



Introduce yourself.

Change the name out and put your information here.

Background of *Core Connections*

CPM has been developing conceptually based mathematics curriculum for 25 years.

- Used by 6 million students, 10,000 teachers.
- Supported by research in methodology.
- Supported by student results.
- Written by classroom teachers with the collaboration of college professors.



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History:

CPM is a non-profit organization that has developed mathematics curriculum and provided its teachers with professional development support since 1989. CPM used two Eisenhower grants to develop its original high school program concurrently with the release of The National Council for Teachers of Mathematics (NCTM) Standards and the funding of other curricular programs by the National Science Foundation (NSF). CPM writers designed a curriculum based on the NCTM standards that is a blend of traditional and integrated approaches. Our textbooks are written mainly by middle school and high school classroom teachers in collaboration with university professors in mathematics and education.

Ten years later the CPM high school courses were selected by the U.S. Department of Education as one of the five exemplary mathematics programs in the country. This process included providing an independent panel of researchers with evidence of CPM's effectiveness.

In 1993 CPM began self-publishing the materials. By retaining editorial control of the courses, the Directors and teacher-authors can provide materials that allow teachers to use the "best practices" of teaching mathematics on which the books are based. We also decided to print the books in black and white so that distractions are reduced and their focus is on mathematics. This format, along with the option of soft or hard bound

bindings, also saves you money with lower textbook costs. We also have the option of eBooks.

Methodology Research

Students learn best when they are:

- actively engaging in a wide array of structured inquiry.
- discussing mathematical thinking and ideas with others.
- using mixed, spaced practice.



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Long-term retention of mathematical knowledge.

The CPM curriculum is based on contemporary research. We have monitored the progress of teachers and students using CPM materials. Problem based learning raises the level of thinking required

Our primary goal is the **long-term retention of mathematical knowledge.**

The research base supports three fundamental principles:

1. Social interaction increases the ability of students to learn ideas and integrate them into existing cognitive structures. **Hence, CPM lessons use study teams.**
2. The integration of knowledge is best supported by engaging in a wide array of problems around a single idea. **Hence, CPM lessons are problem-based.**
3. Long-term retention and transfer of knowledge are best-supported by spaced practice. **Hence, CPM spreads practice with ideas over days, weeks, and months.**

A Balanced Program

CPM promotes:

- procedural fluency (algorithms and basic skills).
- deep understanding of important mathematical ideas.
- strategic competence (problem solving).
- adaptive reasoning (application and extension).
- positive disposition toward mathematics.



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Core Connections does not emphasize problem solving with a disregard for skills, nor does it focus solely on skills without attention to real world problems. Students understand the importance of both, and learn to use the appropriate skills at the appropriate times.

The document Adding It Up (early 1990s) discusses the power of problem-based learning and was a key document in the creation of CCSS. It discusses the fluency, deep understanding, etc., and supports CPM's goals.

Fully Aligns with California's New Content Standards

Interpreting Categorical and Quantitative Data S-ID Summarize, represent, and interpret data on a single count or measurement variable <i>In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.</i>	
S-ID.1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	11.2.1–11.2.3 MN: 11.2.1 11-34, 11-46, 11-53, 11-68, 11-72, 11-103, 11-115
S-ID.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	11.2.2–11.2.3 MN: 11.2.2, 11.2.3 11-53, 11-67, 11-68, 11-85, 11-103, 11-141
S-ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	11.2.1–11.2.3 MN: 11.2.2, 11.2.3 11-25, 11-46, 11-53, 11-68, 11-85, 11-103, 11-141
Summarize, represent, and interpret data on two categorical and quantitative variables <i>Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals. S-ID.6b should be focused on linear models.</i>	
S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	10.1.1 10-16, 10-59, 10-113, 10-144, 11-144

[CCSSM](#)

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This can be found at cpm.org//teachers/reference.htm... Click link CCSSM to go to it directly, if you have internet and choose to do so.


Our CC books are 100% correlated to CCSS including the (+) standards. CC 1-3, CCA have been independently verified by CA DOE.

Other references related to the slide:


- (1) Standard correlations available at website cpm.org//teachers/reference.htm and through eBook
- (2) Additionally at website are reverse correlations (lesson to standard) and practices correlations
- (3) Correlations show where taught, where formalized (MN), and some examples of additional practice

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.



