

Energy and Education: Making the Connection

EDG 699-047

Summer 2004



The teacher as reflective decision maker is the model on which the College of Education has built its teacher preparation program. It represents the effort to prepare teachers for ever-changing roles and continuous personal and professional self-improvement. A reflective decision maker is one who knows how to evaluate and modify current teaching approaches to meet emerging student needs. This ability is grounded in a thorough knowledge of current theory and the ability to evaluate these theories and beliefs in light of new information and circumstances. The College of Education places particular emphasis on the themes of diversity, technology, assessment and evaluation, intellectual vitality, and the professional community.

Professor:

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Websites:

www.nku.edu/~meichtryy

www.nku.edu/~scienceed/courses.htm

www.nku.edu/~enved

Course Materials:

KY NEED Curriculum and Workshop Materials

Materials from the U.S. Department of Energy's Energysmart Program

Course Rationale

The objectives of EDG 699-047 are derived from the essential knowledge, established and current research findings, and sound professional practices as they relate to the *National Science Education Standards*, as well as the following Kentucky's *Experienced Teacher Standards*: Standard 1 (Professional Leadership), Standard 2 (Knowledge of Content), Standard 3 (Designs/Plans Instruction), Standard 5 (Implements/Manages Instruction), Standard 6 (Assesses/Communicates Learning Results), Standard 7 (Reflects/Evaluates Teaching/Learning), Standard 8 (Collaborates with Others), Standard 9 (Professional Development), and Standard 10 (Implementation of Technology). The evaluation measures of this course will assess the student's understanding of the standards listed above and her/his ability to apply these concepts to the teaching/learning process.

Course Description

This course will provide teachers the opportunity to visit energy facilities and installations in Kentucky in order to develop a stronger understanding of energy production, consumption, and

efficiency. □ Teachers will receive curriculum training that meets the KY DOE Program of Studies and that will enhance classroom and extracurricular learning opportunities. □ The National Energy Education Development (NEED) Project's energy education curriculum provides programs for K-12 in a multi-disciplinary context utilizing activities that appeal to all learning styles. □ All programs and activities are correlated to the KY POS.

Course Goals and Objectives

Teachers will develop curriculum products and resources to be used during the 2004/05 year which integrate the energy topics studied during the course around the KY Science Core Content for Assessment.

The overall goal of this course is to improve the content knowledge, pedagogical skills, and confidence levels of teachers in regard to teaching about energy topics. The specific objectives of the program are:

1. Teachers will learn ways to incorporate energy topics into their instruction.
2. Teachers will learn ways to integrate other curricular area with science.
3. Teachers will learn applications of technology in the science classroom.
4. Teachers will learn hands-on, inquiry-based teaching strategies.
5. Teachers will learn ways to integrate the use of community resources in their teaching.
6. Teachers will learn how to conduct field trip-based experiences.
7. Teachers will learn ways to connect learning with real-life, societal issues, and careers.
8. Teachers will develop a curriculum product & teaching resources based on their learning during the course with their students. □
9. Teachers will align the course content and curriculum product with the KY Science Core Content for Assessment.

The course places emphasis on each of the College of Education's themes of diversity, technology, assessment and evaluation, intellectual vitality, and the professional community. specifically addressing the following Kentucky Experienced Teacher Education Standards:

Standard 1: *The teacher provides professional leadership within the school, community, and education profession to improve student learning and well-being.*

Performance Criteria:

- 1.1 Builds positive relationships within and between school and community.
- 1.4 Writes and speaks effectively.
- 1.5 Contributes to the profession knowledge and expertise about teaching and learning.
- 1.8 Initiates and develops educational projects and programs.
- 1.9 Practices effective listening, conflict resolution, and group-facilitation skills as a team member.

