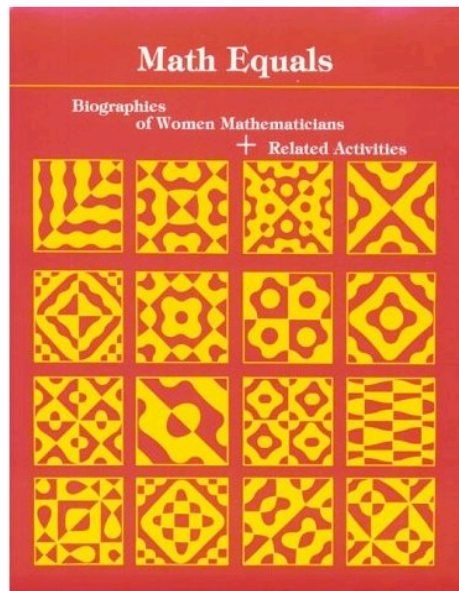




Loyola Marymount
University

Encouraging Women in Mathematics Through an Interdisciplinary Course



Teri Perl's book, *Math Equals*,
Inspired the course

Jacqueline Dewar
JMM 2021, January 6

About the Course

- Looks at the lives of 9 women mathematicians & 1 statistician (4th through 20th century)
- Engages students in wide variety of mathematical topics related to the work of these women
- Examines gender-related issues in mathematics education and participation in math-related careers
- Began as a math for liberal arts course
- Redesigned as an upper division MATH elective
- Sometimes cross-listed with HONORS or Women's Studies because of its interdisciplinary nature



Photo Source: MacTutor
<https://mathhistory.st-andrews.ac.uk/>

Hypatia
370? - 415
Alexandria



Selected Learning Outcomes

Upon completion, students will be able to:

- **Synthesize** from the biographies common experiences/obstacles faced by the 10 women & **identify** factors that enabled their success
- **Discuss** the current status of women's participation and achievement in math/careers
- **Read critically** articles in journals and news media about gender issues in math education
- **Make & investigate** mathematical conjectures



Émilie du Châtelet
1706 - 1749
France



Maria Agnesi
1718 - 1799
Italy

Focus on 3 Recurring Mathematical Themes:

- Inductive and deductive reasoning in mathematics
- Multiple representations of a single concept
- Mathematics as “a study of patterns,” not just numbers.



Mary Somerville
1780 - 1872
Scotland



Data gathered indicate the course:

- Gives students an opportunity to “do math” in a supportive environment
- Introduces them to role models
- Prepares them to discuss the current situation regarding women’s ability and participation in mathematics
- Encourages most students to adopt a more expert view of mathematics (Dewar, 2008)
- Has an influence on future teachers that carries over into their classroom practice (Dewar & Vig, 2012)



Sophie Germain
1776 - 1831
France



Questions prompted by Dewar & Vig (2012)

- What is the student “experience” in our classrooms?
 - Are we encouraging participation, promoting confidence, and achieving engagement by all students?
- Are role models available for all students?
- Are gender and diversity concerns discussed in our departments?



Florence
Nightingale
1820 - 1910
England



Course Activities and Assignments

- A short paper synthesizing 3 readings on gender equity
- Post answers to questions about the biographies and other assigned readings on a CMS discussion board
- Students do math in pairs/small groups
- Every 2 to 3 weeks, a 25-minute quiz on math and bios
- Individual research project
- Digital poster and in-class report on a modern woman mathematician; a future teacher has an option to do a lesson plan
- Final assignment guides them in a review and reflection on the course goals



Ada Byron
Lovelace
1815 - 1852
England



Discussion questions for the biographies

- How did she gain access to education?
- How did she handle family responsibilities?
- What mathematics did she work on?
- What position/career/status did she achieve?
- Any surprises or new developments showing up in her life?



Sonya Kovalevskaya
1850 - 1891
Russia



Commonalities that emerge—

- All had at least one male mentor
- The first 9 had to overcome great obstacles just to study mathematics
- Special family factors enabled them to do so
- Of the 3 most modern women, 2 obtained university positions, but with great difficulty
- If they had families, most had substantial help caring for them

—provide a basis for discussing 21st century



Grace Chisolm
Young
1868 - 1944
England



Impact beyond the classroom

40 LMU students in course (2008, '09, '10)

- 125 jr. high girls in hands-on workshop at a career day
- +2 LMU students, not in course, helped at the career day
- 55 Undergrads at SoCal Undergrad Math Conference
- 70 Teachers and Future Teachers at a conference

By 2012, 3 former students teaching in LA schools
had used course info/materials with:

- 165 Secondary students
- 20 Elementary students



Emmy Noether
1882 - 1935
Germany



SPECIAL THANKS

to the Former Director of the
MAA TENSOR Foundation program



Florence Fasanelli

&

LMU Colleagues

Anna Bargagliotti



Alissa Crans



Lily Khadjavi



Thank You! Any Questions?

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