Transforming Math at Cuyamaca College

Working to deliver education's promise

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Math Pathways Goals

- Annihilate the achievement gap
- Increase the proportion of incoming students who complete a degree-level or transfer-level math course in much less time
- Increase the proportion of students who transfer and/or earn a degree or certificate

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High Leverage Strategies

- Change placement policies to allow more incoming students to enroll directly in transfer-level math
- Accelerate remediation
- Design and implement concurrent-enrollment support models (a.k.a. co-requisite models)

Accelerate Remediation & Concurrent Support Models

One or two course sequences

- PreStats followed by transfer-level statistics
- Intermediate Algebra with concurrent-enrollment support followed by a transfer-level course
- First-level transfer course with concurrent-enrollment support

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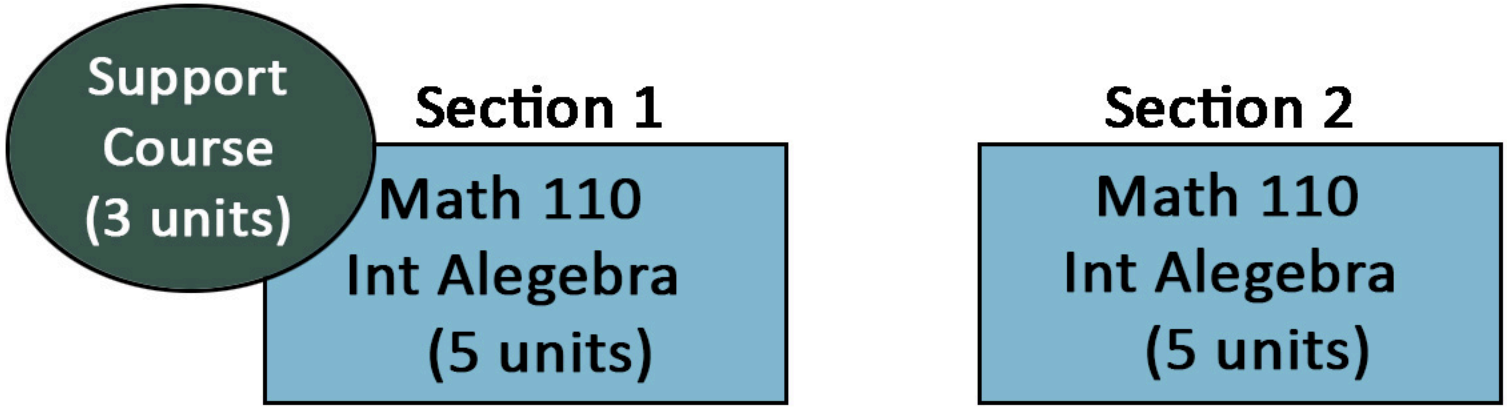
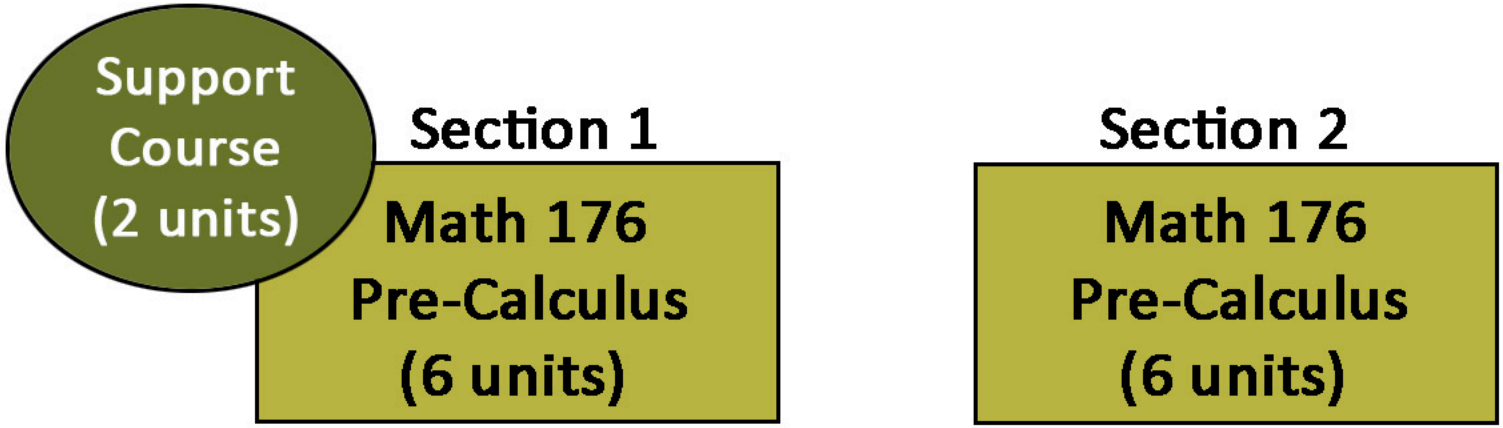
Concurrent Support Model



All section 1 students must enroll in the support course.
Section 2 students cannot enroll in the support course.



