Title

Math in Everyday Life for Grades K-5

Target Audience

This course is intended for pre-service and in-service grades K-5 teachers.

Prerequisites

To participate successfully in this course, learners should be familiar with online courses, or have taken the TeacherLine Practice Learning Online Course. This course also assumes working knowledge of typical elementary-school level math skills.

Course Description

This course is designed to give elementary-school educators effective ways to enrich their math classrooms with illustrations drawn from the real world. Learners will examine the importance of problem solving, calculators, and the Web in the elementary-school classroom. Online discussion boards allow learners to collaborate with one another and to draw from the person professional experiences of other fellow educators. Learners will research the pros and cons of calculator use in the classroom. The Council of Teachers of Mathematics (NCTM) has expectations for calculator use and problem solving; learners will review these standards and guidelines so as to have a framework within which to work when designing lesson plans. As a final task, learners will design their own "walking fieldtrip" that integrates problem-solving activities and calculator or Web-based applications with students' daily lives.

Instructor/Facilitator

See the instructor/facilitator sheet

Credits

To be determined by the offering institution

Objectives

Learners will:

- Understand National Council of Teachers of Mathematics (NCTM) expectations for student problem-solving and the use of calculators in the classroom.
- Review the importance of problem-solving.
- Explore the effective use of calculators.
- Integrate Web-based problem-solving activities into the classroom.
- Produce and implement a "walking fieldtrip" that integrates problem-solving activities and calculator- or Web-based applications into students' daily lives.

Outline of Content and Assignments

The content area comprises a sequence of five parts, or sessions. Each part includes assignments and discussion questions for participants to complete. The final project for the course is found in Session 5.

© 2004-5 PBS. All rights reserved.

Session 1: Examine NCTM Standards that Promote Problem-Solving

By the end of this session, learners will be able to:

- Discuss how they relate real world situations to mathematics instruction and how the standards help teachers develop an understanding of the usefulness of mathematics in the larger world.
- Reflect on the relevancy of the Money Counts lesson plan for students and how it enables students to make connections with their daily lives.
- Evaluate how well the NCTM Problem Solving standards are integrated into the Money Counts lesson plan and reflect on what adaptations could be made to the lesson.

Read
- Grade-by-Grade Learning
- Elementary Math Milestones
- "Problem Solving, Principles and Standards for School Mathematics"
- "Problem Solving Standard for PreK-2 Students, Principles and Standards for School Mathematics"
- "Problem Solving Standard for Grade 3-5 Students, Principles and Standards for School Mathematics"
- "Solving Problems in the Real World"

Review the lesson plan
- Money Counts

Participate in the online discussion

Pollak states that "Real-world problem solving must meet the standards both of mathematics and of the external situation to which mathematics is being applied." Learners will discuss how they relate real world situations to mathematics instruction and how the standards help teachers develop an understanding of the usefulness of mathematics in the larger world. Finally, learners will explain how they determine students' readiness for advanced mathematics courses.

Session 2: Examine the Use of Problem Solving Skills

By the end of this session, learners will be able to:

- Brainstorm ideas for a mathematics game where the students' learning is maximized, the competition aspect of the activity is eliminated, but the students are still given an opportunity to foster their problem solving skills.
- Reflect on what important mathematical concepts are being stressed in the Money Counts video and how they would stress the same mathematical concept using a different question.
- Reflect on how the teacher creates an authentic, worthwhile task to reinforce students' understanding of money concepts in the Money Counts video.

Read
- "What is Contextual Learning?"
- "Contextual Teaching Exchange newsletter"

Watch the videos
- "Money Counts" Video A
- "Money Counts" Video B

Activity
- Review activities for numeracy development for students in Grades K-2 and 3-5.

© 2004-5 PBS. All rights reserved.

Participate in the online discussion

Teachers like to use math games in the classroom. However, some children are very competitive and many potentially good lessons turn into a nightmare as students allow the competition in the game to interfere with the learning.

Learners will think of a competitive game that they have seen used in the classroom to practice math skills and promote problem solving. Learners will use the ideas in the game to brainstorm with other learners a classroom activity in which the same math concepts are introduced or reviewed, the learning is maximized, the competition aspect of the activity is eliminated, but the students are still given an opportunity to foster their problem solving skills.