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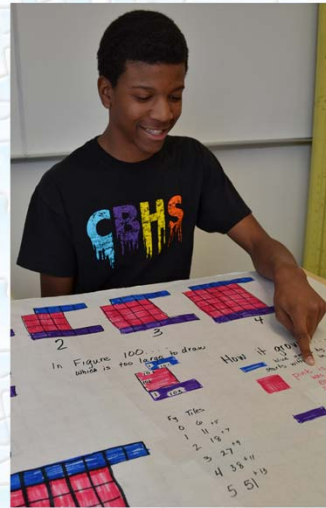
http://www.cpm.org/teachers/CCSS_Practices.htm for how CPM is aligned to the SMPs (standards for mathematical practices)

NOTE: the point of this slide is NOT to read through and discuss the practices. People know about the practices! What is important is the following statement and the next slide.

“Aligning curriculum to content standards is easy. Blending the math practices into every lesson is another matter. CPM has 25 years of experience writing lessons for mathematics textbooks that embed the mathematical practices in them.”

Standards for Mathematical Practice

- CCSS Mathematical Practices are deeply and seamlessly interwoven into the fabric of the daily lessons.
- CPM's philosophy predates the Mathematical Practices by more than 25 years.
- Very similar practices have always been a core and integral part of CPM curriculum materials.
- CPM has a broad experience and long history with these practices.



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http://www.cpm.org/teachers/CCSS_Practices.htm

Above it says “Very similar practices.” Those “similar practices” are the NCTM principles and standards. CPM took the NCTM Principles and Standards to heart and incorporated these into their books in the beginning. They have always been a part of the materials.

What *Core Connections* Does Best!

The Standards for Mathematical Practice are deeply embedded.

- Balance: conceptual understanding, skill fluency, problem solving
- Rigor: emphasis on reasoning and communication
- Coherence: connections and progressions
- Focus: fewer problems, less distractions
- Structured learning in collaborative teams
- Mixed, spaced practice key to success for all

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For rigor: procedures are based on principles of math, not mnemonics


Emphasis is on reasoning, critical analysis, gathering evidence, students justify their thinking and communicating of mathematical arguments are constantly expected


For Coherence: Connections and progressions between topics – not a series of content standards, focus is on the big ideas.

For Focus: Fewer problems allow for more concentration and perseverance, non routine problems encourage transference and opportunities for extensions, team worthy problems require reasoning and are engaging, variety of outcomes: reports, diagrams, models, presentations

How does CPM's *CORE CONNECTION* SERIES have the Standards for Mathematical Practice embedded throughout the curriculum?

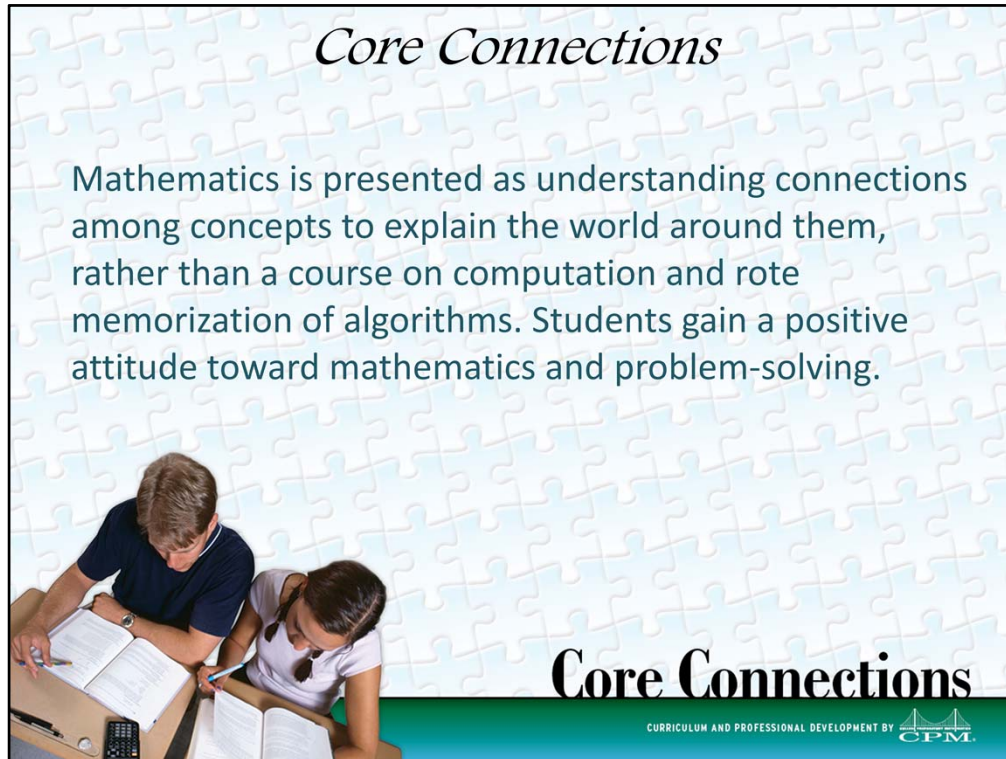
- Problem-Based Lessons
- Multiple Representations
- Embedded use of Technology
- Concept Maps
- Graphic Organizers
- Participation Quizzes
- Study Team and Teaching Strategies