Standard 2: *The teacher demonstrates content knowledge within own discipline(s) and in application(s) to other disciplines.*

Performance Criteria:

- 2.1. Communicates a breadth of content knowledge across the discipline(s) to be taught.
- 2.2. Communicates a current knowledge of discipline(s) taught.
- 2.3. Demonstrates a general knowledge that allows for integration of ideas and information across the discipline's approaches to instruction.
- 2.5 Connects content knowledge to real-world applications.
- 2.6. Plans lessons and develops instructional material that reflect knowledge of current constructs and principles of the discipline(s) being taught.

Standard 3: *The teacher designs/plans instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 3.1 Focuses instruction on one or more of Kentucky's learning goals and academic expectations.
- 3.2 Develops instruction that requires students to apply knowledge, skills, and thinking processes.
- 3.3 Integrates skills, thinking processes, and content across disciplines.
- 3.4 Creates and utilizes learning experiences that challenge, motivate and actively involve the learner.
- 3.8 Includes creative and appropriate use of technologies to improve student learning.
- 3.9 Develops and implements appropriate assessment processes.
- 3.10 Secures and uses a variety of appropriate school and community resources to support learning.
- 3.11 Develops and incorporates learning experiences that encourage students to be adaptable, flexible, resourceful, and creative.

Standard 5: *The teacher introduces instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 5.2. Connects learning with student's prior knowledge, experiences and backgrounds, and aspirations for future roles.
- 5.3 Models the skills, concepts, attributes, and/or thinking skills to be learned.
- 5.4. Uses and develops multiple teaching/learning strategies that are appropriate to student developmental levels and actively engages students in individual and cooperative learning experiences.
- 5.6 Stimulates students to reflect on their own ideas and those of others.
- 5.7 Uses appropriate questioning strategies to help students solve problems and think critically.
- 5.8. Manages student examination of social issues relative to course content, possible responses, and associated consequences.
- 5.10. Presents differing viewpoints when integrating knowledge and experiences across disciplines.
- 5.11 Makes effective use of media and technologies.
- 5.12 Makes efficient use of physical and human resources and time.
- 5.13 Provides opportunities for students to use and practice what is learned.

Standard 6: *The teacher assesses learning and communicates results to students and others with respect to student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 6.1. Selects and uses appropriate assessments.
- 6.2. Makes appropriate provisions for assessment processes that address social, cultural, and physical diversity.
- 6.3. Assesses student performance using the established criteria and scoring guides consistent with Kentucky's assessment program.

Standard 7: *The teacher reflects on and evaluates teaching/learning.*

Performance Criteria:

- 7.1 Assesses and analyzes the effectiveness of instruction.
- 7.3 Assess programs and curricula; proposes appropriate recommendations and needed adjustments.

Standard 8: The teacher collaborates with colleagues, parents, and other agencies to design, implement, and support learning programs that develop student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become team members, think and solve problems, and integrate knowledge.

Performance Criteria:

- 8.1. Initiates collaboration with others and creates situations where collaboration with others will enhance student learning.
- 8.5. Secures and makes use of school and community resources that present differing viewpoints.
- 8.6. Recognizes and responds appropriately to differences in abilities, contributions, and social and cultural backgrounds.
- 8.7. Invites colleagues, parents, community representatives, and others to help design and implement collaborative instructional projects.

Standard 9: *The teacher evaluates own overall performance in relation to Kentucky's learner goals and implements a professional development plan.*

Performance Criteria:

- 9.4 Applies to instruction the knowledge, skills, and processes acquired through professional development.

Standard 10 *The teacher uses technology to support instruction; access and manipulate data; enhance professional growth and productivity; communicate and collaborate with colleagues, parents, and the community; and conduct research.*

Performance Criteria:

- 10.6 Uses the computer to do work processing, create data bases and spreadsheets, access electronic mail and the Internet, make presentations, and use other emerging technologies to enhance professional productivity and support instruction.
- 10.14 Uses computers and other technology for individual, small group, and large group learning activities.

