Foundations for Implementation – Session 4

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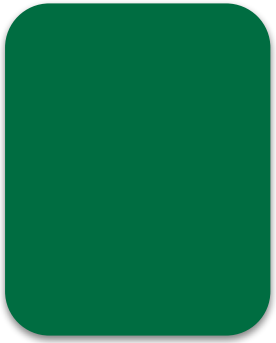
Rev 6/8/23 (ce)

Welcome!

CPM Virtual Learning Series

Session Facilitators



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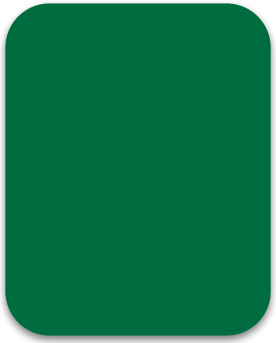

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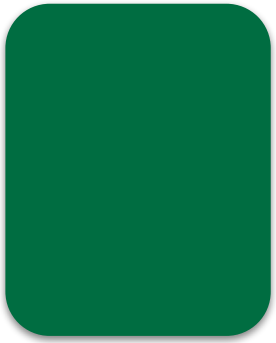
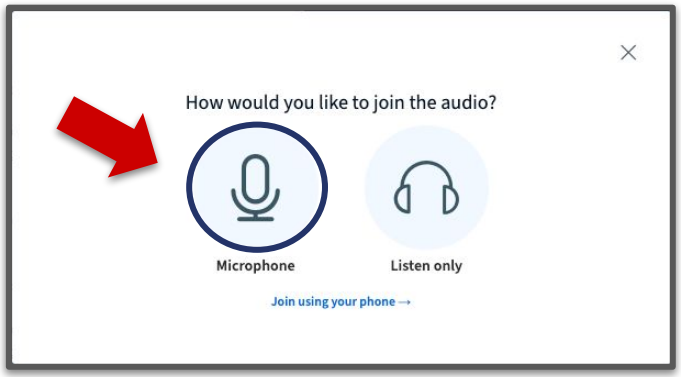


Name

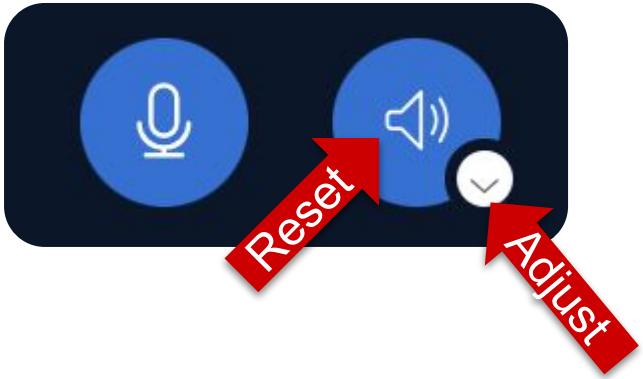
Regional Professional Learning Coordinator

Tech Tip

Audio



Troubleshooting



Opening

Professional Learning Checklist

	Summer Session	Fall Semester	Spring Semester
Live Learning Events	☐ Register and attend: In-Person Days 1-3 **or** Virtual Sessions 1-6	☐ Register and attend: In-Person Day 4 **or** Virtual Sessions 7-8	☐ Register and attend: In-Person Day 5 **or** Virtual Sessions 9-10
Content Modules (On-Demand)	☐ Chapter 1 ☐ Chapter 2	☐ Chapter 3 ☐ Chapter _____	☐ Chapter _____ ☐ Chapter _____
Instructional Modules* (On-Demand)	☐ 1 - Closure and Team Assessments ☐ 2 - Review & Preview ☐ 3 - Intentional Planning	☐ 4 - Supporting Productive Struggle	☐ 5 - Assessment Practices

* Instructional Modules 1–5 will be opened and available upon completion of the Introduction to Foundations Module.
If you support special education or intervention, Inclusion Modules may be completed in place of the Instructional Modules.

Opening

Outcomes

Participants will:

+ Connect Problem-Based Learning research to classroom practices.

+ Learn how the Launch-Explore-Closure lesson structure supports Problem-Based Learning.

+ Collaborate and learn with other teachers.