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These are just a few examples. Please expand as needed and according to your audience's wants/needs.

Worth stating how these ARE the practices. For instance, by having problem-based lessons, students are taught that they must persevere when working through problems and they learn to use appropriate tools. Also, with teams, students are constantly convincing their group, i.e. constructing viable arguments and constructing the reasoning of others.



This sums it up.

Please note: the statement “students gain a positive attitude toward mathematics and problem-solving” is based on teachers’ comments to us.

Students biggest complaint is that they have to think too much. But they will also note that they never forget anything because of the spaced practice.

Inquiry-Based Learning

- Students are active participants in their learning.
- Students solve rich, meaningful problems that lead to deep conceptual understanding of the mathematics.
- Problems have a definite mathematical purpose.
- Problems often connect strands of mathematics.
- Students think critically, analyze, evaluate, conclude.
- Procedures are taught when needed.



This outlines what Inquiry based learning is. Emphasize that we are (1) Problem-based learning, and (2) have a structured approach. CPM's Core Connections is NOT a "free exploration" or a place where students reinvent everything, trying to recreate all of mathematics from scratch. It is structured, and with the problems the way they are written, the strategic placement of the Math Notes AND (most importantly) the teacher's active involvement in the student learning, students are carefully guided to the CORRECT and necessary mathematics. Also, CPM's problems require students to work with a higher level of Webb's Depth of Knowledge.

Big Ideas Develop Over Time

Core Connections, Course 2

**Thread Showing Development and Practice for
Operations with Integers (including simplifying expressions/solving equations)**

Developmental Work:

Lesson 2.2.1 (2-31 to 2-35)	Lesson 3.2.2 (3-39 to 3-45)
Lesson 2.2.2 (2-42 to 2-50)	Lesson 3.2.3 (3-51 to 3-58)
Lesson 2.2.3 (2-56 to 2-61)	Lesson 3.2.5 (3-78 to 3-81)
Lesson 2.2.4 (2-67 to 2-78)	Lesson 3.3.3 (3-112 to 3-119)
Lesson 3.1.1 (3-1 to 3-6)	Lesson 4.3.3 (4-103 to 4-111)
Lesson 3.1.2 (3-12 to 3-17)	Lesson 6.1.1 (6-1 to 6-5)
Lesson 3.2.1 (3-24 to 3-33)	Lesson 6.1.2 (6-12 to 6-15)

Mixed, Spaced Practice in addition to the developmental problems:

