MOREHEAD STATE UNIVERSITY

Program Review for
Bachelor of Science – Secondary Teacher Certification
Department of Biological and Environmental Sciences

December 3, 2002

Prepared for Consideration by:

Educational Professional Standards Board

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TABLE OF CONTENTS

I. Conceptual Framework

Unit Overview 3
BES 8-12 Program and Links to Conceptual Framework 4

II. Program Experiences for BES 8-12 Area of Concentration

Table 1: Curricular Experience Sequence for BES Teacher Education …5
Table 2: Links Between Secondary Biological Teaching Program (8-12) Goals and the New Teacher Standards (NTS)....6
Table 3: Biological Science Curriculum and Standards Relationships....7
Table 4: Professional Education Core and Links to the New Teachers Standards....9
Table 5: Biology Core Courses and Outcomes for 8-12 10
Table 6: National Science Teachers Association Program Review Matrix 11
Clinical and Field Experiences for BES 8-12....15
Table 7: Field and Clinical Experiences in the Biology Teaching Program 8-12....16
Table 8: KERA Initiatives and Links to Professional Education Coursework Matrix 17
Table 9: KERA Initiatives and Links to Biology Teaching 8-12 Program Coursework 17

III. NCATE Themes

Table 10: The Integration of NCATE Themes into the Curriculum and Professional Education for BES 8-12 18

IV. Assessment

A. Assessment of the Candidate....18
Assessment of BES Program 19
Table 11: Assessment Strategies in BES Curriculum....21
On-Going Candidate Assessment 22
Program Exit Requirement....22
B. Program Assessment....22
University Process for Assessment 22
Aggregate Data for Program Assessment....23

V. Program Faculty

Table 12: Professional Education Program Faculty....24
Table 13: Secondary Professional Core Course Faculty……..2

VI. Biological Science Teaching 8-12 Program Checksheet....26

VII. APPENDIX

Listing of all Biology Courses Required for Biology Teaching 8-12 30
Annual Unit Plan 2001-2003....32

Morehead State University
Biological Sciences Grades 8-12, Teacher Certification

I. CONCEPTUAL FRAMEWORK

Unit Overview

The general aim of the Professional Education unit at Morehead State University is to prepare educators who, as graduates of the Department of Biological and Environmental Sciences (BES), demonstrate the knowledge, skills and dispositions that are essential if one is to successfully fulfill the role of new or experienced teacher. The framework that is articulated in the unit conceptual framework is the theme: "Educators as Architects: Designing Environments Where Students Construct Knowledge and Develop Skills". This metaphor is used since it:

1) **lays a foundation** of content and planning/preparation of classroom activities for which to **build** upon in subsequent content courses and for effective teaching;
2) suggests that educators are the **architects** who **develop the blueprint** for creating environments specific to the needs of their students using a variety of **materials**;
3) creates an environment for learners to **construct** their own knowledge through the scientific method.

Educators therefore are responsible for constructing authentic learning environments to engage students in meaningful activities. The "Educator as Architect," metaphor and its constructivist epistemology utilizes the following themes in the educator preparation programs:

- Engaging students in a comprehensive and multifaceted knowledge and skills base that can be applied and used in multiple contexts.
- Acknowledging the belief that learning is an active and on-going process.
- Providing students with direct experiences; so that they can use and process information while seeking solutions.
- Placing students in authentic or "real" world settings so that learning has the potential to be meaningful.
- Encouraging students to extend their ability to process and learn from reflecting on their own experiences so that they can develop more informed and sophisticated teaching practices (professional development).
- Providing students with opportunities to understand the impact that dispositions, attitudes, values, and beliefs have on student learning and development.
- Assessing students and faculty using a variety of quantitative and qualitative measures, including authentic performance-based projects and action-research.
- Encouraging faculty and public school practitioners to fulfill the role of facilitators of learning by constructing experiences in environments that stimulate students and provide thought, action, and reflection.

