

Fresno Pacific University  
Center for Professional Development

Course Syllabus

**INT 929 Writing in the Mathematics Classroom**

Instructor: Paul Reimer

Contact Information

Address: 1108 S. Minnewawa, Fresno, CA 9372

Email: preimer@sbcglobal.net

Website: www.pdcourses.com

**Course Description**

Writing experiences provide ways for students to reflect, share ideas, and understand the meaning of mathematics. When students are asked to explain and justify their thinking to others, writing helps them represent their thoughts and processes clearly. Writing experiences in the classroom also provide opportunities for students to rethink explanations as peers listen and respond.

This course will explore the various uses of writing in the math classroom to enhance student understanding, increase independence, and promote self-evaluation. Specific resources and activities provided will encourage the development and use of writing experiences such as reflective writing, math journals, and problem solving explanations.

The interdisciplinary approach in this course and all of the readings and activities are built upon the principles and standards of the National Council of Teachers of Mathematics and the National Council of Teachers of English.

**Primary Learning Outcomes**

**Participants in this course will:**

- Recognize the value of written communication in the mathematics classroom.
- Explore various types of writing assignments suitable to mathematics.
- Learn how to design writing experiences to support learning as well as assess understanding.
- Implement selected writing activities and demonstrate successful integration with standards-based curriculum.

**Standards Addressed by this Course**

**National Standards in Language Arts**

The following standards specifically apply to this course. They have been selected from "Standards for the English Language Arts," published by the National Council of Teachers of English and the International Reading Association.

4. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
7. Students conduct research on issues and interests by generating ideas and questions, and by posing

problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

8. Students use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.
9. Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.
10. Students whose first language is not English make use of their first language to develop competency in the English language arts and to develop understanding of content across the curriculum.
11. Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.
12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

## **National Standards in Mathematics**

### **Principles:**

- The Equity Principle: High expectations and strong support for all permeate the mathematics program.
- The Curriculum Principle: The curriculum is well developed and articulated throughout the grades; various strands of mathematics are integrated.
- The Teaching Principle: Teachers understand what students know, what they need to know, and support them in their learning by developing the classroom environment.
- The Learning Principle: Students demonstrate understanding, connect and apply mathematical ideas, and exhibit key attitudes and dispositions of mathematical thinkers.
- The Assessment Principle: Assessment informs instruction and learning; assessment benefits both teachers and students.
- The Technology Principle: Technology impacts and enhances both teaching and learning.

### **Content Standards:**

- Number and Operations: This strand includes numbers, ways of representing numbers, relationships among numbers, and number systems. Flexible use of strategies is a key part of computational fluency.
- Algebra: Algebraic thinking spans all grades. It includes experience with understanding, representing, and analyzing patterns, relations, and functions.
- Geometry: This strand encompasses analysis of two- and three-dimensional geometric shapes, spatial relationships and their representations, symmetry transformation, and geometric problem solving.
- Measurement: This strand includes understanding measurable attributes, the units, systems, and processes of measurement, and flexible use of tools and strategies.
- Data Analysis and Probability: This strand addresses the collection of data, its representation and interpretation. Probability is a key part of data analysis as well as a dimension of many other areas of mathematics.

### **Process Standards:**

- Problem Solving: Students identify and solve problems that arise from a variety of experiences and encompass connected mathematical ideas. They analyze problems and apply a wide range of strategies in flexible ways.
- Reasoning and Proof: Students make conjectures (informed guesses), express these conjectures in multiple ways (through language and other forms of representation), and analyze and evaluate their reasonable-

ness.

- Communication: Students organize their thinking by expressing their ideas clearly, and by considering and analyzing the ideas of others.
- Connections: Students recognize the connections among mathematical ideas and across experiences. They acknowledge, appreciate, and apply mathematical ideas outside the mathematics curriculum.
- Representation: Representation is both a process (to represent) and a product (or artifact). Representations include such forms as symbols, pictures, charts, models, and graphic displays. Representations are not ends in themselves, but tools for understanding and communication.

From Principles And Standards For School Mathematics, National Council of Teachers of Mathematics, 2000.

## Course Materials

### Texts:

Burns, Marilyn. *Writing in Math Class: A Resource for Grades 2-8*. Math Solutions Publications, 1995.

