



Foundations for Implementation – Day 2

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Rev 5/4/23 (ce)

Opening

CPM Learning Event Series, Day 2



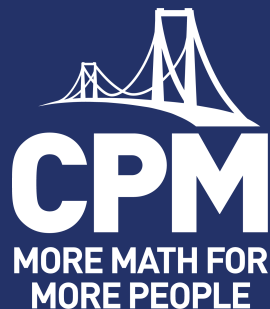
Sign in and make a name tag.



Pick a team sort card.
Find other participants that match your card.

Foundations for Implementation

Day 2



Name
email@cpm.org



@CPMEducationalprogram



@CPMmath

#MoreMathforMorePeople

Opening

Housekeeping



- + Bathrooms
- + 8:00 AM – 4:00 PM
- + Breaks scheduled and as needed
- + Lunch
- + Parking Lot poster
- + Supply/resource table



Opening

Learning Event eBook Access

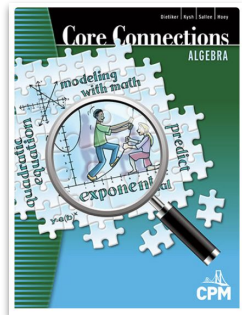


Have two tabs open:

1. Professional Learning Portal



2. eBooks



eBooks Access
my.cpm.org

✓ Use Enrollment Pin

XXXXXXX

Opening

Professional Learning Portal



my.cpm.org



Implementation Action Plan



Learning Log



File Cabinet



Content Modules



Instructional Modules



Inclusion Modules

Opening

Professional Learning Checklist



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

Opening

Icebreaker



The Art of Compromise

On a piece of paper, record your responses to the following questions:

What is your
favorite ice cream
flavor?

What is your
favorite genre of
movie?

Where do you like
to go on
vacation?

Opening

Icebreaker – Share out



1. **Take** turns sharing your responses with your team.
2. **Use** the art of compromise to decide on the following as a team:

What is your
favorite ice
cream flavor?

What is your
favorite genre of
movie?

Where do you like
to go on
vacation?

Outcomes and Agenda

Effective Mathematics Teaching Practices



Implement tasks that promote reasoning and problem solving.



Outcomes and Agenda

Outcomes



Participants:

- + experience and engage in team worthy problems to emphasize how multiple modes of instruction support problem-based learning;
- + learn about the Launch-Explore-Closure lesson structure to identify instructional strategies that support problem-based learning; and
- + make connections between NCTM's Effective Mathematics Teaching Practices and the design of CPM curriculum to advance problem-based learning.

Outcomes and Agenda

Agenda



Focus: Problem-Based Learning



- + Opening
- + Typical Day
- + Formative Assessment
- + Research Connections
- + LEC and Multiple Modes of Instruction

- + Thread
- + Content Module/Chapter Walkthrough
- + Lesson and Chapter Closure
- + Closure

Outcomes and Agenda

Feedback – Day 1



Questions and Wonderings...

- + Fill in from feedback forms
- +
- +

- + Fill in from feedback forms
- +
- +

Outcomes and Agenda

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.

CPM uses these principles to guide our vision and mission of More Math for More People.

Typical Day

Collaborative Learning Expectations



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.



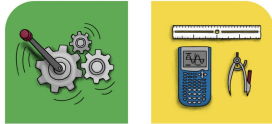
Typical Day

Team Roles

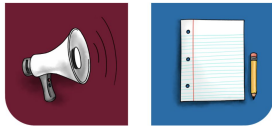


Assign team roles: Alphabetically by first name

Facilitator – Alphabetically first



Resource Manager – Alphabetically second



Recorder/Reporter – Alphabetically third

Task Manager – Alphabetically fourth

Typical Day

CC3 Lesson 3.1.2

Using Tables, Graphs, and Rules to Make Predictions



Math goal:

See regularity in repeated patterns to make predictions.