- Assessing student abilities and demonstrating an awareness of and ability to account for learner diversity; including gender, race, ethnicity, cultural, and exceptionality in all aspects of the educational setting.
- Extending the ability to communicate and collaborate effectively with students, parents, professionals, peers, and members of the community.
- Preparing pre-professionals and faculty who are able to effectively integrate technology into all aspects of the educational process in order to improve communication, teaching, learning, and assessment.
- Monitoring the extent to which each educator preparation program fulfills its goals and commitment to preparing graduates to demonstrate performance standards, as well as the system each uses to produce positive change.

The entire Morehead State Conceptual Framework document is available on line: www.msucoe.org

BES 8-12 Program and Links to Conceptual Framework

The BS in the BES secondary teaching degree is linked to the conceptual framework and its theme "Educators as Architects: Designing Environments Where Students Construct Knowledge and Develop Skills" in a number of ways. The BES Teacher preparation program is designed to provide graduates with the knowledge, skills, and dispositions that are linked to successful teaching.

Sequential coursework is presented at a high level of expectation and ensures that students are ready to apply the knowledge and skills that lay the foundation for expertise in the Biological Sciences. Exposing students to a variety of learning experiences, including: direct, problem solving, and scientific method applications are an essential part of BES coursework as well as the clinical and field component of the program. Learning to solve problems in authentic settings such as the environment and in laboratories enriches the student's academic experience and best prepares them for a career as an effective teacher.

Accountability in the area of designing, planning, implementing learning activities appropriate for diverse learner is reinforced through reading, coursework, awareness of the new teacher performance standards, learner goals and expectations, and core content assessment. Practice refining the teaching skills and dispositions needed to support teacher effectiveness in these areas will occur through a variety of supervised clinical and field practice activities.

Technology skills (scientific instrumentation, computer, video cameras, and other media equipment) are developed and used in variety of ways throughout the program. The intention is to challenge students to use a variety of technological resources for a variety of purposes in order to increase their perceptions of its potential as a learning, assessment, resource, and communication tool.

Reflection plays a central role in the students' professional development because it is designed to get them involved in self-evaluation, accepting personal responsibility for, and ultimately refining their teaching. Input from the MSU faculty supervisors and public school practitioners further enhances the quality of student reflection and therefore the extent to which it contributes to his/her ability to construct environments that provoke thought and action in the classroom. Learning to identify meaningful professional development activities is an extension of the self-evaluation and teaching refinement process.

Collaboration with public school teachers and administrators increases as students move through the four-tiered clinical and field experience sequence of the teacher education program. This program is designed to prepare quality BES teachers who can design learning environments and situations that have a positive impact on the education of children throughout eastern Kentucky.

To demonstrate the departmental links to the conceptual framework, the syllabi for the Methods (BIOL 402) and Field Experience (BIOL 403) courses, are located on the web site: www.msucoe.org. Other required courses are indicated in the Appendix.

II. Program Experiences for BES 8-12 Area of Concentration

In this section of the program review, several matrices will be presented to demonstrate program congruence with: 1) Program Goals and the New Teacher Standards, 2) Professional Education Coursework and New Teacher Standards, 3) Program Coursework and New Teacher Standards, 4) NSTA Outcomes and Coursework KERA Outcomes and Coursework, and 5) Professional Education Coursework and the Learner goals and Academic Expectations/ Program of Studies 8-12/Core Content Assessment.

The Curricular Experience Sequence for students during their four years at Morehead State University is indicated in Table 1. This sequential timing of enrollment allows the student to blend their course accomplishments into their professional education courses as an academic specialist in biology.

Table 1. Curricular Experience Sequence for BES Teacher Education

Curriculum	Freshman		Sophomore		Junior		Senior	
General Education Studies								
Content Studies								
Professional Education Studies								
Pedagogical Studies								
Integrated Studies								

Table 2 indicates the links between the secondary Biology Teaching Goals and the New Teachers Standards. The outcome relationship of courses to performance standards expected of a practicing biological scientist indexed to the nine categories of Kentucky's New Teaching Standards I-IX is shown in Table 3. It should be emphasized

that most of the courses in this area of concentration are content oriented (NTS VIII), but while the other eight standards are not specifically applicable to all, there will be a synthesis of many of the new standards by the student to the classroom and laboratory experiences gained in these content oriented courses. Additionally, supporting courses in chemistry, physical sciences, and mathematics broaden the understanding of processes utilized in the biological sciences. Table 4 compares the New Teachers Standards to the Professional Education core.