2-37, 2-38, 2-40 (e), 2-51, 2-52, 2-53, 2-62, 2-63, 2-79, 2-85, 2-92, 2-116, 2-127,
CL 2-131, CL 2-132, CL 2-133, 3-7, 3-8, 3-19 to 3-21, 3-34 to 3-36, 3-46, 3-47, 3-59
to 3-61, 3-63, 3-69 to 3-71, 3-74, 3-76, 3-82, 3-83, 3-88, 3-91, 3-93, 3-94, 3-96, 3-103,
3-111, 3-114 to 3-118, 3-120 to 3-122, 3-123, 3-126, 3-128, 3-129, CL 3-130, CL 3-131,
4-6, 4-10, 4-16, 4-19, 4-31, 4-32, 4-44, 4-53, 4-63, 4-83, 4-101, 4-113, 4-119, CL 4-123,
CL 4-124, CL 4-126, 5-13, 5-21, 5-33, 5-41, 5-64, 5-74, 5-92, 5-102, 5-113, 5-124, 5-125,
5-140, 5-141, 5-145, 5-148, CL 5-154, CL 5-155, 6-6, 6-8, 6-17, 6-19, 6-23 to 6-25, 6-43,
6-44, 6-57, 6-58, 6-59, 6-62, 6-64, 6-65, 6-67, 6-71 to 6-74, 6-76, 6-79, 6-81, 6-85, 6-87,
6-88, 6-90, 6-102, 6-112, 6-118 to 6-121, 6-125, 6-129, 6-133, 6-137, CL 6-147, CL 6-148,
7-13, 7-23, 7-34, 7-37, 7-44, 7-50, 7-62, 7-68 to 7-71, 7-84, 7-103, CL 7-121, CL 7-123,
8-9, 8-10, 8-14, 8-37, 8-40, 8-48, 8-62, 8-101, 8-107, 8-109, CL 8-110, 9-40, 9-49, 9-69,
9-70, 9-80, CL 9-100. 162 problems.

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Let's try a 6th Grade Problem

1.1.3 How does it grow?

Describing and Extending Patterns

Patterns are everywhere! You may have noticed them in pinecones, flowers, stacks of cans in the grocery store, or many other places. Patterns are interesting partly because of the different ways that you can see how the parts of a pattern are changing. In this course, you will often look for different ways of seeing a pattern or concept. As you study the pattern in this lesson, work with your team to find several ways to see and describe the pattern and how it is growing. The following questions can help guide your discussion.

- How can we describe the pattern?
- Is there another way to see or describe it?
- Does anyone see it differently?

1-15. DOT PATTERN

Examine the dot pattern at right:



Figure 1



Figure 2



Figure 3

a. What should the 4th and 5th figures look like? Draw them below.

b. How can you describe the way the pattern is growing? Can you find more than one way?

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What kind of mathematical thinking
did you see evidence of in this
problem?

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Homework

Homework includes:

- processing of current lessons.
- distributed practice of previous work.
- fluency with skills.
- extensions and applications of problem solving.

Fewer problems allow for more concentration and perseverance.

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Homework assignments are designed to:

- Offer practice with the day's topic,
- Include spaced practice to reinforce and deepen the knowledge of previous topics,
- Provide extensions and enrichments of some topics, and
- Occasionally contain a pre-problem that anticipates an upcoming topic.

Online Homework Help

Students have access to free online help, hints, and solutions to homework.





6-43. Solve each equation for x .

a. $10 - 2(2x + 1) = 4(x - 2)$

✓ **Hint:** There is more than one way to solve this problem.

✓ **Step 1:** One way to start is by multiplying. $10 - 4x - 2 = 4x - 8$

✓ **Step 2:** Simplify by adding $4x$ to each side. $8 = 8x - 8$

✓ **Step 3:** Simplify again by adding 8 to both side $16 = 8x$

✓ **Step 4:** Divide both sides by 8.


✓ **Answer:** $x = 2$

b. $5 - (2x - 3) = -8 + 2x$

✓ **Hint:** See (a) and remember to distribute the negative.

□ **Answer:**

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Can be accessed online through the student portal or through the eBooks.
 All CC edition textbooks now include an ebook so students have access to all support materials, including the ebooks, at home. eBooks require internet access.

Parent Guide with Extra Practice

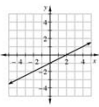
SLOPE—A MEASURE OF STEEPNESS 2.1.2 through 2.1.4

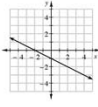
Students used the equation $y = mx + b$ to graph lines and describe patterns in previous courses. Lesson 2.1.1 is a review. When the equation of a line is written in $y = mx + b$ form, the coefficient m represents the slope of the line. Slope indicates the direction of the line and its steepness. The constant b is the y -intercept, written $(0, b)$, and indicates where the line crosses the y -axis.

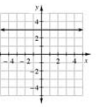
For additional information about slope, see the Math Notes box in Lesson 2.1.4.

