the Mathematical Teaching Practices?*

Consider a STTS that supports sharing the math authority?

Sharing Math Authority

Debrief



Embedded CPM Resources

Suggested
Lesson Plan

Study Team &
Teaching
Strategies

Pocket Questions

Mathcast
Universal Access

Lesson Plan
Structure:
(Launch–Explore
–Closure)

Learning Logs

Team Roles

Classroom/Team
Expectations

Chapter Opening

Chapter Closure

Homework Help

Math Notes

Checkpoint
Problems

Skillbuilders

Agenda

Building on Foundations



Building on Equity



Collaborative Learning

Research says students learn ideas more deeply when they discuss ideas with classmates.

- Opening & Icebreaker
- Mathematical Storyline
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- Creating Collaborative Classrooms
- Closure

Outcome: Reflect on past year(s) of teaching CPM curriculum and consider ways to enhance your collaborative classroom.

Collaborative Classrooms

Debrief



Reflect on your team's collaboration.



What does collaboration
not look like?



What does collaboration
look like?



Create a Collaboration Rubric
Idea from Building Thinking Classrooms

Collaborative Classrooms

On-Demand Module

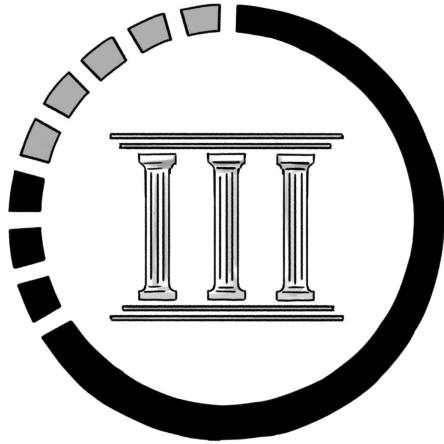


COLLABORATIVE CLASSROOMS

-  Introduction
-  Collaborative Classroom Ideas
-  Storyline of Core Connections Algebra, Chapter 8
-  Core Connections Algebra, Lesson 8.2.5
-  Discussion Post (Collaborative Classrooms)
-  Lesson Planning
-  Action Plan (Collaborative Learning)
-  Activity 3 Completed

Agenda

Building on Foundations



- Opening & Icebreaker
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- Sharing Math Authority
- Creating Collaborative Classrooms
- Closure

Outcome: Develop an action plan to support your ongoing professional learning.

Opening

Outcomes



Participants...

Consider how the mathematical storyline provides opportunities to foster curiosity, make connections, and deepen understanding.

Purposefully use the embedded resources to plan for sharing math authority with students.

Reflect on past year(s) of teaching CPM curriculum and consider ways to enhance your collaborative classroom.

Develop an action plan to support your ongoing professional learning.

Closure

CPM Implementation Progress Tool



Building on...

SECTION ONE: The pillars that represent necessary first steps in any implementation.

Collaborative Learning

Students and teachers are aware of the purpose for and value of working in teams, and are familiar with team norms and roles.

Problem-Based Learning

Students and teachers share math authority as they value and engage in productive struggle. Teachers guide without taking over the thinking.

Mixed, Spaced Practice

Both individual lessons and chapters are followed, using suggested pacing. Review & Preview problems are assigned and valued as an essential part of learning.



Equity



Discourse



Assessment

Closure



- + Parking Lot
- + Attendance
 - **XXXXXX**
- + Continuing Education Credit
- + **Homework:**
 - On-Demand Module
 - Building on Foundations



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#MoreMathforMorePeople