Table 2. Links Between Secondary Biological Teaching Program (8-12) Goals and the New Teacher Standards (NTS)

Program Competencies	***Links to New Teacher Standards***
Demonstrate a working knowledge of content/subject area.	**NTS VIII** Knowledge of content
Demonstrate the ability to select and utilize and integrate general knowledge to extend student learning.	**NTS 1** Designs, plans instruction **NTS III** Implements, manages instruction **NTS VIII** Knowledge of content
Demonstrate a variety of professional skills	**NTS I** Designs/Plans Instruction **NTS II** Creates/maintains learning environm **NTS III** Implements/manages instruction **NTS VI** Collaborates with colleagues **NTS IX** Implements technology
Apply an understanding of learner characteristics and the links these have to planning and assessment	**NTS I** Designs/Plans Instruction **NTS IV** Assess and Communicate learning results **NTS V** Reflects on/Evaluates Teaching **NTS VI** Collaborate with parents/colleagues
Be able to account for student diversity and exceptionality factors	**NTS I** Designs/Plans Instruction **NTS II** Creates/maintains learning environment **NTS III** Implements/manages instruction **NTS IV** Assess/Communicate results **NTS VI** Collaborates with colleagues/parents
Demonstrate ability to select and implement appropriate and effective classroom management techniques	**NTS II** Creates and maintains learning environment
Demonstrate computer competence as well as the ability to select and use a variety of technical and human resources to enhance instruction	**NTS IX** Implements technology **NTS IV** Collaborate with colleagues/ parents
Document knowledge of and ability to use state curricular and assessment materials/guidelines	**NTS I** Designs/Plans instruction **NTS II** Creates/maintains learning environment **NTS IV** Assesses/Communicates results **NTS V** Reflects on/Evaluates teaching **NTS VI** Collaborates with colleagues/parents
Demonstrate the ability to reflect on and critique teaching and identify and use resources to improve effectiveness.	**NTS VII** Professional development

Table 3. Biological Science Curriculum and Standards Relationships

NEW TEACHER STANDARDS																											
	NTS I Designs Plans Instruc-tion			NTS II Creates Maintain Learn-ing Climate			NTS III Imple-ments / Manage Instruc-tion			NTS IV Assess Commu nicates Learn-ing			NTS V Evaluate Teach-ing/ Learn-ing			NTS VI Collab-orates			NTS VII Profes-sional Develop -ment			NTS VIII Content Know-ledge			NTS IX Imple-ments Tech-nology		
COURSES	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**
BIOL 171				X						X			X									X			X		
BIOL 210	X			X						X			X						X				X				
BIOL 215	X			X						X			X						X				X				
BIOL 231	X			X						X			X						X				X				
BIOL 232	X			X						X			X						X				X				
BIOL 304	X			X						X			X						X				X		X		
BIOL 317	X			X						X			X						X				X		X		
BIOL 380	X			X						X			X						X				X		X		
BIOL 402		X			X			X			X			X			X			X				X				X
BIOL 403		X			X			X			X			X			X			X				X				X
BIOL 461	X			X						X			X							X				X		X	
BIOL 499D	X			X						X			X							X				X		X	
BIOL Elec.	X			X						X			X							X				X	X		

I - Introduction: standard indicator at initial level
D - Development: standard indicator is thoroughly implemented
S - Skill: standard indicator is demonstrated proficiently

