Using Technology in the Elementary Math Classroom  
Course Syllabus

Catalog Description
In this workshop, participants will explore new technologies that can be used in elementary math instruction in kindergarten through sixth grade. Participants will review NCTM and state standards and examine the ways in which tools like virtual manipulatives, calculators, spreadsheet programs, online data sources, and applets can support these goals.

In particular, the workshop will address ways in which technology can support elementary algebra, geometry, number and operation, and data analysis standards. Participants will leave the workshop with a lesson plan that integrates new technologies into instruction in their own classrooms.

Prerequisites
This is an introductory workshop for teachers, technology specialists, curriculum specialists, professional development specialists, or other school personnel. Participants are expected to have regular access to computers. In addition, participants should be proficient with using email, browsing the Internet, and navigating to computer files.

Goals
This workshop will enable participants to:

1. Understand which technologies are appropriate for teaching math in the elementary classroom
2. Learn how to use a variety of online tools to enhance math instruction
3. Identify the NCTM standards that are met through online activities
4. Locate valuable math resources on the Internet

Assessment and Course Requirements
Each session includes readings, an activity, and a discussion assignment, which participants are required to complete.

Course Products
As a final product, participants will create a technology-enhanced lesson using the following template:
Final Product Template
http://www.edtechleaders.org/documents/elemmath/elemmath_template.doc

Discussion Participation
Participants will be evaluated on the frequency and quality of their discussion board participation. Participants are required to post a minimum of two substantial postings each session, including one that begins a new thread and one that responds to an existing thread. Postings that begin new threads will be reviewed based on their relevance, demonstrated understanding of course concepts, examples cited, and overall quality. Postings that respond to other participants will be evaluated on relevance, degree to which they extend the discussion, and tone.

Required Readings, Activities and Assignments

Session One: Introduction to Technology in the Elementary Math Classroom
In this session, participants will read an article on the role of technology in mathematics instruction from the National Council of Teachers of Mathematics and view a PowerPoint presentation developed by the George Lucas Foundation. They will also view a short video from the PBS TeacherSource Mathline project that demonstrates one way of using technology effectively in the elementary classroom. In the discussion participants will reflect on how and when technology can be an appropriate tool for math instruction.
Readings:
- *The Technology Principle* (Principles and Standards for School Mathematics, National Council of Teachers of Mathematics)
- *PowerPoint Presentation: Technology Integration in Math*
  This PowerPoint presentation which was developed by the George Lucas Foundation provides a great overview of the benefits of integrating technology into your math curriculum. Take the time to read the notes on the slides to gain more valuable information.
  http://glef.org/modules/ms/Math_PPT/ppframe.htm

Video:
- "Chances Are, Part Two: It's a Mystery to Me" (Elementary School Math Project, PBS TeacherSource Mathline)

As an activity, participants will browse several highlighted math sites while thinking about how these sites could help them to meet the learning objectives they have for their students. Participants will take notes on the Math Resource Collection Template. (http://www.edtechleaders.org/documents/elemmath/MathResourceRecord.doc)

**Session Two: Using Virtual Manipulatives to Meet NCTM Standards**
In this session, participants will read about and explore virtual manipulatives, which are electronic versions of the manipulatives used in many classrooms everyday. Once they've examined the available virtual manipulatives, participants will experiment with one of the activities appropriate for their students. Finally, they will reflect on your experiences and try to identify roles this technology might play in the classroom.

Readings:
- *What Are Virtual Manipulatives?* by Patricia Moyer, Johnna Bolyard, and Mark Spikell (Teaching Children Mathematics, February 2002)
- *Using Virtual Manipulatives on the Web to Develop Number Sense* by Margo Lynn Mankus,
  http://www.frontiernet.net/~mmankus/talks/nctm2000/nctmc000.htm

As an activity, participants will explore the National Library of Virtual Manipulatives for Interactive Mathematics website. (http://matti.usu.edu/nlvm/nav/vlibrary.html) and chose an activity to complete and assess.

**Session Three: Using Technology to Find and Analyze Real World Data**
In this session, participants will read an NCTM article on using the web for data analysis and they will explore the many sources of data available on the Internet. Participants will also view examples of projects from around the country where teachers have utilized technology to incorporate real-world data into math investigations.