Agenda

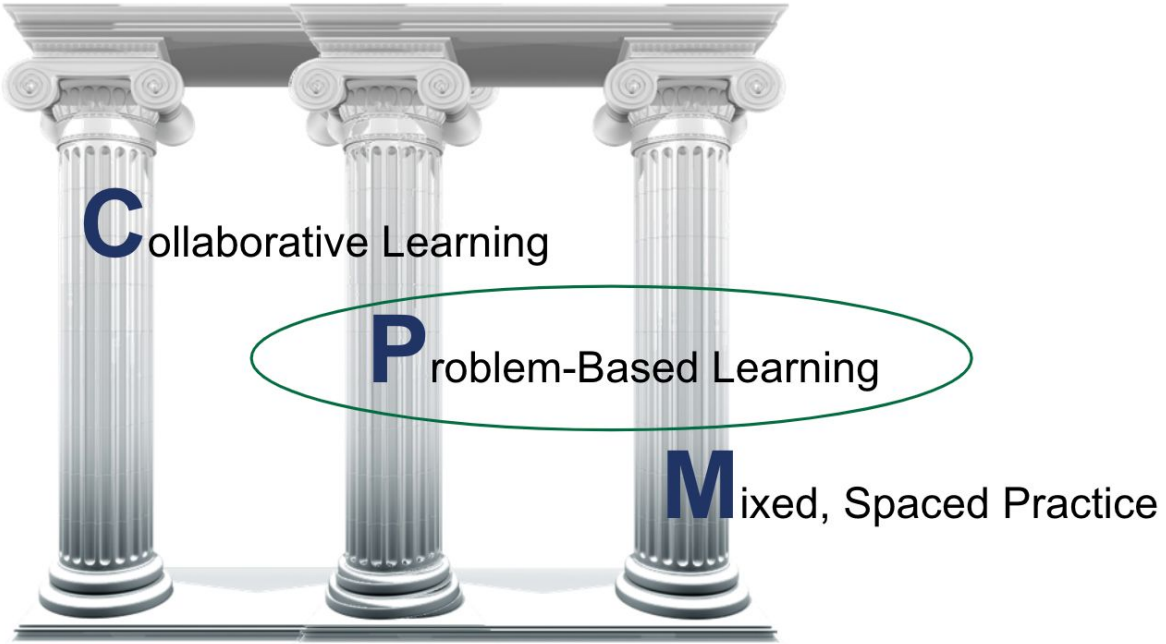
Session Four

Focus: Problem-Based Learning

- ☐ Icebreaker
- ☐ Lesson Structure
- ☐ Math Thread
- ☐ Lesson Support
- ☐ On-demand Support
- ☐ Closure

Opening

Three Pillars of CPM



Guiding Principles

CPM's Guiding Principles

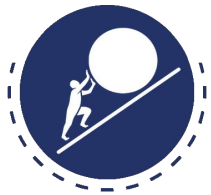
Students deepen their mathematical understanding when they are engaged with concepts over time.

Students have significantly better retention of mathematics when concepts are grounded in context.

Students' involvement in effective study teams increases their ability to learn mathematics.

Effective study teams are guided, supported, and summarized by a reflective, knowledgeable teacher.

Assessing what students understand requires more than one method and more than one opportunity.



When students and stakeholders embrace a growth mindset, they understand that mastery takes time, effort, and support.

Opening

Working Agreements

- Be willing to take **risks**.
- Have a **visionary** mindset.
- Stay **engaged**.
- Explore and reflect on our **beliefs**.
- Give **grace** to others and ourselves.

Change takes time, effort, and support!

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

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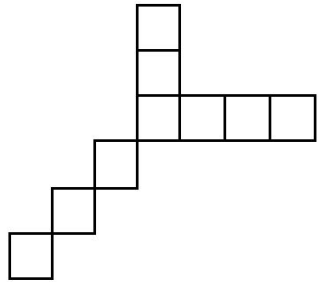
Student

Visualizing Patterns

Determining Team Roles -

Add the number of letters in your first and last names.



You will finish this Icebreaker in your team room.

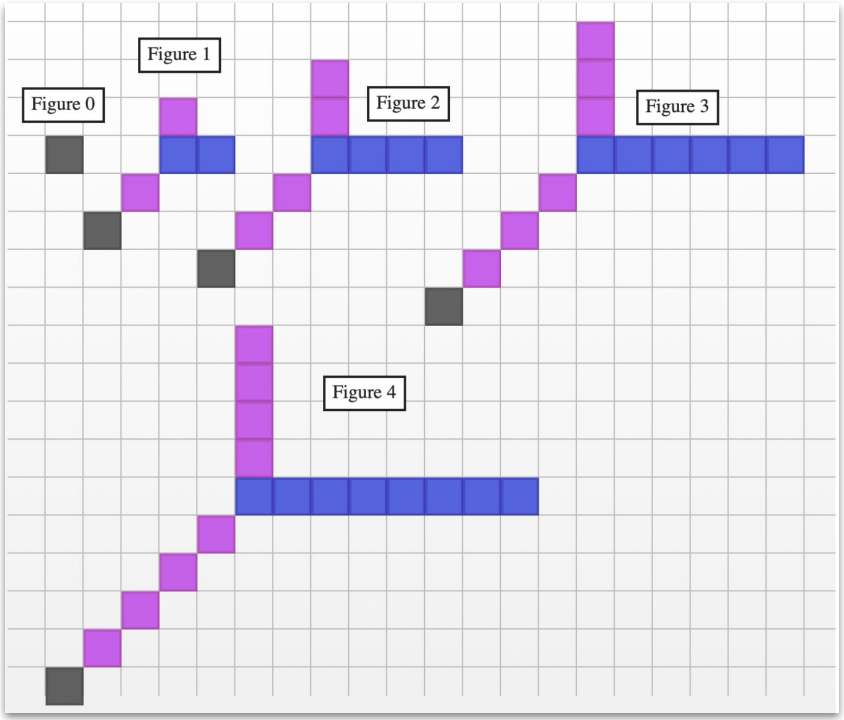
Icebreaker

Debrief

Student

What would figure 100 look like?

Set your status to a thumbs up when you have an idea.



Agenda

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Focus: Problem-Based Learning

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Lesson Structure

Problem-Based Learning

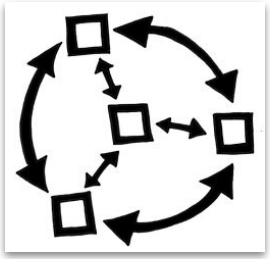
How do we create and support an environment for effective problem-based learning?

Collaborative Learning Agreements	Team Roles	Circulation	Purposeful Lesson Launch
Study Team and Teaching Strategies (STTS)	Rich Tasks	Purposeful Questioning	Purposeful Closure

Lesson Plan Structure

Supporting Problem-Based Learning

The **Launch-Explore-Closure (LEC)** lesson structure is an essential part of implementing effective CPM lessons and sharing math authority with students.

