CII Course Syllabus

Title
Integrating Technology Into The Middle School Mathematics Curriculum

Target Audience
This course is designed for current and pre-service Math teachers of grades 6-8

Prerequisites
There are no prerequisites for this course.

Course Description
The teaching of Math has evolved with an emphasis on problem solving throughout the curriculum. Through solving real-world dilemmas students are engaged in not only applying Math facts, skills and concepts, but in generating unique solutions for practical problems. While manipulatives have been the focus of this kind of hands-on learning, technology offers new and exciting ways to bring Math alive for students. Technology and Math are a dynamic combination, and through this course you will explore the strategies, resources and possibilities for middle school teachers to integrate them across the curriculum.

Facilitator
TBA

Credit
To be determined by college or university

Standards
This course will help the teacher to meet **8 VAC 20-25-30. Technology standards.**
B. Instructional personnel shall be able to apply knowledge of terms associated with educational computing and technology.
C. Instructional personnel shall be able to apply computer productivity tools for professional use.
D. Instructional personnel shall be able to use electronic technologies to access and exchange information.
E. Instructional personnel shall be able to identify, locate, evaluate, and use appropriate instructional hardware and software to support Virginia's Standards of Learning and other instructional objectives.
F. Instructional personnel shall be able to use educational technologies for data collection, information management, problem solving, decision making, communication, and presentation within the curriculum.
G. Instructional personnel shall be able to plan and implement lessons and strategies that integrate technology to meet the diverse needs of learners in a variety of educational settings.

Learning Outcomes
After completion of this course, learners will:

- examine the tenets of inquiry-based instruction within the context of the Virginia state Standards of Learning
- explore Web-based resources for Math complete a Math-based WebQuest
- explore the Creative Problem Solving (CPS) model
- experience a CPS activity
- develop a CPS task which can be used as the Task for a WebQuest
- consider strategies for teaching geometry

- examine examples of Math lessons that involve problem solving
- create the Task and Process sections for a WebQuest
- consider approaches to data collection and analysis
- explore resources for teaching probability
- gather resources for an original WebQuest
- consider approaches to teaching linear equations
- explore rubrics as a tool for authentic assessment
- devise an original rubric for his or her WebQuest
- assemble WebQuest components into one document and post WebQuest to the course site

Process

In each assignment the learner will have access to numerous online resources from high quality sources.

Assignment 1: Math Practitioners

In examining the Mathematics Standards of Learning Teacher Resource Guide, it becomes evident that each standard focuses not just on the mastery of content but on the application of content in practical, real world ways. Students are asked to be Math practitioners who identify a problem, propose solutions, and test their ideas in real world contexts.

There are many wonderful websites on the Internet that will help us teach these concepts to our students. This week we explore a variety of math web-resources.

Product

Take a Math activity you currently use in the classroom and identify how it uses an authentic, real-world task that is rich in content across multiple subject areas. If your example does not meet these criteria, suggest how you can redesign the activity to be a truly authentic task.

Select one of the suggested WebQuest sites and identify the process students will complete from beginning to end Why did you select this specific WebQuest? Which SOLs would this WebQuest address? How could you modify this WebQuest to maximize its usefulness in your classroom.

Idea Sharing

Write about areas of Math do students seem to have the most difficulty with in middle school?

Write about areas on the Virginia SOL Math tests would you most like to target for student improvement?

For a satisfactory grade, submits at least one thoughtful post early in the session, and at least two responses to other learners at various times during the session. For an **exemplary grade**, submits two or more thoughtful posts early in the session, and more than two responses to other learners at various times during the session.

Assignment 2: Creative Problem Solving

Creative Problem Solving (CPS) is a process in which students learn to identify a problem, establish criteria for solving it, brainstorm possible solutions and then evaluate them based on their criteria. CPS is a highly effective way to help students internalize the steps of problem solving that are applied not only in Math, but in any authentic, real world situation. This week we will explore the Creative Problem Solving process for the classroom.

Product

Write your own dilemma based on a concept from your Math curriculum. Remember that the topic (or content) of the dilemma should be a real world dilemma that is not isolated to any one-subject area. Post your dilemma for your classmates to respond to.