Student Activities, Evaluation, and Grading Policy

1. **Course Attendance** is required to receive credit for this course.
2. **Curriculum Product:** Develop a curriculum product to be taught during the 2004/05 school year which integrates the energy topics studied during the workshop around the core content being taught. A general plan for this product is due by July 16. This plan should be submitted electronically as an email attachment as a Word or RTF file or by floppy disk. Guidelines for this plan will be provided.
3. **Final Project:** Complete a project which reflects learning and/or uses resources gained during the workshop. This project must get prior approval from Dr. Meichtry. Example projects include a series of lessons, the development of a new curriculum resource, development of a website/webpage, or a field trip experience for your students. This project is due by July 16.
4. **Professionalism:** Interact professionally with course instructors, speakers, and other participants. Students must demonstrate respectful standards of behavior during activities & discussion, collaborate responsibly with colleagues, work cooperatively, and fulfill their collegial responsibilities.

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The **final grade** will be determined in the following manner:

<u>Requirement</u>	<u>Percentage</u>
Course Attendance	Required
Curriculum Product	50%
Final Project	40%
Professionalism	10%
TOTAL	100%

GRADING SCALE		
A	Superior	92-100%
B	Above Ave.	85-91%
C	Average	75-84%
D	Below Ave.	70-74%
F	Failure	Below 70%

Making the Connection: Energy and Education

June 14 – 18, 2004

Tentative Itinerary

Monday, June 14, 2004	8:30 AM	REGISTRATION – East Kentucky Power Corporate Office, Winchester, KY
	9:00 AM	Conference Begins Classroom sessions at East Kentucky Power in Winchester, KY
	NOON	LUNCH at East Kentucky Power
	1:00 PM	Load Bus – Travel to Salt Lick, KY
	2:00 PM	Vernal Pond Project – DBNF – Salt Lick, KY
		DINNER: LODGING: Carter Caves State Resort Park Olive Hill, KY
Tuesday, June 15, 2004	7:00 AM	BREAKFAST/Check-out/Load Bus
	8:00 AM	BUS DEPARTS
	9:00 AM	East Kentucky Power Green Valley Landfill Gas Project
	11:30 AM	Tour Markwest – South Shore, KY
	12:30 PM	LUNCH PROVIDED BY MARKWEST
	1:30 PM	Travel to Paul Blazer High School/Poage Elementary
	2:00 PM	Tour Solar School Sites (Paul Blazer/Poage)
	3:30 PM	Tour AEP Coal Loading Facility – Ceredo, WV Travel to Prestonsburg, KY
	6:00 PM	DINNER: <i>* Possible evening event at East KY Science Center</i> LODGING: Jenny Wiley State Resort Park Prestonsburg, KY
Wednesday, June 16, 2004	7:00 AM	BREAKFAST
	8:00 AM	BUS DEPARTS
	9:00 AM	Big Sandy Coal Fired Power Plant - Louisa, KY
	11:30 AM	LUNCH at Big Sandy – Provided by AEP
	1:30 PM	Tour Equitable Resources Hydrocarbon Facility
	3:30 PM	Return to Jenny Wiley DINNER at YOUR LEISURE – FREE NIGHT LODGING: Jenny Wiley State Resort Park Prestonsburg, KY

Thursday, June 17, 2004

5:00 AM BUS DEPARTS – Breakfast on the bus!
6:00 AM Starfire - Elk Tour, Surface Mine and Reclamation
Site
11:00 AM LUNCH at Starfire
NOON Travel to Hazard
1:00 PM TECO
Tour TECO Underground Mine AND Challenger
Center
Travel to Corbin, KY
DINNER:
LODGING: Hampton Inn, Corbin, KY

Friday, June 18, 2004

8:00 AM BUS DEPARTS
9:00 AM Tour Hydropower at Laurel Dam, Corbin, KY
11:00 AM Travel to Berea
NOON LUNCH: Cultural Arts Center, Berea, KY
1:30 PM Tour Berea College Eco-Village

5:00 PM END DAY IN WINCHESTER