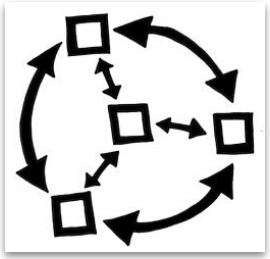


Launch – Lesson Opening
Explore – Structured Problem-Based Learning
Closure – Lesson Closure

Lesson Structure

Lesson Plan Structure

TO SUPPORT PROBLEM-BASED LEARNING



An effective Lesson Explore structures problem-based lessons through the use of:

1. Team Norms and Team Roles
2. Effective Launch-**Explore**-Closure
3. **Multiple Modes of Instruction**
4. Circulating, Listening, and Questioning

Lesson Structure

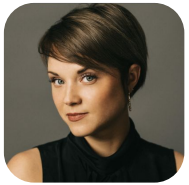
Multiple Modes of Instruction

TO SUPPORT PROBLEM-BASED LEARNING

Teacher

Research has shown that, in classrooms with rich mathematical tasks, supporting student success requires multiple modes of instruction such as teamwork, whole class discussions, presentations, and more. This is true not only in the sense of providing differentiated learning opportunities, but also in the sense of sparking and sustaining mathematical interest.

—Dr. Lara Jasien, CPM Director of Research



Lesson Structure

Multiple Modes of Instruction

TO SUPPORT PROBLEM-BASED LEARNING

Problem-Based Learning provides opportunities for teachers to engage students using Multiple Modes of Instruction. Study Team and Teaching Strategies (STTS) support the following modes of instruction and more!

- Teacher-Led Discussions
- Partner Work
- Teams of Four
- Individual Think Time
- Student Presentations
- And More!

