

Mathematics Across the Curriculum & Quantitative Literacy

What? Why? When?

Workshop for ACCESS Fellows

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Agenda

- What is QL and MAC?
 - Why would you want to be involved?
 - What work and opportunities are available.
- 

Quantitative Literacy - An Operational Definition

- At your table spend 10 minutes finishing the following sentence:
- A quantitatively literate person should . . .



Robert Orrill

- “Quantitative Literacy is a cultural field where language and quantitative constructs merge and are no longer one or the other.”



Mathematics and Democracy

Lawrence Cremins

inert literacy “a level of verbal and numerate skills required to comprehend instructions, perform routine procedures and complete tasks in a routine manner,”

liberating literacy “command of both the enabling skills needed to search out information (in our case – quantitative information) and the power of mind necessary to critique it, reflect upon it, and apply it in making decisions.”



American Education: The Metropolitan Experience 1876-1980

The National Numeracy Network

The National Numeracy Network envisions a society in which all citizens possess the power and habit of mind to search out quantitative information, critique it, reflect upon it, and apply it in their public, personal and professional lives.

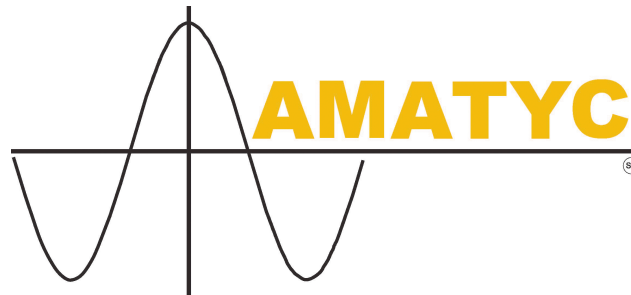


Beyond Crossroads



An individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen.

- Programme for International Student Assessment (2000)



Quantitative Literacy is

- An pedagogy and subject
 - “not a traditional math class”
- Interdisciplinary
- Emphasizes life-long learning



The Mathematical Association of America

A quantitatively literate college graduate should be able to:

- Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
- Represent mathematical information symbolically, visually, numerically, and verbally. Use arithmetical, algebraic, geometric and statistical methods to solve problems.
- Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
- Recognize that mathematical and statistical methods have limits.

Quantitative Reasoning for College Graduates



The Mathematical Association of America

Too big an order for a one- or two-term mathematics course? Unquestionably. Just as writing is not the sole province of English departments, neither does the responsibility for students' mathematical development rest only with mathematicians. Of course, the impetus to promote quantitative literacy, the leadership to define its elements effectively, and the energy to sustain its objectives will have to reside in the mathematical community. But mathematics must permeate the undergraduate experience the same way it permeates modern society: **MATHEMATICS ACROSS THE CURRICULUM!**"



1998 - Quantitative Reasoning for College Graduates

Mathematics Across the Curriculum -

An Operational Definition

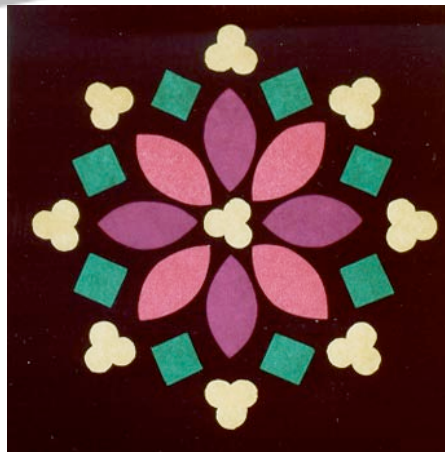
- At your table spend 10 minutes finishing the following sentence:
- A Mathematics Across the Curriculum Project would . . .



Mathematics Across The Curriculum



Mathematics Across The Curriculum
at Dartmouth College





Mathematics Across The Curriculum

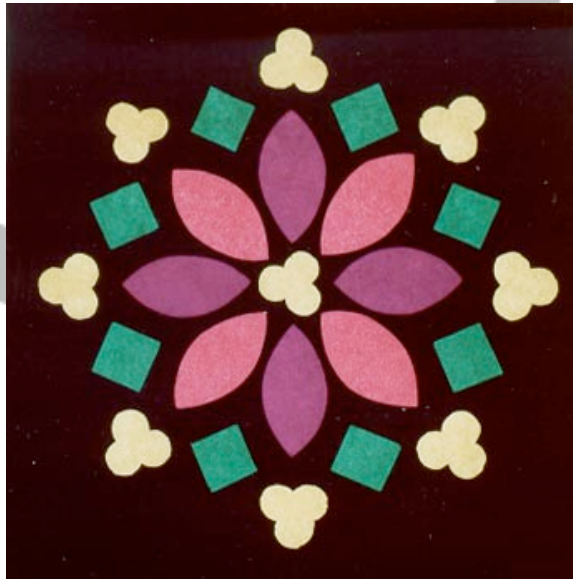
at Dartmouth College



- Make mathematics welcome and even indispensable across the entire curriculum
- Motivate students to take mathematics seriously
- Broaden the diversity of those undergraduates enrolling in math or science courses
- Increase the ability of students to approach data in a mathematical manner
- Increase the ability and willingness of students to use mathematics they already know to facilitate their understanding of other subjects and to draw upon other subjects to improve their mathematics
- Stem the flow away from science and math of students with talent and ability
- Make the methods and materials designed to further these goals available, accessible and outright friendly to the broad national audience of faculty in undergraduate institutions