Readings:
- *PBS TeacherSource: Using Real-World Data*,
  http://www.pbs.org/teachersource/whats_new/math/tips0700.shtml
- *Hitting the Math Trail*
  The National Math Trail program shows teachers how their students can create mathematics problems based on what they see in their community. Students also use computer technology to submit their math problems to the National Math Trail Web site.
  http://www.educationworld.com/a_curr/curr403.shtml

As an activity, participants will choose to explore a data source online activity designed for elementary students. Participants will also begin to plan their own technology-enhanced lesson using the planning template (http://www.edtechleaders.org/documents/elemmath/elemmath_template.doc)

**Session Four: Using Spreadsheets in the Classroom**
In this session, participants will learn about how to use spreadsheets to enhance their mathematics lessons and to help students apply and organize knowledge gained from data analysis projects. The readings will highlight the
benefits of using spreadsheets with students and the activities will allow them to gain practical experience with using and designing spreadsheet activities.

Readings:
- Use Spreadsheets to Teach Mathematics and Meet Standards
- Using Charts and Graphs in the Classroom

Session Five: Using the Calculator as a Tool to Support Mathematics Instruction
During this session, participants will review several relevant standards from NCTM and read an article outlining the ways in which calculators can be used as instructional tools in the elementary math classroom. Then they will explore an interactive activity demonstrating one calculator-enhanced lesson that could be replicated in a primary-level classroom.

Readings:
- Calculators as Learning Tools for Young Children’s Explorations of Number by DeAnn Huinker (from Teaching Children Mathematics, February 2002),
- Computation, Calculators, and Common Sense: A Position of the National Council of Teachers of Mathematics
  http://www.nctm.org/about/position_statements/computation.htm

As an activity, participants will complete a calculator activity entitled "Learning about Number Relationships and Properties of Numbers Using Calculators and Hundred Boards: Displaying Number Patterns." This activity will explore different ways to use calculators in the primary grades to meet the NCTM standards of Number and Operation, Reasoning and Proof, and Communication. This activity uses an online interactive applet, and can also be adapted for use with older students to explore more advanced concepts such as multiplication, division, and factoring.

Session Six: Planning for Math and Technology Integration
In the final session, participants will read about and view an example of an exemplary math lesson that effectively incorporates technology. They will be able to refer to this lesson as a model when completing their template for their own technology-enhanced lessons. Participants will reflect on the many mathematical applications of technology that they've explored in this workshop and they will formulate plans to introduce one or more of these technologies into your own elementary classrooms or schools. They will also complete a final course survey.

Reading:
- Circles, Stars, and Candy Bars: Multiplication with Second and Third Graders
  In this exhibit, NBCT Julie Cox teaches her second and third grade North Carolina students to multiply using games, manipulatives, and an Internet Web quest. Her students respond to these activities with interest and increased knowledge of multiplication facts. All of the video commentary is written below the video clip so you do not have to view all of the video portions. This lesson can serve as a model for you final product template. You can navigate through the different parts of the lesson using the menu on the left-hand side at the top of the page.
  http://ali.apple.com/ali_sites/deli/exhibits/1000568/

As an activity, participants will complete the Final Product Template of their technology-enhanced lesson plan and post it to the Final Product discussion area. Participants will also explore a few excellent math websites that highlight how teachers can incorporate project-based learning into the math curriculum.

  o Take Me Out To The Ball Game
    Plan the trip of lifetime to major league baseball stadiums.
    http://bayless.mints.more.net/Miller/basebwq/baseballquest.htm
- **Old MacDonald Needs a Vacation**
  Old MacDonald has been working on his farm for 30 years without a vacation. His family convinced him he needs a vacation. Farmer MacDonald hires you and your friends to work the farm and keep production levels up.
  http://schoolweb.missouri.edu/southland.k12.mo.us/smith/oldmacdonald/intro.html

- **Scholastic’s Math Resources**
  Here you can search for lesson plans or activity by curriculum topics. Some of the activities include web-based adventures that require your students to gather real-world data to solve problems.
  http://teacher.scholastic.com/ilp/index.asp?SubjectID=3

Lastly, participants will complete a final survey evaluating the course.