Lesson Structure

Multiple Modes of Instruction

TEACHER- LED CLASS DISCUSSIONS

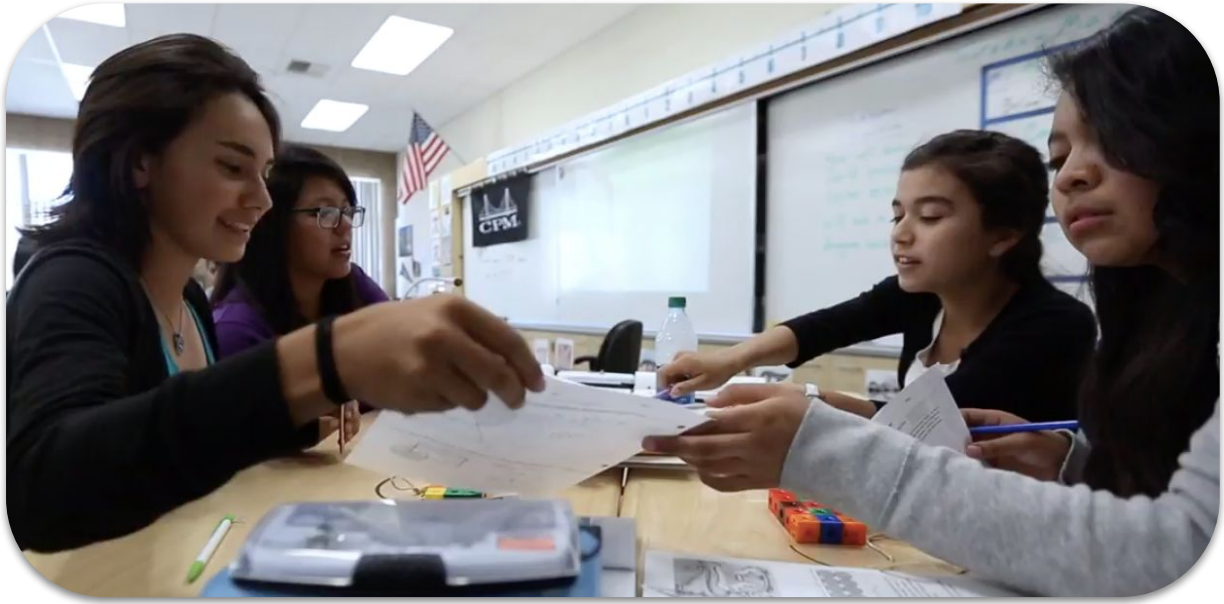
Teacher

Whiparound

Lesson Structure

Multiple Modes of Instruction

TEAM OF FOUR

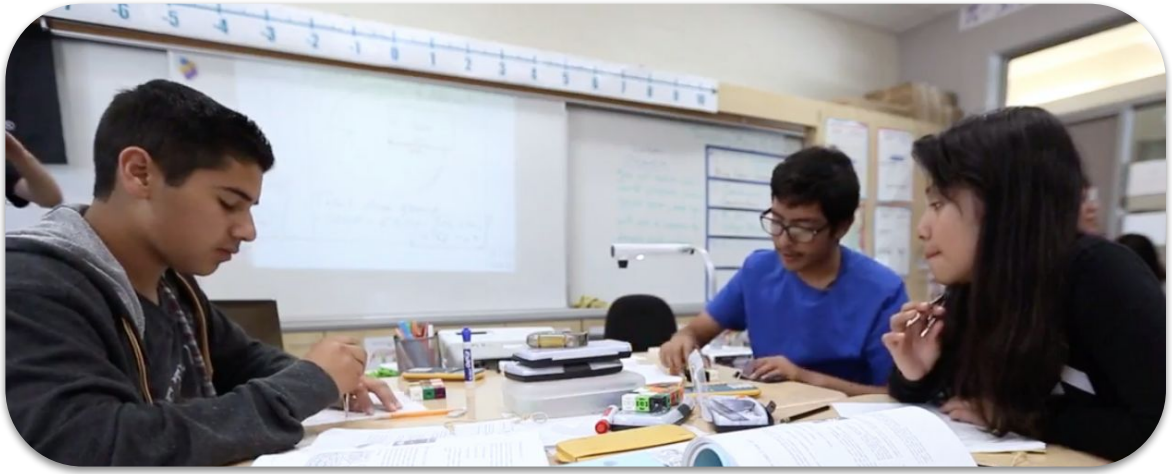


Teammates Consult

Lesson Structure

Multiple Modes of Instruction

TEAM OF THREE

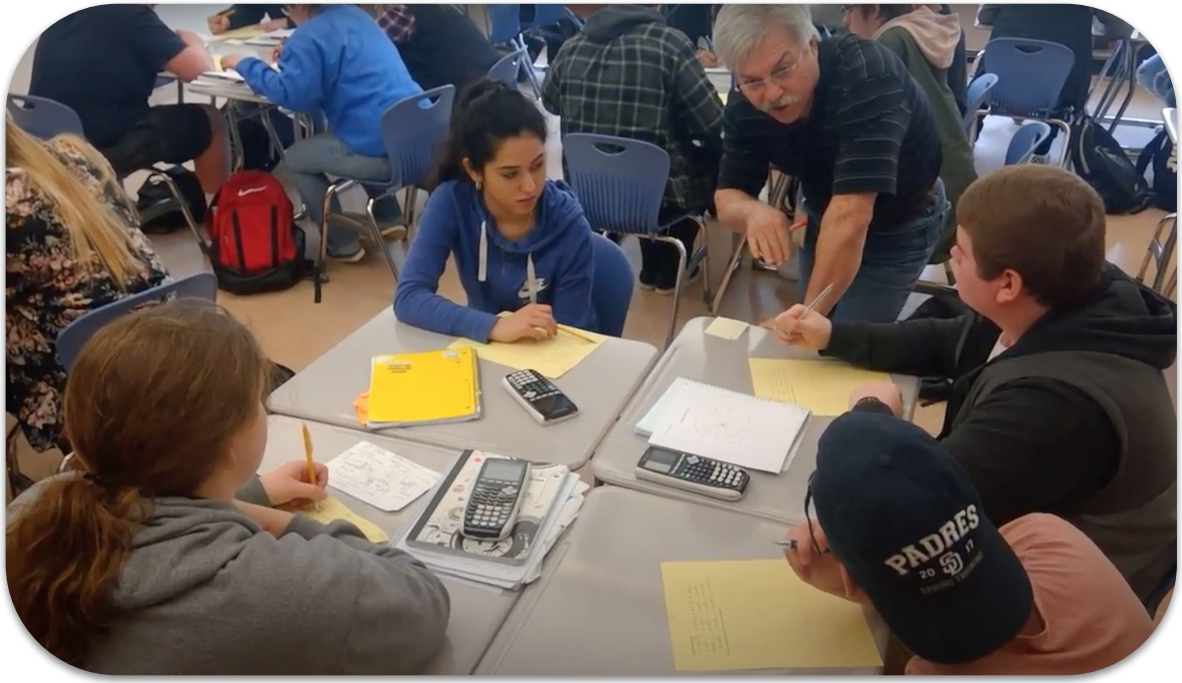


Shared Team Roles

Lesson Structure

Multiple Modes of Instruction

TEACHER-LED TEAM DISCUSSIONS

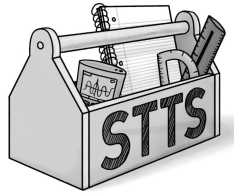


Red Light, Green Light

Lesson Structure

Multiple Modes of Instruction

INDIVIDUAL WORK

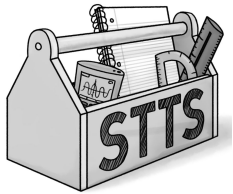


Think-Ink-Pair-Share

Lesson Structure

Multiple Modes of Instruction

PARTNER WORK



Pairs Check

Lesson Structure

Multiple Modes of Instruction

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- Teacher-Led Discussions
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- Individual Think Time
- Student Presentations
- And More!

Lesson Structure

Lesson Explore Support

TEACHER NOTES – EXAMPLES

Teacher

Includes recommended Study Team and Teaching strategies.

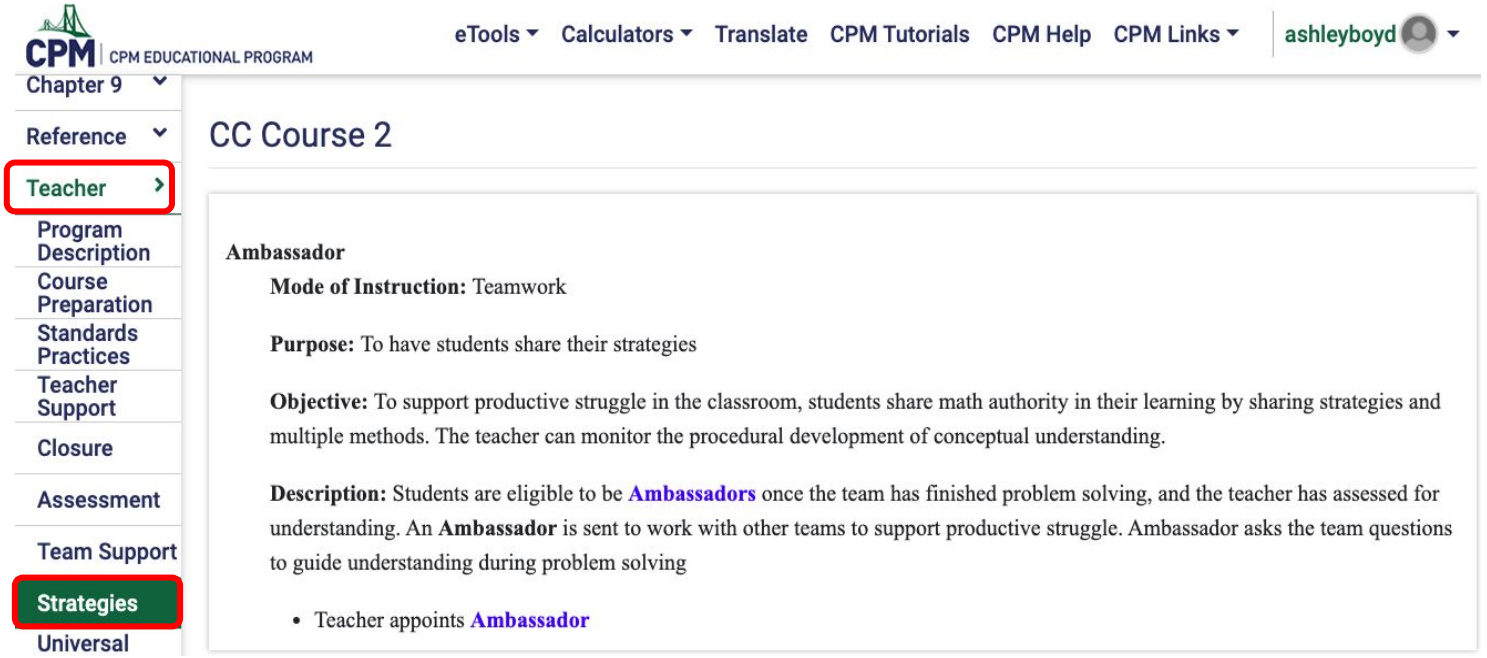
Suggested Lesson Activity:

You can start problem 4-1 as a **Teammates Consult**. Make sure that everyone understands the task before picking up their pencils and starting the task. If students will be working from the textbook, assign each team a pattern from problem 4-1. Depending on the size of your class, you may need to give some teams the same pattern. Or distribute the Lesson 4.1.1A Resource Page ("Tile Pattern Team Challenge"), which contains the task instructions so that students do not need their books on their desks. The Lesson 4.1.1A Resource Page includes five pages in all, each with a different tile pattern. Each team should receive two copies of the resource page for their pattern.

Students should do their work on graph paper, which makes it easier to draw the tile patterns clearly. Teams will take the remainder of the class period to complete the task. Some teams may begin their poster. Remind students as you circulate that although each student will need to turn in the pattern analysis individually, students should be working in their teams and discussing each question together before moving on. This can be done as a **Huddle** by bringing one person from each team up to the front of the class to share the information.

Lesson Structure

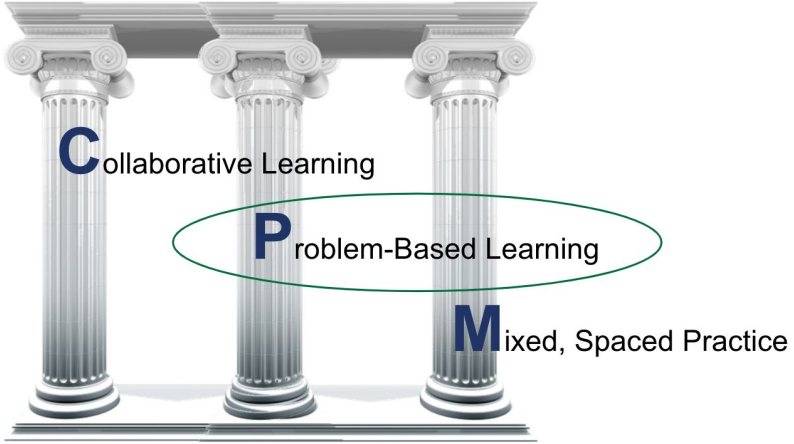
Teacher Tip



eBook ▷ Teacher Tab ▷ Strategies

Lesson Support

Three Research Pillars



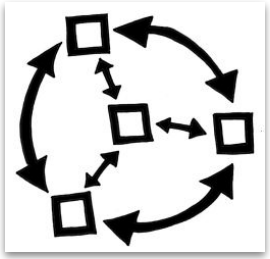
SECTION ONE: The pillars that represent necessary first steps in any implementation.

Collaborative Learning	Problem-Based Learning	Mixed, Spaced Practice
Students and teachers are aware of the purpose for and value of working in teams, and are familiar with team norms and roles.	Students and teachers share math authority as they value and engage in productive struggle. Teachers guide without taking over the thinking.	Both individual lessons and chapters are followed, using suggested pacing. Review & Preview problems are assigned and valued as an essential part of learning.

Lesson Structure

Lesson Plan Structure

TO SUPPORT PROBLEM-BASED LEARNING



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Brain Break

Alphabetical Animals

As a class, create an alphabetical list of animals using the Public Chat.

Once someone has added an animal for that letter, move to the next letter.

