

Selected Topics in Education

Reading the Licking River

EDG 693-044

Summer 2002

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: Dr. Yvonne Meichtry **Office Hours:** Summer - By Appointment

Office: BEP 160 **Phone:** 859-572-6380 (W), 859-441-9653 (H) **Email:** meichtryy@nku.edu

Textbook & Materials:

Kentucky Division of Water. (1986). *A field guide to Kentucky rivers and streams*.

Kentucky Division of Water. (1986). *A field guide to Kentucky wetlands*.

Kentucky Division of Water. (1998). *The Licking River region in Kentucky*. Frankfort, KY: Kentucky Division of Water.

Kentucky Watershed Watch Program 2000:

Watershed watch biological stream assessment

Watershed habitat assessment protocols

Watershed watch water chemistry sampling methods

Kinman, B. (1999). *Kentucky fish*. Frankfort, KY: Kentucky Department of Fish and Wildlife Resources.

Excerpted from Master Watershed Stewards, Ohio State University Extension. (1998). *Streams, the rivers in your backyard*

Reading the river course handbook (2002). Highland Heights, KY: NKU

Staff. The Lamotte Company. (2001) *The monitor's handbook*,

Course Rationale

The objectives of EDG 693-044 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, funded by Kentucky's Council on Postsecondary Education Eisenhower Program, consists of a one-week summer workshop. Teachers will also participate in two follow up sessions to be held during the 2002/03 academic year during which they will refine and share the lessons and curricular materials they develop.

The workshop's title, "Reading the River," was inspired by renowned conservationist's Aldo Leopold's concept of reading the landscape to discover and understand the natural and human forces that shape the environment. Travelling by canoe and van during a six-day journey down the Licking River, teachers will be challenged to view the river and its watershed with "new eyes" -- making observations and learning about the biology, geology, land use, history and the culture of the Licking River watershed.

The trip will begin at the headwaters of the Licking River in Magoffin County where participants will find the origin of the 300 mile river and learn why conditions in the headwaters are especially important to overall stream health. Moving downstream, participants will visit Cave Run Lake in Rowan and Bath counties to learn about the economic and environmental impacts of this 8,300-acre impoundment. Land use changes and the impact of land use on water quality will be observed and examined as the group travels from upland coal-bearing areas down through agricultural lands, finally reaching the urbanized area near the Licking's confluence with the Ohio River in Northern Kentucky.

Course Goals and Objectives

Teachers will develop a series of lessons to be taught during the 2002/03 year which integrate the watershed topics studied during the workshop around the core content being taught. An important goal of the project is to develop the Licking River curricular materials in such a way that they can be used by teachers throughout the watershed and adapted for use in other watersheds throughout Kentucky. The curricula submitted by all participants will be compiled and made available to others on the NKU Science Education website.

Specific objectives of the course are for teachers to:

1. increase their use of technology in the classroom.
2. increase their use of hands-on, inquiry-based teaching strategies.
3. increase gender & minority equity in their classroom.
4. integrate the sciences to a greater degree.
5. integrate other curricular areas with science to a greater degree.
6. integrate the use of community resources to a greater degree.
7. conduct field-based investigations to a greater degree.
8. provide more real-life, societal and career connections to science in the classroom.
9. teach science content and processes in ways that will help to improve test scores of students, as measured by the Commonwealth Assessment and Testing Systems (CATS).
10. use the watershed lessons & curriculum materials developed during the summer program with their students.

11. develop and share curriculum materials relevant to the Licking River Watershed as a template for similar curricular guides in other watersheds throughout Kentucky.

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. EDG 693-044 specifically addresses the following Kentucky Experienced Teacher Education Standards (means of assessment include course participation and curriculum product):

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:

Communicates a current knowledge of discipline(s) taught.

- 2.3 Demonstrates a general knowledge that allows for integration of ideas and information across the disciplines.
- 2.4 Demonstrates an overall knowledge of one's discipline(s) that allows the teacher to teach to the students' ability levels and learning styles.
- 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.
- 2.9 Collaborates with teachers in other disciplines to analyze and structure cross-disciplinary approaches to instruction.

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.
- 3.5 Creates and utilizes learning experiences that are developmentally appropriate for learners.

- 3.6 Develops and incorporates strategies that address physical, social, and cultural and that show sensitivity to differences.
- 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.
- 5.5. Provides opportunities for students to increase their knowledge of cultural similarities and differences.
- 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.
- 5.9 Demonstrates interpersonal/ team membership skills and supportive behavior with students in facilitating instruction.
- 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 2002/03 school year which integrates the watershed topics studied during the workshop around the core content being taught. Specific guidelines and the format to be used for this curriculum will be provided during the course.

3. **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.

To take information directly from another source without giving credit to or citing the original source is plagiarism. Plagiarism is in violation of copyright laws and NKU's Student Honor Code which is attached to this syllabus. Refer to <http://www.nku.edu/~library/howto/plagiarism.shtml> for information on what constitutes plagiarism and how to avoid it:

<http://www.nku.edu/~library/howto/plagiarism.shtml>

For information about the violation of the Cheating and Plagiarism Student Honor Code, see the document attached.