Team goal:

Justify the best representation for making predictions.

Typical Day

Debrief CC3 Lesson 3.1.2

Using Tables, Graphs, and Rules to Make Predictions



What did I
do, as the
teacher,
while you
were
working to
support all
students?

What was
your
experience in
the role of
the student?

What role did
questioning
play in
supporting
effective study
teams?

How does the
use of team
roles and
STTS provide
structured
support for
study teams?

Typical Day

Managing Student Work



Things to consider...

Learning Logs



Toolkits & Math Notes



Math Work



- + Core problems
- + Resource Pages
- + Review & Preview

Typical Day

Teacher Tips



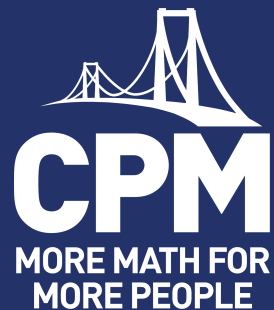
Use Toolkits
for Math
Notes and
Learning
Logs

Create an
interactive
notebook.

Have students
use a 3 ring
binder, spiral
notebook, or
folder to
organize
classwork,
resource pages,
and homework.

Use a Learning
Management
System.

Take a break



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@CPMmath

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Research Connections

Reading Protocol



Go Around One

- + Person 1 reports one idea that they recorded.
- + While person 1 reports, other group members listen, but do not question person 1, comment, or give clues.
- + When person 1 finishes, person 2 reports while the group listens.
- + Repeat until all group members have reported all of their ideas.
- + The group discusses ideas that were reported.

Research Connections

Problem-Based Learning – Why?



CPM's 2023 Research Base Executive Summary Problem-Based Learning

eBook:

Click on the **Teacher Tab** on the left side

Next choose **Program Description**

Select the tab **Research Summary**

Click on Problem-Based Learning (**Executive Summary**)

Research Connections

Go-Around One Protocol



Focus on the **blue boxes**: *“CPM infers from this research that...”*

And **think** about:

**What is math authority, and why is it important in
problem-based learning?**

Research Connections

Debrief: Go-Around One Protocol



What is math authority, and why is it important in problem-based learning?

Discussion Round

1. Person 1 reports the idea that they recorded.
2. While person 1 reports, other team members listen, but do not question or comment.
3. When person 1 finishes, repeat until all group members have reported all of their ideas.
4. The team discusses all ideas and comes to a consensus on which idea their team will share.

Research Connections

Three Pillars of CPM



Collaborative Learning

Problem-Based Learning

Mixed, Spaced Practice

Attaining Long-Term Knowledge



Research Connections

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.



Launch-Explore-Closure

Problem-Based Learning – How?

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

- + Team roles
- + Study Team and Teaching Strategies
- + Collaborative learning agreements
- + Non-routine team-worthy problems
- + Circulation and Team interactions
- + Purposeful questioning
- + Further Guidance
- + **Purposeful lesson launch and closure**

Launch-Explore-Closure

Lesson Plan Structure to Support 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

Launch-Explore-Closure

Lesson Launch to Support Problem-Based Learning



Whiparound

Video Reflection

What did you notice about this lesson launch?

Launch-Explore-Closure

Lesson Launch to Support Problem-Based Learning



An effective **Lesson Launch**...

Activates
prior
knowledge.

Has a clear
math goal.

Establishes
clear learning
expectations.

Launch-Explore-Closure

Lesson Launch Support CCA Lesson 5.2.2 Teacher Notes



Suggested Lesson Activity:

When you introduce today's lesson, focus on the fact that the students' task is to identify and share strategies for finding equations for arithmetic sequences. As they work in their study teams, they should both articulate their own strategies and listen for the strategies that others are using. As you observe teams choosing different strategies, you may decide to interrupt their work to ask students to present to the entire class, or you may leave this until the end of the day as closure.