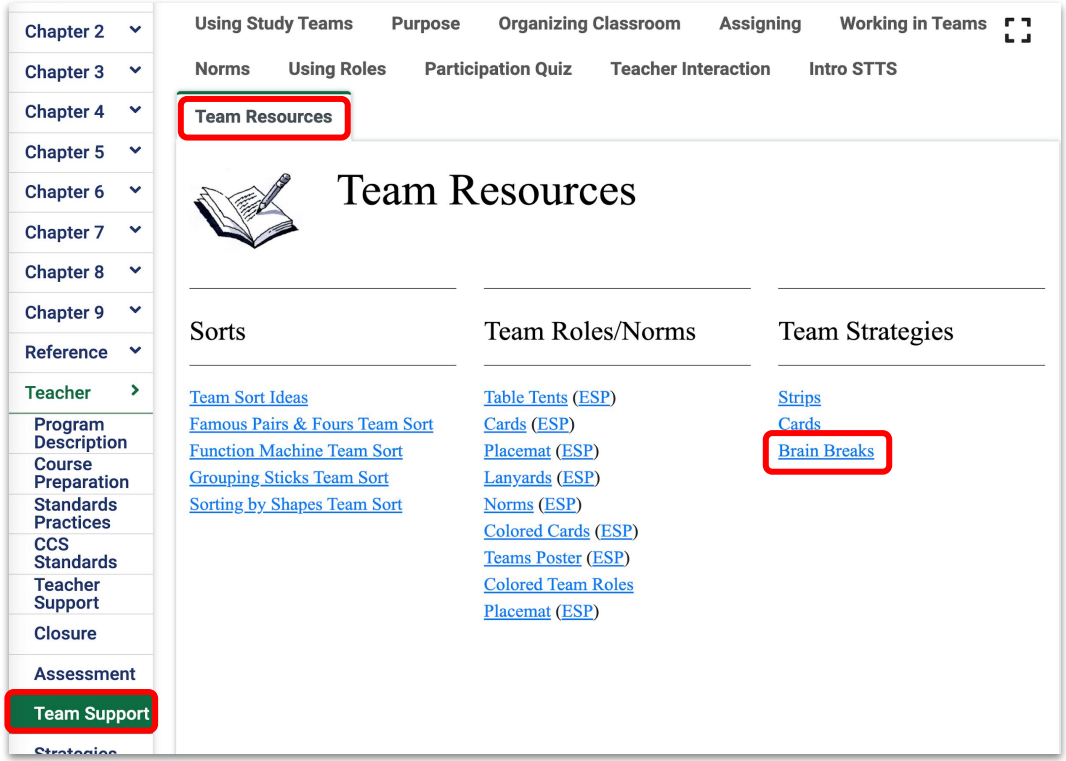
1m 30s

How to participate?

Post in the Public Chat.

Brain Break

Teacher Tip



eBook ▷ Teacher Tab ▷ Team Support ▷ Team Resources

Agenda

Session Four

Focus: Problem-Based Learning

- [x] Icebreaker
- [x] Lesson Structure
- [ ] Math Thread
- [ ] Lesson Support
- [ ] On-Demand Support
- [ ] Closure

Math Thread

Team Agreements and Roles

Together, work to learn mathematics.

Explain and give reasons.

Ask questions and share ideas.

Members of your team are your first resource.

Strive for understanding.

Math Thread

Study Team and Teaching Strategy

Student

Elevator Talk

- Each team is given a topic.
- Every team summarizes the topic into a quick presentation.
- Each team shares their elevator talk following the teacher's directions.

Math Thread

CC3 Lesson 3.1.1
Extending Patterns and Finding Rules

Student

3-1. Some people desc
pattern below, dra
individually, and
Explain how you

a.

Figure 2

b.

Figure 2

H

like?

3-2. FINDING RULES FROM TABLES

How can you describe the rule that governs a pattern or table? Obtain the Lesson 3.1.1A Resource Page from your teacher and find the tables below. As a class, find the pattern, fill in the missing parts, and extend each table with at least two more $x \rightarrow y$ pairs that fit the pattern. Then generalize the pattern's rule in words.

a.

IN (x)	OUT (y)
	C
L	N
	F
Q	
W	Y

Rule:

b.

IN (x)	OUT (y)
easy	
	light
hot	cold
up	down
left	

Rule:

c.

IN (x)	OUT (y)
△	⬠
⬠	
	⬡
⬡	⬡
⬡	

Rule:

d.

IN (x)	OUT (y)
8	17
–2	
	9
12	25
10	21

Rule:

e.

IN (x)	OUT (y)
100	51
4	
6	4
30	16
	31

Rule:

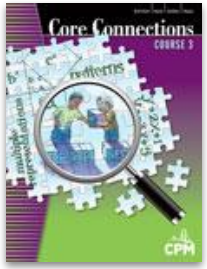
f.

IN (x)	OUT (y)
4	16
–1	1
	9
12	
–6	

Rule:

Math Thread

CC3 Lesson 3.1.1
Extending Patterns and Finding Rules



Student

Math goal:
Look for regularity in the relationship between inputs and outputs. Consider strategies for uncovering patterns.

Team goal:
Work together to learn mathematics.

Math Thread

Study Team and Teaching Strategy

Reciprocal Teach

- In pairs, Person A pretends that Person B was absent and explains a concept.
- Switch roles and continue.

Partners:

Resource Manager & **Task Manager**

Recorder/Reporter & **Facilitator**

private chat

Math Thread

Reciprocal Teach

Student

What values are most helpful when determining the rule? Why?

Partners:

Resource Manager → **Task Manager**

Recorder/Reporter → **Facilitator**

private chat

Math Thread

Reciprocal Teach

How do input/output values help us determine the rule?

Partners:

Resource Manager ← **Task Manager**

Recorder/Reporter ← **Facilitator**

private chat

Agenda

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Focus: Problem-Based Learning

- [x] Icebreaker
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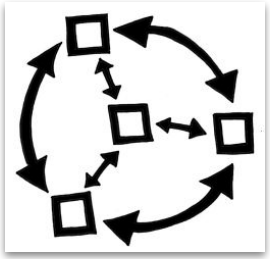
Lesson Structure

Lesson Plan Structure

TO SUPPORT PROBLEM-BASED LEARNING



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4. **Circulating, Listening, and Questioning**

Lesson Structure

Problem-Based Learning

Why is circulating, listening, and questioning necessary?