Create a table that lists specific criteria you would want your students to include in addressing your dilemma in a WebQuest. List the criteria down the left hand side of the table and then list possible points for each across the top of the table in adjacent columns. Share your table with the class.

Idea Sharing

Write about how are WebQuests and Creative Problem solving the same? How are they different?

Discuss how can departmentalized faculty make use of a WebQuest or CPS activity so that students can apply the problem solving process across the curriculum?

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Assignment 3: Geometry Instruction in the Middle School

With the current focus on Math achievement, there is the tendency to look at Mathematics in terms of accurate answers. The truth is there is no better way to ensure accuracy than to be mindful of the process that goes into the solving of problems. This week we will take a look at the process of problem solving and apply it to the design of our WebQuests.

Product

Examine these three clips from http://pbs-mathline.virage.com/cgi-bin/visearch?user=pbs_mathline&template=template_6-8.html&query=+VideoLessonName%3ALooking+VideoLessonName%3AThrough+VideoLessonName%3AAlgebraic+VideoLessonName%3ALens+VideoLessonName%3AGrades+VideoLessonName%3A6-8&grade=6&MathCategory=0&Methodology=0&Lesson=VideoLessonName%3ALooking+VideoLessonName%3AThrough+VideoLessonName%3AAlgebraic+VideoLessonName%3ALens+VideoLessonName%3AGrades+VideoLessonName%3A6-8&page=1 Looking Through Algebraic Lens Grades 6-8

Write a draft of your Task and Process for your WebQuest, based on the dilemma you wrote in Week 2. Share them with the class on the discussion board.

Idea Sharing

Write about the processes are taking place in learning about capacity? What levels of van Hiele are employed in this lesson? How is geometry used to develop a stronger number sense?

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Assignment 4: Math Content in the Information Age

Assignment

While there are many traditional Math support materials that can be used effectively in the classroom, instruction today requires that we reach out beyond traditional resources and involve students in the collection and analysis of data. This week we will look at ways to provide meaningful learning experiences through rich sources of information.

Product
Create an annotated hotlist of five to seven links and share it with your classmates on the discussion board.

Idea Sharing
Examine these three clips from http://pbs-mathline.virage.com/cgi-bin/visearch?user=pbs_mathline&template=template_6-8.html&query=+VideoLessonName%3ARemove+VideoLessonName%3AOne&grade=6&MathCategory=0&Methodology=0&Lesson=VideoLessonName%3ARemove+VideoLessonName%3AOne Remove One. Discuss students collecting data to study probability? How could you adapt this activity for your classroom?
Use the following search tools to find resources for your WebQuest:
· http://www.altavista.com/ AltaVista
· http://www.google.com/ Google
· http://www.yahooligans.com/ Yahooligans
Write about which gave you the most results? Which gave you the best results? What other search tools might you try to find additional links?
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Assignment 5: Equations and Assessment
Perhaps the most controversial of topics over the past decade, assessment continues to play a vital role in improving the quality of Math education. This week we will examine the kinds of assessment that are most appropriate for the middle school Math classroom.

Product
Create a rubric that will assess your students on the criteria you have established for the work product they will create in your WebQuest. Next week, post your rubric with your finished WebQuest.

Idea Sharing
Describe a favorite lesson of yours that teaches an important concept of linear equations. What makes it successful? How do you assess student mastery?
For a satisfactory grade, submits at least one thoughtful post early in the session, and at least two responses to other learners at various times during the session. For an **exemplary grade**, submits two or more thoughtful posts early in the session, and more than two responses to other learners at various times during the session.

Assignment 6: Bringing it all Together
Now that you have all the components of your WebQuest complete, you can assemble it and upload it to the course site so that your classmates can review your work and offer you feedback. By posting your WebQuest early in the week, you will ensure plenty of time for your peers to enjoy your work. Once you have feedback, feel free to make any revisions you think are necessary and then upload your final draft to the course for credit.

Final Project
Post your WebQuest on the discussion board for review by your classmates.
Offer feedback to at least two classmates on their WebQuests.
Make revisions to your WebQuests based on peer feedback.
Post your final draft of your WebQuest in your digital drop box.

Schedule

This course is scheduled to take approximately 30 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

Materials (hardware, software, plug-ins)
Technical Requirements

• Word processor

• Internet service provider

• Email

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 Update: January 26, 2007
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