

SEMINAR IN MODERN ELEMENTARY SCHOOL MATHEMATICS

Ma 608

Course Description

This course includes classroom applications of the following ideas: distinction between number and numeral structure in arithmetics; the use of set ideas in understanding the fundamental operations in arithmetic; and a modern approach to the solution of verbal problems, open sentences, number families, patterns in arithmetic, geometry, and informal proofs.

Goals of the Course

1. To provide a context for thinking about mathematics and mathematics education.
2. To emphasize the importance of problem solving and exploration in the mathematics curriculum so that children are actively engaged in reflecting on mathematical ideas.
3. To cover in depth some important ideas in elementary mathematics.
4. To instill the importance of communication and reasoning in the mathematics curriculum.
5. To provide an understanding into making connections among elementary math topics

Instructional Procedures

This seminar is designed to develop an appreciation and understanding of modern elementary school mathematics. Based on the National Council of Teachers of Mathematics Standards for Curriculum and Evaluation, the course covers a variety of current issues such as cooperative learning, writing, manipulatives, and assessment in mathematics. The seminar is conducted so that it provides a model for the teaching process and includes concepts of problem solving, estimation, logic, communication, and the use of technology. Students will research and discuss mathematical ideas.

Course Content

Some of the following topics (covered in depth):

1. Numeration systems.
2. Whole numbers.
3. Decimals.
4. Fractions.
5. Estimation and mental math.

6. Measurement and size.
7. Geometry.
8. Probability and statistics.
9. Assessment.

Evaluation Measures

1. Class participation.
2. Preparation of research assignments.
3. Final project.

Bibliography

A. Required Text

Elementary School Mathematics: Teaching Developmentally, 2d ed., by John A. Van de Walle, Longman Publishing Group, New York and London, 1994.

About Teaching Mathematics: A K-8 Resource by Marilyn Burns, Cuisenaire Company of America (Math Solutions Publications), White Plains, NY, 1992.

B. Additional Required Reading

Standards for Curriculum and Evaluation by the National Council of Teachers of Mathematics, Reston, VA, 1989.

Addenda Series: Grades K-6, National Council of Teachers of Mathematics, Reston, VA.

Subject-Matter Books: Grades K-6, National Council of Teachers of Mathematics, Reston, VA.

Geometry and Spatial Sense
Making Sense of Data
Number Sense and Operations
Patterns

C. Supporting Bibliography

Curcio, Frances R., Developing Graph Comprehension: Elementary and Middle School Activities, National Council of Teachers of Mathematics, Reston, VA, 1989.

Payne, Joseph N., ed., Mathematics for the Young Child, National Council of Teachers of Mathematics, Reston, VA, 1990.

Reys, Barbara J., et al., Developing Number Sense in the Middle Grades: Addenda Series, Grades 5-8, National Council of Teachers of Mathematics, Reston, VA, 1991.

Thiessen, Diane, Margaret Matthias, and Jacquelin Smith, The Wonderful World of Mathematics: A Critically Annotated List of Children's Books in Mathematics, 2d ed., National Council of Teachers of Mathematics, Reston, VA, 1998.

Welchman-Tischler, Rosamond, How to Use Children's Literature to Teach Mathematics, National Council of Teachers of Mathematics, Reston, VA, 1992.

D. Relevant Periodical Sources

"Algebraic Thinking," focus issue of Teaching Children Mathematics, February 1997.

"Communication," focus issue of Teaching Children Mathematics, February 1995.

Elementary Mathematician, Consortium of Mathematics and Its Application (COMAP).

Teaching Children Mathematics (formerly Arithmetic Teacher), National Council of Teachers of Mathematics.

E. Other Resources

Videos

Mathematics: What are you teaching my child? featuring Marilyn Burns, Scholastic, Inc.*

Mathematics with Manipulatives Series:*

Pattern Blocks

Cuisenaire Rods

Base Ten Blocks

Geoboards

Color Tiles

Six Models

Mathematics: Teaching for understanding. Cuisenaire Company of America.*

Software

Math Shop Jr.*

Math Shop*

Weights and Measures*

Fractions and Decimals*

LOGO turtle geometry*

Manipulatives

Geoboards*

Mira Math*

Algeblocks*

Instructor's Cuisenaire Manipulatives Set and resource book*