Consider starting the class with Reciprocal Teaching, where one partner explains what they know about an *arithmetic sequence* and the other partner then explains what they know about a *geometric sequence*.

Launch-Explore-Closure

Lesson Launch Support CCA Lesson 5.2.2



5.2.2 How do arithmetic sequences work?

Generalizing Arithmetic Sequences



In Lesson 5.2.1, you learned how to identify arithmetic and geometric sequences. Today you will solve problems involving arithmetic sequences. Use the questions below to help your team stay focused and start mathematical conversations.

What type of sequence is this? How do we know?

How can we find the equation?

Is there another way to see it?

Launch-Explore-Closure

Lesson Launch



The **Lesson Launch** should:

- + connect to prior learning.
- + have a clear math goal.
- + establish clear learning expectations for students.



Launch-Explore-Closure

Study Team and Teaching Strategies



Dyad

- + Students share—without interruption—with a partner.
- + Each partner shares for an equal amount of time.
- + Listening partner remains quiet and uses positive body language.

Launch-Explore-Closure

CPM Principles of Assessment



Dyad

What does formative assessment look like, feel like, and sound like in your classroom?

How is it a learning experience for both you and your students?

CPM's Fourth Principle of Assessment:

Formative assessment is a learning experience for both the student and teacher.

Launch-Explore-Closure

Lesson Closure to Support Problem-Based Learning



Effective Lesson Closure...

Connects to
the math goal.

Provides
active student
reflection.

Provides
feedback to
both the
student and
teacher.

Launch-Explore-Closure

Lesson Closure Support Teacher Notes



Closure: (10 minutes)

Bring the class together and have teams share strategies for finding equations for arithmetic sequences based on multiple representations. Consider asking questions such as “*How could you use a table to find the equation for an arithmetic sequence?*”, “*Did any team use an equation? How?*”, and “*How could you use a graph?*” This could be done as a Walk and Talk.

Closure: (10 minutes)

The Learning Log entry in problem 5-5 allows students to summarize what they have learned about the kind of pattern they have modeled and generalized. Because students will continue to build an understanding of the patterns and connections among different representations of exponential functions, it is not necessary for them to have an exhaustive definition or explanation in their Learning Logs at this point.

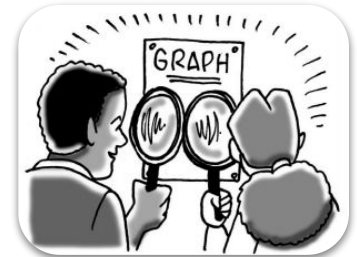
Launch-Explore-Closure

Lesson Closure Formative Assessment



Focus Question:

How does lesson closure provide opportunities for teachers to formatively assess students?



Launch-Explore-Closure

CPM Principles of Assessment



1. Teachers need to be involved in the crafting of assessments.
2. Teachers need to read and work through all test problems.
3. Students should be assessed only on content with which they have been meaningfully engaged.
4. Formative assessment is a learning experience for students and teachers.
5. While teachers are required to evaluate and assign grades, grading should be flexible.

Launch-Explore-Closure

Lesson Closure



Task: Read the lesson closure for your assigned lesson.



Facilitator – 1.##.##



Resource Manager – 1.##.##



Recorder/Reporter – 1.##.##



Task Manager – 1.##.##

Launch-Explore-Closure

Lesson Closure



Jigsaw (Four Corners)

Meet with your lesson team and **discuss** the following:

1. *Summarize the key takeaways from the closure activity for your lesson.*
2. *How does the closure create opportunities for students to reflect on the lesson goal?*



Whiparound

Return to your team and **share** your closure in a team whiparound.

Launch-Explore-Closure

Lesson Closure



Lesson Closure should:

- + be a reflection of the math goal;
and
- + give students the opportunity to
actively reflect.



Launch-Explore-Closure

Lesson Closure



Teacher Tips

Plan and
prioritize
lesson
closure.