It provides the teacher the opportunity to:

- Reinforce a productive learning environment
- Model expected behavior through engagement
- Connect student language to math concepts.
- Learn from students to determine interventions
- Support team interactions
- Provide just in time support for study teams
- Assess the needs of individuals, teams, & whole class
- Gain feedback to guide lesson closure

Lesson Structure

Classroom Connections

PURPOSEFUL CIRCULATION TO SUPPORT PROBLEM-BASED LEARNING

Lesson Structure

Lesson Explore
TEACHER NOTES – SUPPORT

Materials:

Chapter Pocket Question Cards (Also under Teacher Tab under Teacher Resources)

Pocket Questions:

Lesson 3.1.2

- How can you make a prediction?
- How can we represent doubling a value algebraically?
- How many years have gone by since the tree was planted?
- How can you write the rule without words?
- What does *x* represent?
-
-

(Example)

Suggested Lesson Activity:

As you circulate, ask questions that require students to think and justify their thinking, such as, "*What is the pattern (rule)?*", "*How do you see it?*", and "*How can you tell your pattern is correct?*"

(Example)

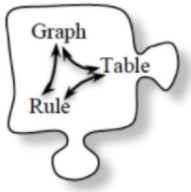
Lesson Structure

Lesson Explore

STUDENT LESSON – SUPPORT

Teacher

3.1.1 What is the rule?



Extending Patterns and Finding Rules

You have been learning how to work with variables and how to find values for variables in equations. In this section, you will learn how to extend patterns and how to generalize your pattern with a rule. As you work with your team, use these questions to focus your ideas:

How is the pattern growing?

What is the rule?

Is there another way to see it?

How can you tell if your rule is correct?

Lesson Structure

Teacher Tip
CIRCULATION

Closure

Lesson Support

Teacher Tips

Use a timer to support lesson pacing.

Use the pocket questions provided for each lesson.

Converse with teams at eye level.

Choose 1–2 STTS to start the year.

When you engage with study teams, model the behavior you expect to see.

Agenda

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Focus: Problem-Based Learning

- [x] Icebreaker
- [x] Lesson Structure
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Foundation for Implementation

Continue the Learning

Content Modules

Instructional Modules

Professional Learning Checklist

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Content Modules (On-demand)	☐ Module 1 - Chapter 1 Content ☐ Module 2 - Chapter 2 Content	☐ Module 3 - Chapter 3 Content ☐ Module _____	☐ Module _____ ☐ Module _____
Instructional Modules* (On-demand)	☐ Module 1 - Closure and Team Assessments ☐ Module 2 - Review & Preview ☐ Module 3 - Intentional Planning	☐ Module 4 - Supporting Productive Struggle	☐ Module 5 - Assessment Practices

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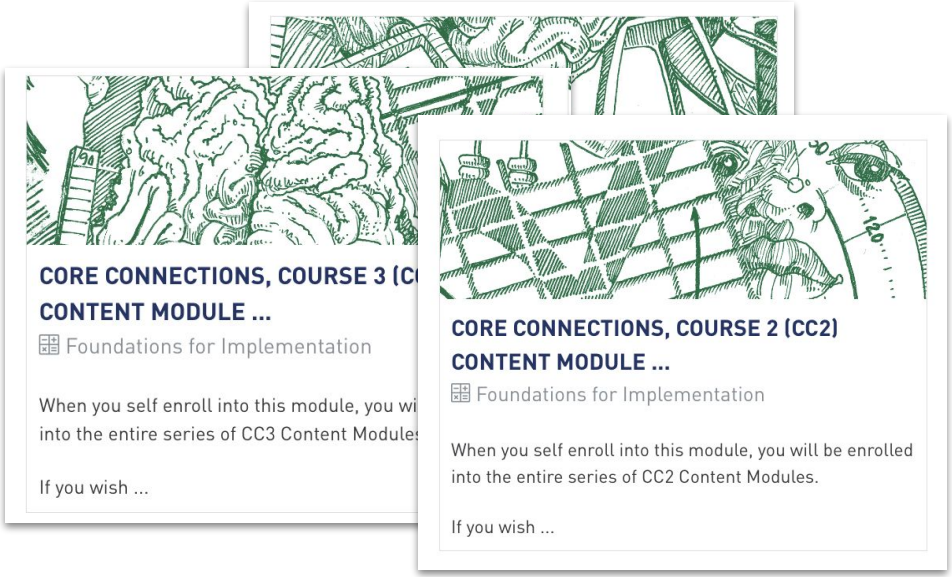
Content Modules