Example 1

If m is positive, the line goes upward from left to right. If m is negative, the line goes downward from left to right. If $m = 0$ then the line is horizontal. The value of b indicates the y -intercept.

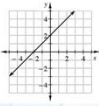
$y = \frac{1}{2}x - 1$


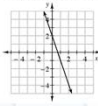
$y = -\frac{1}{2}x - 1$


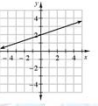
$y = 0x + 3$ or $y = 3$


Example 2

When $m = 1$, as in $y = x$, the line goes upward by one unit each time it goes over one unit to the right. Steeper lines have a larger m -value, that is, $m > 1$ or $m < -1$. Flatter lines have an m -value that is between 0 and 1, often in the form of a fraction. All three examples below have $b = 2$.

$y = x + 2$



$y = -3x + 2$
(steeper and in the downward direction)


$y = \frac{1}{3}x + 2$
(less steep)


Topic introduction identifies placement in the scope of the course content.

Examples provide complete and detailed explanations.

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The Parent Guide presents the ideas for each chapter using a direct instruction mode so that parents can quickly review topics to help their child. This resource is available in print form or as a free download from the CPM website.

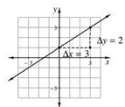
We want to stress that our field-testing and subsequent usage show that students who complete the lessons as intended, including homework, have adequate practice and master the material. However, should students need additional practice or an alternative explanation of the topic, teachers can integrate these resources to differentiate instruction for students.

If teachers need help with the mathematics of the lesson, the Parent Guide booklet augments the support found in the lesson plan notes. Also, some teachers find these helpful when a student has been absent for an extended period of time.

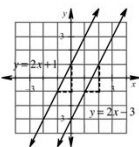
Parent Guide with Extra Practice

Example 3

Slope is written as a ratio. If the line is drawn on a set of axes, a *slope triangle* can be drawn between any two convenient points (usually where grid lines cross), as shown in the graph at right. Count the vertical distance (notated Δy) and the horizontal distance (notated Δx) on the dashed sides of the slope triangle. Write the distances in a ratio:
 $\text{slope} = m = \frac{\Delta y}{\Delta x} = \frac{2}{3}$. The symbol Δ means change. The order in the fraction is important: the numerator (top of the fraction) must be the vertical distance and the denominator (bottom of the fraction) must be the horizontal distance. The slope of a line is constant, so the slope ratio is the same for any two points on the line.



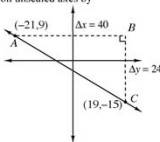
Parallel lines have the same steepness and direction, so they have the same slope, as shown in the graph at right.



If $\Delta y = 0$, then the line is horizontal and has a slope of zero, that is, $m = 0$. If $\Delta x = 0$, then the line is vertical and its slope is undefined, so we say that it has no slope.

Example 4

When the vertical and horizontal distances are not easy to determine, you can find the slope by drawing a generic slope triangle and using it to find the lengths of the vertical (Δy) and horizontal (Δx) segments. The figure at right shows how to find the slope of the line that passes through the points $(-21, 9)$ and $(19, -15)$. First graph the points on unscaled axes by approximating where they are located, then draw a slope triangle. Next find the distance along the vertical side by noting that it is 9 units from point B to the x -axis then 15 units from the x -axis to point C, so Δy is 24. Then find the distance from point A to the y -axis (21) and the distance from the y -axis to point B (19). Δx is 40. This slope is negative because the line goes downward from left to right, so the slope is $m = \frac{\Delta y}{\Delta x} = -\frac{24}{40} = -\frac{3}{5}$.



More worked-out examples with detailed explanations.

Core Connections

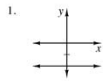
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(You can go through this slide quickly. It is just evidence that there are worked out examples.) The examples are given to help parents better understand how to do the problem. It is usually presented the way that they are familiar with solving or explains how CPM is presenting the topic (like with manipulatives or a new idea like Circle the terms instead of PEMDAS).

Parent Guide with Extra Practice

Problems

Is the slope of each line negative, positive, or zero?



Identify the slope in each equation. State whether the graph of the line is steeper or flatter than $y = x$ or $y = -x$, whether it goes up or down from left to right, or if it is horizontal or vertical.