Mathematics Across the Curriculum



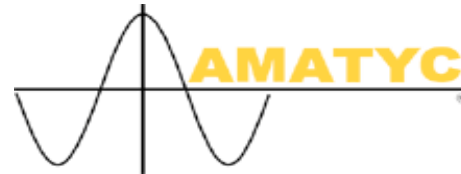
The Mathematics Across the Curriculum (MAC) Project helps students become more quantitatively literate. The project provides support and training for faculty, especially faculty from disciplines not traditionally associated with mathematics, to incorporate mathematics or quantitative reasoning into their courses.





Mathematics Across the Community College Curriculum

- AMATYC is the lead institution.
 - Edmonds CC
 - Seattle Central CC
 - Miami Dade College
- DE supported our first year.
- NSF will support all four years.



WHAT CAN MAC LOOK LIKE?



- **Think SHORT:**

- A project or module within an existing course that emphasizes the use of mathematical or quantitative reasoning.
- A small (+1 or 2 math credit) coordinated studies course where you and your math mentor teach math associated with one aspect of the course.

- **Examples of small projects:**

- Payroll Accounting – Columbia College
- Art (Ceramics) – Green River Community College
- EAP: Composition for College & Math credit



ART: CERAMICS

GREEN RIVER COMMUNITY COLLEGE



- Combined Ceramics & 1 CR Math – Fall 2006
 - **Measurement activities**
 - **Ratio/proportion**
 - Scavenger hunt
 - Symmetry patterns
 - Ethnomathematics
 - Unique surfaces



WHAT CAN MAC LOOK LIKE?



- **Think TALL:**

- A course which integrates mathematical or quantitative reasoning throughout.
- A coordinated studies course that integrates mathematics or quantitative reasoning
- A course that includes a service-learning component doing quantitative work

- **Examples of BIG projects**

- LEAF school – Edmonds Community College
- Going with the Flow – Central Wyoming College
- Space on Earth - North Essex Community College



ANTHROPOLOGY – MAC³ AND SERVICE LEARNING EDMONDS COMMUNITY COLLEGE



- Learn-n-serve
Environmental
Anthropology Field
(LEAF) School
 - AmeriCorps
scholarship, 15 credits
in Human Ecology



WHAT CAN MAC LOOK LIKE?



- **Think GRANDE!**
 - An institution-wide initiative (Accreditation, QEP, Assessment project)
 - A NSF-grant-funded project
- **Examples of REALLY BIG projects**
 - Edmonds CC
 - Miami Dade College
 - Spokane Falls CC
 - Middlesex CC
 - See *Current Practices* book by MAA



Some Concrete Examples

- On your table are several examples of MAC projects available at:
 - MQED - The Center for Quantitative Education at Dartmouth
 - MAC³
- Take 5-10 minutes to look through one or two of them.



What's in it for you?

- Spend 10 minutes at your table discussing . . .

What you would gain as a community college math instructor working in QL or MAC?



What's in it for you?

What our MAC³ participants say. . .



What would you like to do?

Spend 10 minutes at your table
discussing how to get involved in QL or
MAC . . .

- What are your interests?
- Who could you work with?
- What fits your institution



What's goin' on?

Mathematics Across the Community College Curriculum

www.mac3.amatyc.org

Supports college faculty of all disciplines in creating quantitative literacy curriculum using institutes and traveling workshops



National Numeracy Network

www.math.dartmouth.edu/~nnn/

Supports a network of persons working in quantitative literacy with meetings, newsletters and coming soon . . . a peer reviewed e-journal



Special Interest Group of the MAA Quantitative Literacy

www.monsterworks.com/sigmaaqi/

Supports mathematics faculty working in quantitative literacy with newsletters, publications and presentation opportunities



The Center for Mathematics and Quantitative Education at Dartmouth

www.math.dartmouth.edu/~mqed/

A collection of materials suitable for teaching quantitative literacy across all disciplines and levels



What's Going On?

January 6-9 - Joint Mathematics Meeting in San Diego (SIGMAA-QL) (www.maa.org)

January 18-21 - MAC³ Winter Institute in Miami (www.amatyc.org)

May 13-15 - National Numeracy Network at Carleton College (www.go.carleton.edu/quirk)

July 15-18 - AMATYC MAC Summer Institute (www.amatyc.org)