Foundations for Implementations

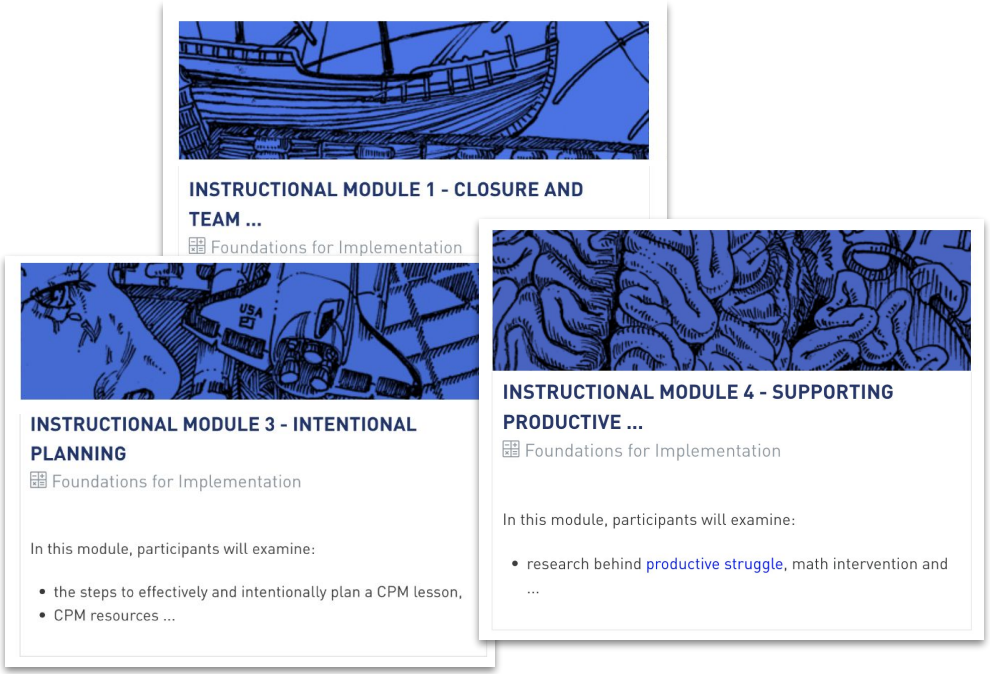
Content Modules



On-Demand Modules

Instructional Modules

Foundations for Implementations



Instructional Modules

On-Demand Modules

Agenda

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- ☑ Closure

Closure

Outcomes

Participants will:

+ Connect Problem-Based Learning research to classroom practices.

+ Learn how the Launch-Explore-Closure lesson structure supports Problem-Based Learning.

+ Collaborate and learn with other teachers.

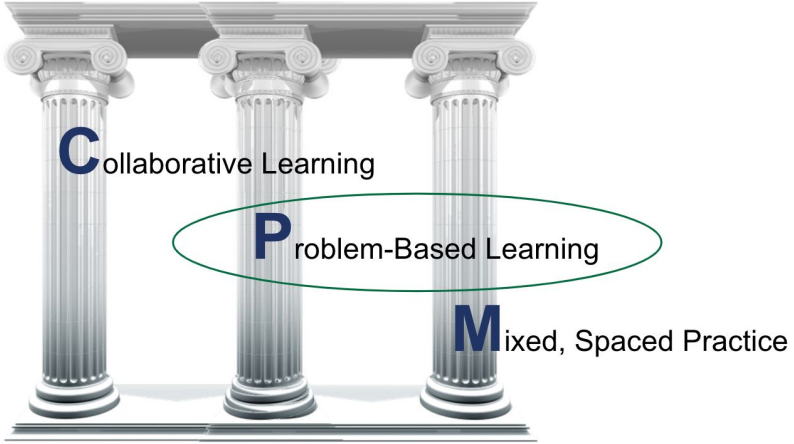
Closure

Study Team and Teaching Strategies

Ambassador	Fishbowl	Huddle	**Notice & Wonder**	**Reciprocal Teach**	**Think-Ink-Pair-Share (T.I.P.S)**
Carousel: Around the world	Fortune Cookie	I Spy	**Pairs Check (Pairs Chat)**	**Red Light, Green Light**	**Think-Pair-Share**
Carousel: Index Card	**Gallery Walk**	**Jigsaw: 4 Corners**	**Participation Quiz**	Silent Appointment	Traveling Salesman
Carousel: Station Rotation	Give One, Get One	Listening Post	Peer Edit	Silent Debate	Tuning Protocol
Dyad	Hot Potato	Numbered Heads	Pick Three	Swapmeet	Walk and Talk
Elevator Talk	Hot Seat	Math Chat	Proximity Partner	**Teammates Consult**	**Whiparound**

Closure

Three Research Pillars



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

Collaborative Learning	Problem-Based Learning	Mixed, Spaced Practice
Students and teachers are aware of the purpose for and value of working in teams, and are familiar with team norms and roles.	Students and teachers share math authority as they value and engage in productive struggle. Teachers guide without taking over the thinking.	Both individual lessons and chapters are followed, using suggested pacing. Review & Preview problems are assigned and valued as an essential part of learning.

Closure

Teacher Tips – Inclusion

Teacher Actions That Support ***Inclusion***

Intentionally plan lessons without lowering the cognitive demand.

Use explicit agreements, team roles, and STTS to scaffold discussions and level status.

Allow time for students to shift from conceptual to procedural fluency.

Develop and assign competence to students using math learning behaviors.

Closure

Ignite Your Classroom

Start promptly.

Peer support expected within each team.

Active learning.

Respond to the team rather than individuals.

Circulate. **C**irculate. **C**irculate.

Closure. **C**losure.

Closure

- **Parking Lot**
- **Attendance & Feedback**

  Either scan the QR code

  OR

  Enter passcode in the portal

  XXXXXX

- **Next Steps:**
  - Finish Introductions to Foundations Module.
  - Before the start of the school year:
    - Finish Instructional Modules 1 through 3.
    - Complete Content Modules 1 & 2.

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HOUSEKEEPING

ANCHOR PAGE

WELCOME

PUZZLE

TEAM GOAL

TEACHER LENS

LEARNING LOG

THREAD

CONTENT MODULE

MATH GOAL

STUDENT LENS

EQUITY LENS

ASSESSMENT

PRODUCTIVE STRUGGLE

RESEARCH PILLARS

MSP

COLLABORATIVE LEARNING

PBL

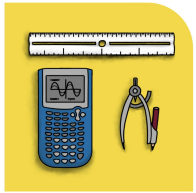
STUDY TEAMS

LEARNING TARGET

TASK CARD

TEAM ROLES ALL

RESOURCE MANAGER



TASK MANAGER

REPORTER RECORDER

FACILITATOR

IMPLEMENTATION ACTION PLAN

TEAM ROOMS

IMPLEMENTATION PROGRESS TOOL

STTS