This is the first CUPM report to address the entire undergraduate mathematics curriculum, for all students.

It is the result of four years of work including extensive consultation with hundreds of mathematicians as well as faculty from biology, chemistry, economics, engineering and other partner disciplines.

Supported by grants from NSF and the Calculus Consortium for Higher Education

The Mathematical Association of America
Premise 1: Mathematics is an exciting, dynamic field that should be recognized as lying at the core of the entire undergraduate curriculum.

Premise 2: Excellence is achieved by focusing on the outcomes we want of our students and tailoring the program to the specific needs of our students within the context of our institution.
Preparing for the *Guide*

- Focus groups at Joint Math Meetings 2000, 2001 & Mathfest 2002—over 500 participants
- Panel discussions at meetings
- Invited papers, September 2000
- Reports from AMS, AMATYC, ASA, NCTM

*The Mathematical Association of America*
CRAFTY Curriculum Foundations Project

Susan Ganter, Clemson

Bill Barker, Bowdoin

The Mathematical Association of America
CRAFTY Curriculum Foundations Project: Voice of the Partner Disciplines

Biology: “Statistics, modeling and graphical representation should take priority over calculus.”

Physics: “Courses should cover fewer topics and place increased emphasis on increasing the confidence and competence [of] students…Conceptual understanding of basic mathematical principles is more important than esoteric computational skill.”

• Reasoning and analytical skills
• Interplay of applications, problem solving and theory
• Broad, flexible major for diverse student goals
• Take advantage of technology
• Recruit and nurture majors; good advising

• Include data analysis and discrete mathematics in major
Six General Recommendations

1. Understand the student population and evaluate courses and programs.

MAA project *Supporting Assessment in Undergraduate Mathematics*

http://www.maa.org/saum

*Assessment Practices in Undergraduate Mathematics*, Gold et al. 1999

The Mathematical Association of America
Six General Recommendations

2. Develop mathematical thinking and communication skills.

Mathematics: “The most important task of the first two years is to move students from a procedural/computational understanding of mathematics to a broad understanding encompassing logical reasoning, generalization, abstraction, and formal proof. The sooner this can be accomplished, the better.” — Curr. Fdns. Proj.

The Mathematical Association of America
Six General Recommendations

3. Communicate the breadth and interconnections of the mathematical sciences.

Consortium for Mathematics and Its Applications
http://www.comap.com

Journal of Online Mathematics and its Applications
http://www.joma.org

The Mathematical Association of America
Six General Recommendations

4. Promote interdisciplinary cooperation.

*Curriculum Foundations Project: Voices of the Partner Disciplines*

The Mathematical Association of America
Six General Recommendations

5. Use computer technology to support problem solving and to promote understanding.

“The view of programming as consisting only of if-then, do-while, and a few other structures is several decades behind the current state of the art …If a person needs to learn a programming language in the future, the best basis is to know one of the state-of-the-art languages of today.”

The Mathematical Association of America
Six General Recommendations

6. Provide faculty support for curricular and instructional improvement.

“There should be clear standards of excellence for those whose greatest achievements are in teaching or other educational activities, and faculty who meet those standards should share in faculty rewards, both financially and through promotion in rank.”

AMS report Towards Excellence

The Mathematical Association of America
Supplementary Recommendations for Specific Student Audiences

A. General education or introductory courses,

B. Majors in partner disciplines, elementary & middle school teachers,

C. Majors in mathematical sciences,

D. Secondary school teachers, majors preparing for non-academic workforce, majors preparing for graduate school.
Illustrative Resources
A web-based supplement to CUPM Guide

Illustrative Resources describes courses, programs, curricular materials, articles, etc. that illustrate ways the recommendations can be implemented at varied institutions.

The Guide and its companion Illustrative Resources are available at www.maa.org/cupm

The Mathematical Association of America