Concurrent Support Model

Schedule

Support Course (3 units)	Math 110 Int Alegebra (5 units)
8:00 - 9:50	10:00 - 12:20

Student & teacher experience

Math 110 Int Algebra w/ just-in-time remediation (8 units)
8:00 - 12:20

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Paradigm Shifts

The activity-based math classroom

- Contextualized teaching & learning
- Focus shifts from the teacher to the learner
- Just-in-time remediation
- Productive struggle with brains-on activities
- Intentional support for the affective domain

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Group Map

FRONT OF ROOM

Red	Silver	Blue
Green	Black	Purple

BACK OF ROOM

1.8 New Camera (in-class group work activity for Intermediate Algebra with support)

The following activity is excerpted from section 1.8 (pages 70 and 71) of *Mathematics in Action: Algebraic, Graphical, and Trigonometric Problem Solving, 5th Ed* by the Consortium for Foundation Mathematics. After the instructor *sets up* the activity, students would be organized into groups of three and instructed to work with each other to complete these problems in their textbooks. Note: students who typically place into PreAlgebra, Beginning Algebra, or Intermediate Algebra enroll in the course combination.

Activity 1.8

Objectives

- Write a linear equation in the slope-intercept form given the initial value and the average rate of change.
- Write a linear equation given two points, one of which is the vertical intercept.
- Use the point-slope form to write a linear equation given two points, neither of which is the vertical intercept.
- Compare slopes of parallel lines.

A New Camera

You are a photography major. A camera and lens that you want are now available at a cost of $1200. There is a special promotion for students that allows you to make monthly payments for 2 years at 0% interest. You are required to make a 20% down payment, with the balance to be paid in 24 equal monthly payments. This is an opportunity to get the equipment you really want, so you investigate to see whether you can afford to take advantage of this promotion.

Teaching Intermediate Algebra with Concurrent-Enrollment Support
An Activity-Based Approach with Just-in-Time Remediation

You're preparing a lesson for your Intermediate Algebra course with concurrent-enrollment support. You'll use the attached 1.8 Activity from the intermediate algebra textbook as the primary group-work during class. You want your students to engage in productive struggle while working with their group-mates on the 1.8 Activity; however you recognize that you will need to provide some just-in-time remediation to prevent their productive struggle from devolving into frustration.

Work with your group-mates to respond to number 1 and 2.

1) You begin by identifying the basic skills students will need to complete the 1.8 group-work from the intermediate algebra textbook. You pull out your list of prerequisite skills previously covered (left-hand column in the table below). Next you review the 1.8 Activity your students will work on during class. Now it's time to complete the right-hand column of the table.

Prerequisite Skills Already Covered	Additional Prerequisite Skills for 1.8
Identify the variables in a given Scenario; Identify input/output variables; Identify independent/dependent variables; Ordered pairs Square a number, Evaluate a function using function notation, Graph rational and irrational numbers on the number line, Apply order of	

2) After making the prerequisite list, you decide to review the 1.8 Activity one more time. The activity should require students to struggle, but that struggle needs to be productive. You do not want their struggles to devolve into frustration (they'll give up and mentally check out). So you decide to identify the aspects of the 1.8 Activity that could be too difficult for each of the following groups of students (do it).

Traditional PreAlgebra Students:

Traditional Beginning Algebra Students:

Group Map

FRONT OF ROOM

Sparrow	Finch	Penguin
Eagle	Pelican	Hawk

BACK OF ROOM

Warm-up Question - Buying a Car

It's your nephew's 16th birthday. He's been saving to buy a car, and his parents have promised to give him 16% of the cost of the car for his birthday present. He found a car he wants to buy for $4800 and wants to be sure he will have enough money. He needs to calculate how much money he will get from his parents.

What is 16% of $4800?

Average Rate of Change Review

The table below gives the number, N, of students enrolled at a College t years after 1990.

Years after 1990 , t	# of Students, N
10	9,000
20	9,350
24	9,490

1) Find the average rate of change from 10 years to 20 years.

2) Find the average rate of change from 20 years to 24 years.

3) Is the function linear? How do you know?

A New Camera

You are a photography major. A camera and lens that you want are now available at a cost of $1200. There is a special promotion for students that allows you to make monthly payments for 2 years at 0% interest. You are required to make a 20% down payment, with the balance to be paid in 24 equal monthly payments. This is an opportunity to get the equipment you really want, so you investigate to see whether you can afford to take advantage of this promotion.

Professional Development

Community of Practice (COP) meetings address:

- How to teach in the activity-based classroom
- Classroom management issues
- Revising and improving brains-on activities
- How to foster productive struggle
- How to implement just-in-time remediation

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The Math Pathways Box

https://app.box.com/s/vkpu5kutm8lz5ozm65flpjcbvug8vpfs

- Lesson Plans
- Brains on classroom activities
- Exams
- Quizzes
- Group cards

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Challenges

Fall 2016 implementation – lessons learned

- Enrolling in courses with concurrent-enrollment support
  - Multiple-measures not retroactive
  - Students unnecessarily enroll in support course
- Placement policies too restrictive
- Training faculty

Triumphs

Fall 2016 implementation – successes so far

- Training math faculty to teach in the student-centered classroom (groups, teacher-guided discovery, brains-on activities)
- Student engagement
- Instructor enthusiasm and buy-in

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