Use the
suggested
closure
activity from
the Teacher
Notes.

Use a timer to
establish a
daily routine.

Incorporate
Study Team
and
Teaching
Strategies.

Launch-Explore-Closure

Turn and Talk

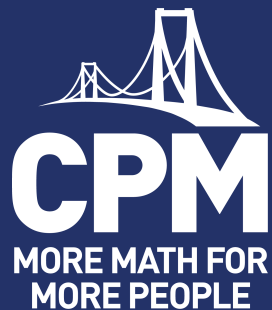


Turn and Talk

How will I ensure students experience an effective Launch and Closure?



Take a break



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Launch-Explore-Closure

Lesson Explore to Support Problem-Based Learning



An effective **Lesson Explore** structures problem-based lessons through:

Team
Agreements
and Team
Roles

Effective
Launch-
Explore-
Closure

Multiple
Modes of
Instruction

Circulating,
Listening,
and
Questioning

Launch-Explore-Closure

Multiple Modes of Instruction to Support Problem-Based Learning



*“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.”*

(L. Jasien, personal communication, 2021)

Launch-Explore-Closure

Teacher-Led Class Discussions



Whiparound

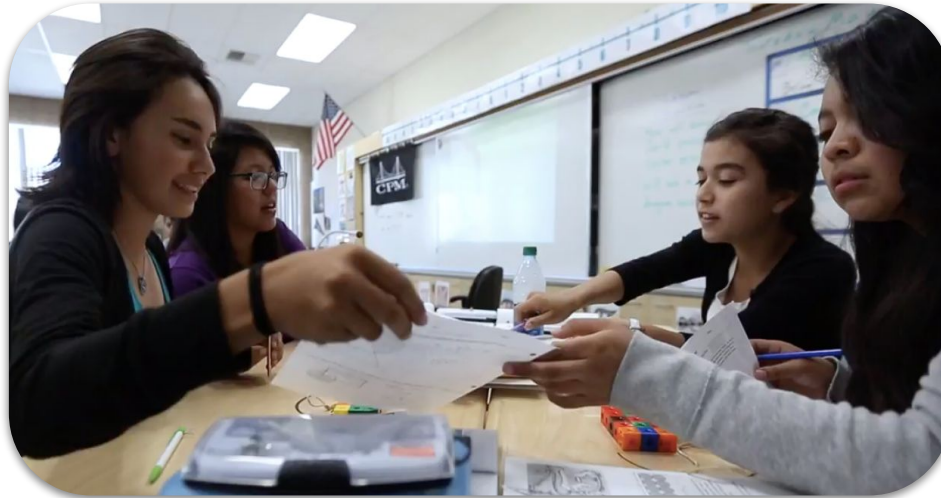


Launch-Explore-Closure

Teams of Four



Teammates Consult



Launch-Explore-Closure

Teams of Three

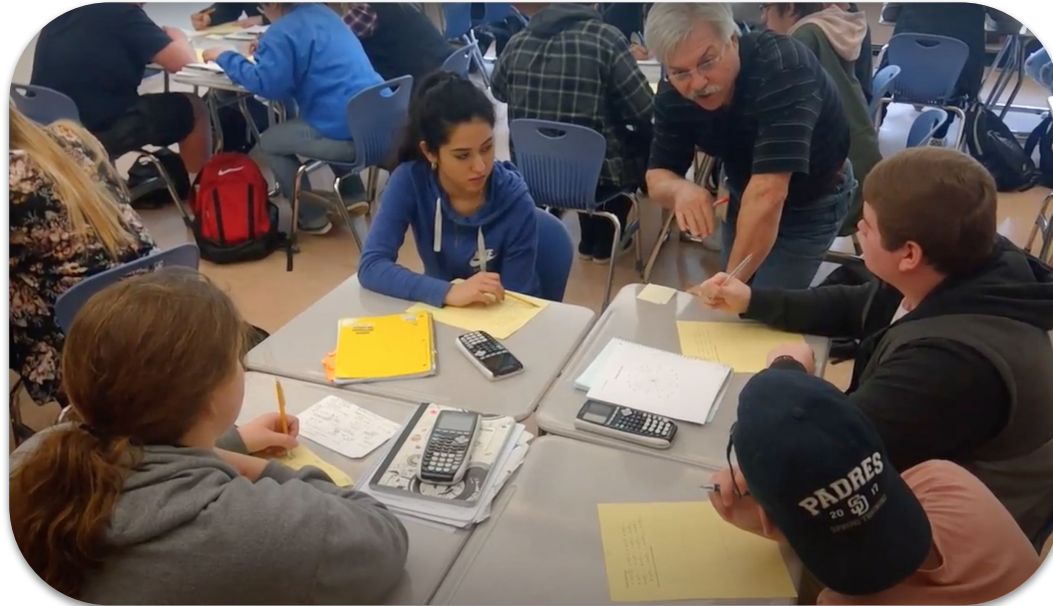


Shared Team Roles



Launch-Explore-Closure

Teacher-Led Team Discussions



Launch-Explore-Closure

Individual Work



Think-Ink-Pair-Share



Launch-Explore-Closure

Partner Work



Pairs Check



Launch-Explore-Closure

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
- + Individual Thinking Time
- + Student Presentations
- + Plus more

Launch-Explore-Closure

Lesson Explore Support



Suggested Lesson Activity:

Suggested Lesson Activity –

Includes recommended Study Team

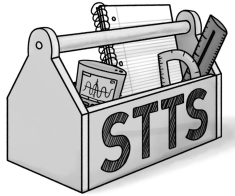


You can start problem [4-1](#) as a **Teammates Consult**. Make sure that everyone understands the task before picking up their pencils and starting the task. If students will be working from the textbook, assign each team a pattern from problem [4-1](#). Depending on the size of your class, you may 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.

