

CII Course Syllabus

Title

Integrating Technology Into The Middle School Science Curriculum

Target Audience

This course is designed for current and pre-service Science teachers of grades 6-8

Prerequisites

There are no prerequisites for this course.

Course Description

Welcome to "SOL Science and Technology for Middle School." This online module is designed to bring you up to date on the most effective ways to teach the middle school sciences using technology. Using the Virginia Standards of Learning as our foundation, you will discover ways to provide students with a richly engaging and successful learning environment.

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:

- Integrate the Virginia Standards of Learning for middle school science and technology into instruction
- Investigate available technology resources for earth, life and physical sciences
- Use technology resources to create a hotlist of resources for science instruction
- Explore the possibilities for the virtual field trip format in science instruction

- Apply knowledge of the Virginia Standards of Learning and lesson planning in explore resources for teaching probability the creation of a curriculum-related science-based virtual field trip

Process

The teaching of Science over the past decade has evolved with an emphasis on inquiry skills throughout the curriculum. Through active learning students are engaged in not only mastering important facts, skills and concepts, but in internalizing them so that they can be applied in various contexts. Whereas the Science lab is the center for this kind of hands-on learning, technology offers new and exciting ways to bring Science alive for students. More importantly, technology can accommodate students' different orientations to learning and understanding. Technology and Science 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.

Assignment 1: Middle School Science and Technology Strategies and Resources

Earth and Space Science are addressed throughout the elementary Standards of Learning and continue to be featured at the middle school level. In the traditional classroom instruction in these disciplines was limited by the actual access you had to materials. In the digital age, however, teachers have far greater access to resources that can supplement your own instruction. This week we will examine how Web-based resources can enhance your inquiry-based Science curriculum.

Product

Using the recommended resources from Week 1, create your own set of bookmarks you will make use of in your teaching. Select only those resources that will be useful to you. This is for your use only. You do not need to post this to the discussion board.

Select one of the suggested Virtual Field Trip sites and tour it for yourself. What would your objective be for students in touring this site. What would be a good follow up assessment task for students once they have completed their VFT of this site? How would you assess the product they create from their follow up task? Please state specific criteria you would look for in their work.

Idea Sharing

Discuss how close does your instructional style already approximate the inquiry model? Based on the Week 1 readings, what changes would you make to more faithfully implement this model with your students?

*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: Earth and Space Science

Earth and Space Science are addressed throughout the elementary Standards of Learning and continue to be featured at the middle school level. In the traditional classroom instruction in these disciplines was limited by the actual access you had to materials. In the digital age, however, teachers have far greater access to resources that can supplement your own instruction. This week we will examine how Web-based resources can enhance your inquiry-based Science curriculum..

Product

Using the recommended resources from Week 2, create your own hotlist of online research resources. Select only those resources that will be useful to you.

Use the following four Web-based resources to determine how gravity impacts on man-made satellites that attempt to explore our universe:

From Apples to Orbits

<http://library.thinkquest.org/27585/>

Cassini

<http://www.jpl.nasa.gov/cassini/>

Ulysses

<http://ulysses.jpl.nasa.gov/>

Post a paragraph on the discussion board stating your contention of how gravity both helped and hindered Cassini and Ulysses as they moved farther out into our solar system, citing at least three specific pieces of information you found in your research.

Having completed your research on Cassini and Ulysses, what hypothesis would you make about the role of gravity in our solar system? Post your hypothesis on our discussion board in the place provided.

Idea Sharing

Write how web-based resources can enrich your existing Science program? What access do you have in your classroom to the Web? What access do you have to a lab?

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: Life Sciences

Life Sciences receive emphasis in both the sixth and seventh grade Science Standards of Learning. Life Science includes both biology and botany and covers the concepts of ecosystems, interdependence and biodiversity. This week we will

examine excellent online resources for these disciplines and consider the role Web-based publishing can have in celebrating successful student research.

Product

Using the recommended resources from Week 3, create your own hotlist of online life science resources. Select only those resources that will be useful to you, and be sure to include the require links on Web publishing. Post your list to the discussion board.

Idea Sharing

Write about why does biology seem to have so much more emphasis than botany in the Standards of Learning? Is the emphasis it is given appropriate? Why or why not?

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Assignment 4: Physical Sciences

Assignment

Physical Science is the domain of the 8th grade SOLs, yet it is present in almost every grade level. By the time students have reached 8th grade the SOLs have already provided for a variety of experiences with matter, energy, light, sound, force and motion, electricity and magnetism, as well as the periodic table of the elements. Students are now ready to pursue the physical sciences in the inquiry-based model at higher levels of thinking and doing. Consider the activities found at <http://galileo.phys.virginia.edu/education/outreach/8thgradesol/home.htm> UVA SOL Physics Activities, <http://www.smv.org/pubs/PSSolutionsTOC.pdf> Physical Science Solutions, and the guidelines provided for at the <http://www.pen.k12.va.us/VDOE/Instruction/physsci.doc> Physical Sciences Teacher Resource Guide. This week we will explore top physics resources online and learn some basic ways to create and import images into documents published online.

Product

Using the recommended resources from Week 4, create your own hotlist of online physical science resources. Select only those resources that will be useful to you, and be sure to include links on free clip art.

Take your research hypothesis from Week 2 on the role of gravity and add graphics to it. Then convert it into a web page document using the tool of your choice and upload your newly formatted document to the class website.

Idea Sharing

Write about why do the physical sciences necessarily create a demand for more simulations and interaction than the other disciplines we have explored in previous weeks?

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Assignment 5: Virtual Field Trips

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?

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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.

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