4. $y = 3x + 2$

5. $y = -\frac{1}{2}x + 4$

6. $y = \frac{1}{3}x - 4$

7. $4x - 3 = y$

8. $y = -2 + \frac{1}{2}x$

9. $3 + 2y = 8x$

10. $y = 2$

11. $x = 5$

12. $6x + 3y = 8$

Without graphing, find the slope of each line based on the given information.

13. $\Delta y = 27$ $\Delta x = -8$

14. $\Delta x = 15$ $\Delta y = 3$

15. $\Delta y = 7$ $\Delta x = 0$

16. Horizontal $\Delta = 6$
Vertical $\Delta = 0$

17. Between $(5, 28)$ and $(64, 12)$

18. Between $(-3, 2)$ and $(5, -7)$

Answers

1. zero

2. negative

3. positive

4. Slope = 3, steeper, up

5. Slope = $-\frac{1}{2}$, flatter, down

6. Slope = $\frac{1}{3}$, flatter, up

7. Slope = 4, steeper, up

8. Slope = $\frac{1}{2}$, flatter, up

9. Slope = 4, steeper, up

10. horizontal

11. vertical

12. Slope = -2, steeper, down

13. $-\frac{27}{8}$

14. $\frac{3}{15} = \frac{1}{5}$

15. undefined

16. 0

17. $-\frac{16}{59}$

18. $-\frac{9}{8}$

Practice problems

Answers for every practice problem

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Practice problems and answers are included.



Web Resources

www.cpm.org

For teachers, parents and students



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Take a trip through the web site, if possible. Make sure to show applets, homework help, teacher/parent/student portals....

The blue link is a hyperlink to use, if you have time. Then you won't need the three slides that follow.



Home page

The screenshot shows the CPM Educational Program website. On the left is a navigation menu with four main categories: LEARN ABOUT CPM, TEACHER SUPPORT, STUDENT SUPPORT, and PARENT SUPPORT. Each category has a list of sub-links. On the right is the main content area with a welcome message, headlines, and news updates. Three blue arrows point from the left menu to the right content area: one from TEACHER SUPPORT to the '2012 Newsletter' link, one from STUDENT SUPPORT to the 'Homework Help Update' link, and one from PARENT SUPPORT to the 'Common Core State Standards' link.

LEARN ABOUT CPM
 Video Introduction
 Professional Development
 Curriculum
 Research and Reports
 More

TEACHER SUPPORT
 Professional Development
 Teaching Resources
 Management Resources
 Common Core State Standards
 Newsletters
 CPM Discussion Forum
 More

STUDENT SUPPORT
 Homework Help
 Student Resource Pages
 Technology Resources
 Extra Practice
 More

PARENT SUPPORT
 How to Help Your Student
 Parent Guides
 Tips for Learning in a CPM Class
 Research and Studies
 More

Welcome to CPM Educational Program, an educational non-profit organization dedicated to improving grades 6-12 mathematics instruction. CPM offers professional development and curriculum materials. We invite you to learn more about the CPM mathematics program by clicking the "Learn about CPM" link at left. The other sections offer support materials for teachers, parents and students.

Headlines
[2012 Newsletter "News You Can Use"](#)

2012 CPM National Conference Update:
 A special Friday morning extended session is offered for administrators this year. This session will focus on issues with implementation of the Common Core State Standards at the district and site level. Administrators are then invited to attend general sessions with their teachers during the remainder of the main conference.

The two-day preconference will focus on issues of assessment. As education shifts from the pitfalls derived from... there is compelling research that indicates authentic formative assessment, focused on student... is an essential strategy for teachers. Join us to learn more.

News
Homework Help Update:
CPM Pre-Calculus with Trigonometry Homework Help – selected answers, solutions, hints and references – is... core chapters (1-9) will all be completed by the end of February. E-book users will also notice that the Homework Help will be linked to each problem for easy access. PCT teachers are still encouraged to make the solution manual for the course available to students. *Calculus* Homework Help is anticipated for the Fall 2012.

Common Core State Standards (CCSS): CPM is offering a new series of textbooks to meet the grade 6-8 and high school CCSS content standards: *Core Connections: Courses 1 - 3* and *Core Connections Algebra 1 & 2* and

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Teacher, Parent and Student portals. Give a few examples of what they can find under each portal.

Questions?

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