Launch-Explore-Closure

Lesson Explore Support



Study Team and Teaching Strategies

eBook:

Click on the **Teacher Tab** on the left side.

Next choose **Strategies**.

Scroll through the strategies.

Launch-Explore-Closure

Lesson Explore: To Support Problem-Based Learning



An effective **Lesson Explore** structures problem-based lessons through:

Team
Agreements
and Team
Roles

Effective
Launch-
Explore-
Closure

Multiple
Modes of
Instruction

Circulating,
Listening,
and
Questioning

Launch-Explore-Closure

Circulation, Listening, Questioning



Why is circulation, listening, and questioning necessary?

- + Reinforces a productive learning environment.
- + Supports team interactions.
- + Models expected team behavior through engagement.
- + Provides differentiated support for study teams.
- + Assesses the needs of individuals, teams, and the whole class.
- + Gains feedback to determine necessary interventions.
- + Uses observations to guide feedback and lesson closure.

Launch-Explore-Closure

Purposeful Circulation to Support Problem-Based Learning



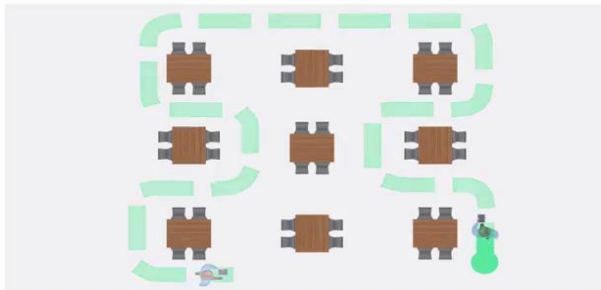
PURPOSEFUL CIRCULATION

TO SUPPORT PROBLEM-BASED LEARNING

VISIT EVERY STUDY
TEAM ON EACH
CIRCUIT

STICK TO THE
ROUTE

VARY YOUR ROUTE
TO GO BY EVERY
STUDENT



CPM EDUCATIONAL PROGRAM

1

MORE MATH FOR MORE PEOPLE

Launch-Explore-Closure

Lesson Explore Support Teacher Notes



Materials: [Chapter Pocket Question Cards](#) (also under Teacher tab under Teacher Resources)

Example 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 Universal Access Support:

To support English Language Learners with the concept of growth take a few minutes to discuss the question, “*How many years have gone by since the tree was planted?*”

Launch-Explore-Closure

Student Lessons – Questioning?