Session 3: Explore the Use of Calculators

By the end of this session, learners will be able to:

- Discuss the strengths and weaknesses in presented arguments about calculator use in the classroom.
- Discuss their position on whether it is appropriate to use calculators in their mathematics instruction.
- List 3 appropriate and 3 non-appropriate uses of calculators in the classroom.
- Reflect on how online calculators may be helpful in introducing calculators to students.
- Reflect on how they may use an online calculator tool with their students.

Read

- "Computation, Calculators, and Common Sense"
- "The Role of Calculators in Math Education"

Activity

Explore the following Web sites:

- Calculators On-Line Center
- Talking Calculator

Participate in an online discussion

Learners will respond to the following: According to the NCTM's 1998 Statement on Calculators and the Education of Youth, "Appropriate instruction that includes calculators can extend students' understanding of mathematics and will allow all students access to rich problem solving experiences."

Math teacher Thomas Cowdery, on the other hand, is concerned that if calculators are introduced too early in the classroom, "Students will cease to believe that they are capable of doing arithmetic and accept it as something only done by a machine." Comment on at least two strengths and two weaknesses that you see in each argument. Where do you stand? Why?

Session 4: Locate and Evaluate Related Web Resources and Lesson Plans

By the end of this session, learners will be able to:

- Conduct a Web search and share three useful Web resources including the specific criteria used to evaluate each Web resource on the discussion board.

Read

- "Guidelines for Evaluating Web Sites"
- "Evaluating Technology-Based Curriculum Materials"

© 2004-5 PBS. All rights reserved.

- "Seven Steps to Responsible Software Selection"

Review lesson plans
- Soak It Up
- Food for Thought

Watch videos
- “Soak It Up,” Video A
- “Soak It Up,” Video B
- “Food for Thought,” Video A
- “Food for Thought,” Video B

Activity
- Web search for three educational resources

Participate in online discussion

Learners will write about three of the most useful Web resources they found online. Learners are to provide specific criteria that they used to choose the three resources along with the URL and a description of how the resources may be used in real world situations and instructional units.

Session 5: Final Project: Develop Your Own Walking Tour

By the end of this session, learners will be able to:

- Synthesize their learning about making connections to every day life in mathematics instruction by designing a problem-solving lesson plan that includes a walking field trip.
- Discuss ideas for developing and improving the lesson plan.
- Evaluate the effectiveness of the lesson plan in a reflective paper.

Complete the following final project:

During this course, participants have explored how real-world activities can teach problem-solving to their students. They have investigated online resources and strategies to integrate the calculator and the Internet into their teaching to further enhance problem-solving lessons.

The final project for this course is to produce and implement a “walking fieldtrip” lesson plan that integrates problem-solving into students’ daily experience. Participants will generate a list of activities from which the students can choose; these activities must integrate the appropriate NCTM standards, use calculators or Web-based applications, and apply mathematics to real-world scenarios in their community. Students will use the PBS TeacherLine lesson plan template to develop their plans. They will also write a short reflection paper based on their implementation.

The course participant will need to complete the following steps:

- Develop a problem-solving lesson plan to teach that includes a walking field trip
- Identify NCTM and local standards that the lesson addresses
- Identify technology components and ISTE standards that are integrated into the lesson
- Learners will use the lesson plan template to identify goals for the lesson, objectives, standards, prerequisites, materials needed, a lesson overview, teaching strategies, lesson procedures, and assessment criteria
- Implement the lesson plan
- Create a 2- or 3-page paper that describes the implementation of the lesson plan, including what worked well and what you would change if you taught it again
- Provide student work samples and student comments about their learning experience (optional)
- Submit your reflection paper, lesson plan, and samples of student work to your facilitator.

© 2004-5 PBS. All rights reserved.

Participate in online discussion
Participants will go to the discussion board and post their lesson for feedback before implementation. Learners will use peer review guidelines and the assessment rubric to guide their feedback of other learners' lesson plans.

Schedule

This course is scheduled to take approximately 15 hours to complete readings, activities, video, assignments, reflections and a final project.

Requirements

Learners are expected to:
Complete all assignments
Participate regularly in discussion boards
Follow all procedures

Materials (hardware, software, plug-ins)

- Word processor
- Internet service provider
- E-mail

Academic Dishonesty Policy

To be inserted by university institution only

Evaluation

This course is evaluated on a letter grade basis, and may be available for graduate credit. See graduate credit details pertaining to specific graduate credit institutions.

Last Updated: November 24, 2006

© 2004-5 PBS. All rights reserved.