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

<u>Requirement</u>	<u>Percentage</u>	GRADING SCALE	
Course Attendance	Required	A	Superior 92-100%
Curriculum Product	90%	B	Above Ave. 85-91%
Professionalism	10%	C	Average 75-84%
		D	Below Ave. 70-74%
		F	Failure Below 70%
TOTAL	100%		

READING THE RIVER 2002

DAY	MORNING ACTIVITIES	AFTERNOON	EVENING
Sunday June 16	-Workshop check-in -Program pre-surveys -Workshop Overview & Guidelines for Curriculum Project and application to KY Program of Studies	Teaching stations to learn: 1. CBL & technology use 2. Chemical monitoring 3. Biological & physical monitoring techniques 4. Habitat assessment 5. Classroom applications	-Cook Out -Introduction to Licking River Watershed -Riparian Ecology
Monday June 17	-Geology, hydrology, and botany of the Licking Headwaters -Sampling Water Quality in Licking River Headwaters -Downstream stream monitoring	-Lunch at headwaters area -Stream monitoring downstream (Carpenters Bend); macroinvertebrates, chemistry, and physical characteristics. -Magoffin County Historical Society- stream monitoring, tour	Dinner-Historical Society Day reflections
Tuesday June 18	-Overview of Cave Run Lake area & Forestry Service resources for teachers - Fishes of KY -Tours: Cave Run Lake Dam, fish hatchery, and fish identification	-Lunch at Forest Service -Pontoon study of Cave Run Lake	Optional wetlands hike, fishing, and other recreational activities.
Wedn. June 19	-Canoe safety -Mussel field study at Moore's Ferry -Stream monitoring	Downstream canoe trip	Wildlife viewing and other recreational activities at Blue Licks Battlefield State Park on the Licking River
Thursday June 20	-Canoeing and stream monitoring: Blue Licks Battlefield State Park -Museum tour-BLBSP	-Flooding history & effects (Falmouth) -Cultural resources of the Licking River valley -Licking River Watershed Management	-Agricultural practices along the Licking River -Campfire program: Kentucky Waters and Licking River Song
Friday June 21	Microanalysis of plankton collected during workshop Reflections and study at the mouth of Licking River	-Sanitation District No. 1, No. KY -Summary of data collection throughout week -Shared reflections -Next steps in curriculum development -Post-surveys	

References

- Kentucky Department of Fish and Wildlife:
Teacher's Guide to Kentucky Fish
Teacher's Guide: Small Stream Ecosystem
Teacher's Guide: The Big River Ecosystem
- Mitchell, M. & Stapp, W. (1990). *Field manual for water quality monitoring*. Dexter, MI: Thomson-Shores Printers.
- National Forum on Nonpoint Source Pollution. (1996). *Water: Taking a new tack on nonpoint water pollution*. Washington, DC: National Geographic Society & The Conservation Fund.
- Kentucky Division of Water. (1997). *Guidelines for stream and wetland protection in Kentucky*. Frankfort, KY: Natural Resources and Environmental Protection Cabinet.
- Reid, G. & Zim, H. (Editor). (2001). *Pond life: A guide to common plants and animals of North American ponds and lakes*. St. Martin's Press, Golden Guide Series.
- Taylor, B. (1992). *Look closer: River life*. London: Dorling Kindersley, Ltd.

University Websites

Northern Kentucky University Science Education: <http://ww.nku.edu/~scienceed>

Water Education Websites

EE Link: <http://nceet.snre.umich.edu/>

EE Link Grants Page: <http://eelink.net/grants-generalinformation.html>

EPA

<http://www.epa.gov/enviroed/>
<http://www.epa.gov/teachers/> and - <http://www.epa.gov/kids/>
<http://www.epa.gov/enviroed/oecat/>
<http://www.epa.gov/enviroed/oecat/>
<http://www.epa.gov/enviroed/oecat/>

KY Department of Fish and Wildlife Resources: <http://www.kdfwr.state.ky.us/teacher.htm>

Kentucky Division of Forestry: <http://www.webcom.com/duane/wood/kdf.html>

KY Division of Water: <http://water.nr.state.ky.us/dow/dwhome.htm>

Kentucky Natural Resources and Environmental Protection Cabinet

Water temperature: <http://water.nr.state.ky.us/ww/wcptmp.htm>
Dissolved oxygen: <http://water.nr.state.ky.us/ww/wcpdo.htm>
pH: <http://water.nr.state.ky.us/ww/wcpvh.htm>

Kentucky Geologic Survey: <http://www.uky.edu/KGS/>

Water related web sites in and outside KY: <http://www.uky.edu/KGS/water/waterlinks.htm>

Kentucky PRIDE Program: <http://www.kypride.org/cleanstreams.htm>

Kentucky Water Watch: <http://www.state.ky.us/nrepc/water/wwhomepg.htm>

Lamotte: <http://www.lamotte.com/>

Licking River Watershed Watch: <http://water.nr.state.ky.us/watch/licking.htm>

Natural Resources Conservation Service: www.nrcs.usda.gov

Ohio Department of Natural Resources, Division of Water:
www.dnr.state.oh.us/water/programs/programs.htm

Ohio River Valley Water Sanitation Commission, <http://222.orsanco.org>

Reading the Licking River: www.readingtheriver.org

Sanitation District No. 1, Northern KY: <http://www.sd1.org/>

Tri-State Environmental Resource Center : <http://terc.uc.edu/>

Water Environment Federation: <http://www.wef.org/>

Water on the Web: <http://wow.nrri.umn.edu/wow/index.html>

Education Agencies

Kentucky Department of Education: <http://www.kde.state.ky.us/>

Kentucky Environmental Education Council:
<http://www.state.ky.us/agencies/envred/KEECcouncil.htm>

Community Resources

Boone, Campbell and Kenton County Conservation Districts

Environmental Education Alliance

Licking River Watershed Watch

Ohio River Basin Consortium for Research and Education, <http://www.orbcre.org/main1.html>

Sanitation District No. 1 of Northern KY

Northern KY Sierra Club and Water Sentinels Project

Professional Organizations

Kentucky Association for Environmental Education: www.kaee.org

Kentucky Science Teachers Association: www.ksta.org

National Science Teachers Association: www.nsta.org

North American Association for Environmental Education: www.naaee.org

Ohio River Basin Consortium for Research and Education, <http://www.orbcre.org/main1.html>

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