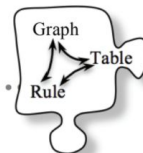


CPM Lessons include:

- + Focus question in the title
- + Lesson objective
- + Lesson introduction
- + Focus questions for teams

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?

Launch-Explore-Closure

Purposeful Circulation



THE THREE PASS PROMISE



CPM CPM EDUCATIONAL PROGRAM **MORE MATH FOR MORE PEOPLE**

Launch-Explore-Closure

Learning Log Reflection



Title: Supporting Productive Struggle

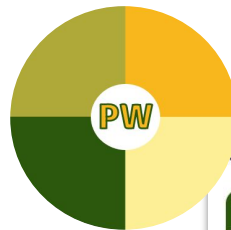
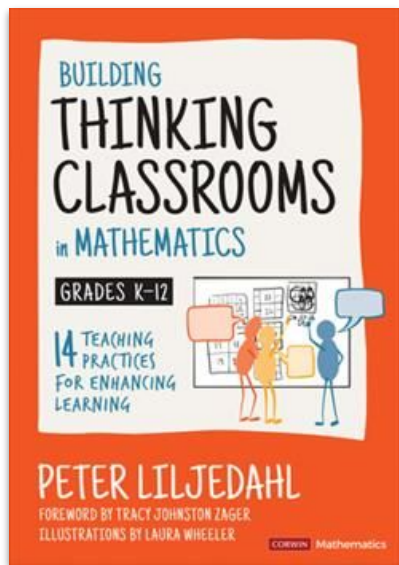
How does teacher circulation and questioning support collaborative learning with problem-based lessons?

Mathematical Language Routines

Visibly Random Teams



Let's create new teams for the afternoon!

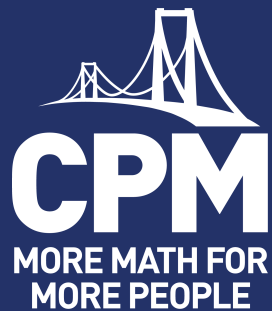


RESULT

Team 1	Team 2
Team 3	Team 4

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

Lunch Time



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Thread

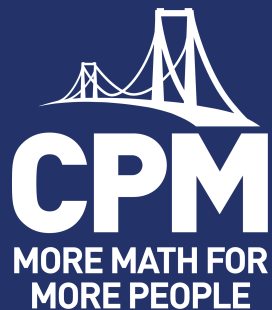
Welcome Back: Icebreaker



Favorite song

1. Go to tinyurl.com/Top100Billboard.
2. Find the top songs from the year you graduated high school.
3. Choose your favorite song from the list.
4. Share your favorite song with your team members.
5. Find a team compromise of a favorite song.

Take a break



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Content Module/ Chapter Walkthrough

New Teams



Please sit together with same-course teachers.

Options: All 4th year courses (Precalculus, Statistics, Calculus) at one table.

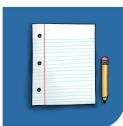
Co-Teachers, join the team of the course you teach or support.

Assign team roles:



Facilitator – Highest number of states lived in

Resource Manager – Second highest number of states lived in



Task Manager – Third highest number of states lived in

Recorder/Reporter – Fewest states lived in

Content Module/Chapter Walkthrough

Chapter Walkthrough



How will you support your students in reaching the goal of the lesson?