O'Connell, Susan, et al. "Aiming for Understanding: Lessons Learned about Writing in Mathematics." *Teaching Children Mathematics* 12 (November 2005): 192-199. (In course binder)

## Course Requirements

### A. Assignments:

**To complete this course satisfactorily, participants must submit:**

1. Reactions to using writing in math class.
2. Math autobiography.
3. Summaries of three writing assignments.
4. Summary of two suggestions for using writing.
5. Responses to three questions teachers ask.
6. Summary of insights from article reading.
7. List of two recommended Internet sources.

Detailed explanations and suggestions are provided in "Schedule of Topics and Assignments."

### B. Assessment:

**Grades will be determined using the following percentages:**

1. Reactions to using writing in math class: 10%
2. Math autobiography: 15%
3. Summaries of three writing assignments: 35%
4. Summary of two suggestions for using writing: 10%
5. Responses to three questions teachers ask: 10%
6. Summary of insights from article reading: 10%
7. List of two recommended Internet sources: 10%

Responses and lessons will be evaluated to determine thoughtful, engaged reflection, incorporation of course concepts, and effective, creative classroom procedures. Coursework is to be typed. Instructions regarding reading and writing assignments should be followed carefully.

Total scores determine the final grade:

90 - 100% = A

80 - 89% = B

79% or below = no credit

All coursework must reflect a minimum “B” quality to receive credit.

On the grade form to be returned with completed materials, participants may request either a letter grade (A or B) or credit (Cr). Every person with a score of 80% or more will receive three semester units of credit.

### **C. Returning Completed Work:**

Teachers should return completed work within one year of the date of registration, but not less than three weeks after registering.

It is not necessary to place work in binders or portfolios. Materials may be secured with a paper clip and mailed in a simple manila envelope. Regular U.S. postage is recommended. Certified, registered or express mail that requires a signature upon receipt is often delayed.

Keep a copy of all coursework in the unlikely event of mail loss. Work will not be returned.

#### **Please return:**

1. Initial reactions to using writing in the mathematics classroom.
2. Math autobiography.
3. Three summaries of writing assignments.
4. Summary of two suggestions for using writing in the math class.
5. Responses to three questions teachers ask.
6. Summary of insights from article reading.
7. List of two recommended internet sources.
8. Grade form.

#### **Mail all the above items to:**

Paul Reimer  
1108 S. Minnewawa  
Fresno, California 93727

### **Policy on Plagiarism**

All people participating in the educational process at Fresno Pacific University are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled according to the procedures set forth in the Fresno Pacific University Catalog.

### **Schedule Of Topics And Assignments**

1. Read Part 1 (Chapters 1-3) of *Writing in Math Class*, by Marilyn Burns.  
Summarize your initial reactions to the use of writing in the mathematics classroom. Include examples from your personal experiences with writing and any uses of it in your mathematics teaching. Record your thoughts in several short paragraphs.
2. In Chapter 1, Burns gives examples of math autobiographies written by students. Reflecting on your mathematical thinking and experiences, write a brief (200-400 words) math autobiography.
3. Read Part 2 (Chapters 4-8) of *Writing in Math Class*.  
Design and teach three writing assignments for your students. Select from the types of assignments described in Part 2 of the text. Using the author’s narrative and student examples given, determine which writing assignments would support or enhance your current mathematics instruction. Briefly respond

in narrative form to the following questions for each of the three writing tasks. The response to each assignment should be about 150-200 words.

- a. What is the purpose or goal for using the assignment?
- b. How will you implement the writing task?
- c. How will this assignment support student learning of the specific concept being taught?
- d. What challenges might your students have with the assignment and how will you address these challenges?
- e. (After teaching) What did you learn about your students' thinking through their responses to the assignment? (Note: If you are not currently teaching or are unable to use these assignments in the classroom, you may omit this question without penalty.)

4. Read Part 3 (Chapters 9-13) of *Writing in Math Class*. This section describes tips and suggestions for using student writing in the mathematics class. Select two suggestions that seem most applicable to you as a teacher or to your specific students. Summarize each suggestion and include any modifications you would make with your own students. Each summary should be about 150-200 words.
5. Read "Questions Teachers Ask" from *Writing in Math Class*. Using your writing experiences with students, write your own answers to any three of these questions. Total response should be 200-400 words.
6. Read "Aiming for Understanding: Lessons Learned about Writing in Mathematics." Identify and discuss three insights you found interesting in this article. Total response: 200-400 words.
7. Preview some of the many online resources on using writing in the mathematics classroom. These may be easily accessed by typing "using writing in mathematics" into a search engine. Identify and briefly describe two web sources you would recommend to your colleagues.