How will you use team roles in this lesson to support student learning?

How will you use Study Team and Teaching Strategies in this lesson to support student status in teams?

What expectations will you set for students to maintain effective collaboration?

Chapter Closure

Closure Activities



Notice and Wonder

- + Student receives a topic, picture, piece of work, math problem, sample student or teacher work, reading, etc.
- + Complete the prompt: I notice ____.
- + Complete the prompt: I wonder ____.

Chapter Closure

Closure Activities



Notice and Wonder

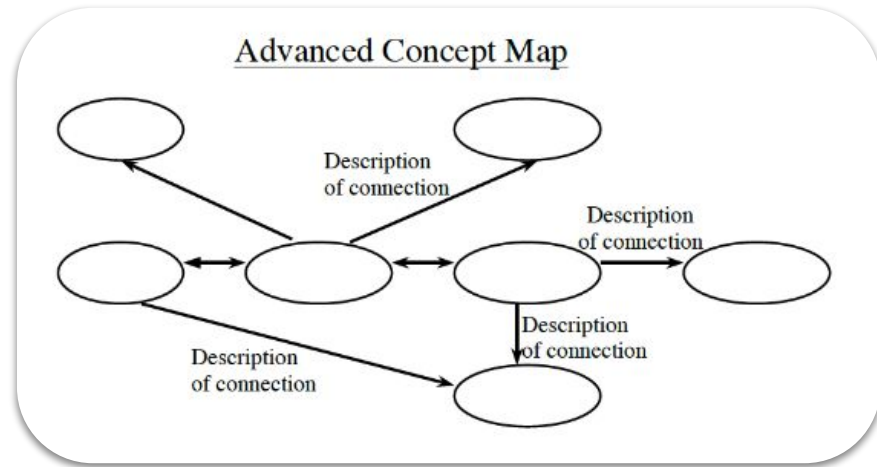
1. Look through the Chapter Closure for Chapter 1.
2. Complete the prompt: I notice ____.
3. Complete the prompt: I wonder ____.
4. Discuss with your team your notices and wonders.

Chapter Closure

Concept Map



With your team, create a Concept Map for Chapter 1.



Chapter Closure

Learning Log Reflection



Title: Formative Assessment and Chapter Closure

How does chapter closure create learning opportunities for both students and teachers?





What have we learned?



Closure

Study Team and Teaching Strategies



Math Chat

- + Display posters with one topic or concept per poster.
- + Student has one writing utensil.
- + Silently, student circulates to each poster, writing a brief note or explanation on each one.
- + After rotation is complete, students return to seats.

Closure

Closure Activity



Math Chat

1. There are posters around the room and hallway, each with a question.
2. Individually **complete** the activity without talking.
3. **Write** something about the topic, an original thought or response. (Don't forget a writing utensil.)
4. After responding to each poster, go back through and **read** what others have written.

Closure

Implementation Action Plan



Prompts:

1. **My plan** to ensure all students experience an effective lesson launch and closure is ____.

At least **one actionable** step I will commit to is ____.

2. **My plan** to effectively support problem-based lessons through circulation and questioning is ____.

At least **one actionable** step I will commit to is ____.

Closure

Outcomes and Feedback



Participants:

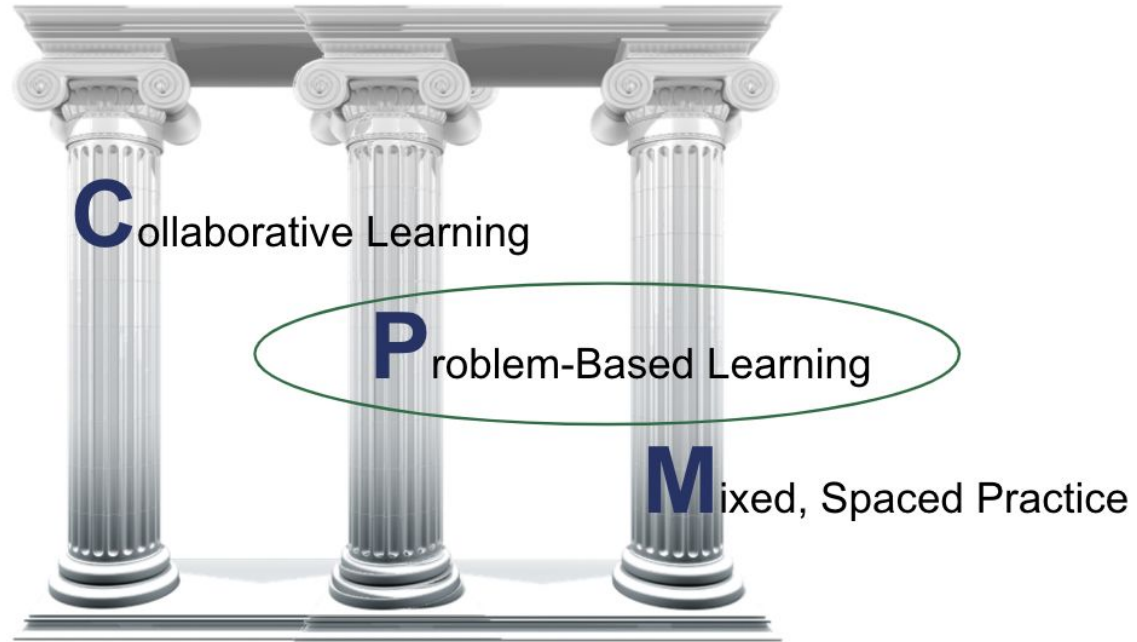
- + experience and engage in team-worthy problems to emphasize how multiple modes of instruction support problem-based learning;
- + learn about the Launch-Explore-Closure lesson structure to identify instructional strategies that support problem-based learning; and
- + make connections between NCTM's Effective Mathematics Teaching Practices and the design of CPM curriculum to advance problem-based learning.

Learning Event Feedback:

1. Open up the learning event module.
2. Scroll down to Event Attendance and Feedback.
3. Open Day 2 Feedback.
4. Complete the Feedback form.

Closure

Three Pillars of CPM



Research Connections

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.

Closure

Teacher Tips – Implementation



Teacher Actions that Support *Implementation*

Use the Teacher Notes as intended.

Work all the problems in the lesson ahead of time, including the Review & Preview problems.

Create purposeful lesson plans.

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.

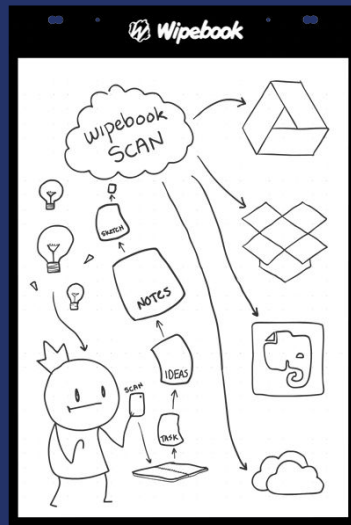
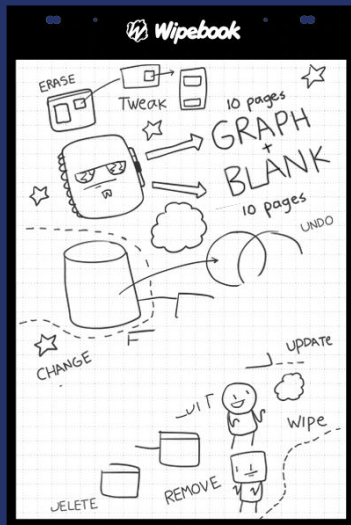
Active learning.

Respond to the team rather than individuals.

Circulate. Circulate. Circulate.

Closure. Closure.





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Closure



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