Table 3. Continued-- Biology Curriculum and Standards Relationships

	NEW TEACHER STANDARDS																												
	NTS I Designs Plans Instruc-tion			NTS II Creates Maintain Learn-ing Climate			NTS III Imple-ments / Manage Instruc-tion			NTS IV Assess Commu nicates Learn-ing			NTS V Evaluate Teach-ing/ Learn-ing			NTS VI Collab-orates			NTS VII Profes-sional Develop -ment			NTS VIII Content Know-ledge			NTS IX Imple-ments Tech-nology		
CHEM 101/111	X			X			X			X			X			X			X			X					
CHEM 201/112	X			X			X			X			X			X			X				X				
BIOL 301	X			X			X			X			X			X			X				X				
PHYS 201	X			X			X			X			X			X			X				X				
GEOS 108	X			X			X			X			X			X			X				X				
MATH 152	X			X			X									X								X	X		
MATH 141	X			X			X									X								X	X		
MATH 174	X			X			X									X								X	X		
MATH 353	X			X			X									X								X	X		
GEOS 108	X															X							X	X	X		
EDF 207	X			X			X										X								X		
EDF 211		X			X			X			X			X			X					X					
EDF 311		X			X			X			X			X			X		X						X		
EDSE 312		X			X			X			X			X		X			X							X	
EDSP 332	X			X				X		X			X			X			X						X		
EDSE 416			X			X			X			X		X			X		X					X		X	

I - Introduction: standard indicator at initial level
D - Development: standard indicator is thoroughly implemented
S - Skill: standard indicator is demonstrated proficiently

Table 4. Professional Education Core and Links to the NEW Teachers Standards

NEW TEACHER STANDARDS																												
	NTS I Designs/ Plans Instruc-tion			NTS II Creates/ Maintain Learn-ing Climate			NTS III Imple-ments/ Manage Instruc-tion			NTS IV Assess Commu nicates Learn-ing			NTS V Evaluat Teach-ing/ Learn-ing			NTS VI Collab-orates			NTS VII Profes-sional Develop -ment			NTS VIII Content Know-ledge			NTS IX Imple-ments Tech-nology		
COURSES	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**	**I**	**D**	**S**
EDF 207	X			X			X										X								X		
EDF 211		X			X			X			X			X			X					X						
EDF 311		X			X			X			X			X			X		X						X		
EDSE 312		X			X			X			X			X		X			X							X	
EDSP 332	X			X				X		X			X			X			X						X		
EDSE 416			X			X			X			X		X			X		X					X		X	

I - Introduction: standard indicator at initial level
D - Development: standard indicator is thoroughly implemented
S - Skill: standard indicator is demonstrated proficiently

Graduates of this program will demonstrate mastery of the subject matter of basic biological science and the basic pedagogy skills to grow and develop as a professional in secondary education. They will be able to perform in authentic teaching situations using a knowledge base of academic content coupled with the skills and processes required to be an effective teacher. The sum total of the required course work, both in the discipline of biological science and teacher training involves learning and understanding scientific literature, use of modern technology in basic research and in information retrieval, having oral and written composition skills, being able to think critically and to analyze data in a critical manner as well as competency in research methods. As a professional educator the graduates will be able to plan effective instructional strategies and obtain the necessary materials and supplies required for classroom and laboratory management involved in student-centered learning. The basic core and supplemental science requirements provide the graduate the background and abilities to integrate the designed curriculum with other disciplines. The synthesis of the content oriented biological, mathematical, and physical science courses with secondary education courses develops a graduate with the professional attitudes required by contemporary standards of knowledge on professional issues National Science Teachers Association (NSTA) and promotes the individual commitment to professional growth.

The skills acquired in the content courses match well with National Science Teachers Association (NSTA) and National Biology Teachers Association (NBTA)

guidelines. (see Table 5) The category of diversity in this context relates to the diversity of living organisms and not the diversity of culture or society. The content courses transcend all societies and cultures in that the professional biologist deals with life processes that are the same for all humankind. With the laboratory components in these core courses, the student seeking to become a qualified teacher of biological science is exposed to a wide array of teaching pedagogies.

Table 5. Biology Core Courses and Outcomes for 8-12

Outcomes	Biol 171	Biol 210	Biol 215	Biol 231	Biol 232	Biol 304	Biol 317	Biol 380	Biol 402	Biol 403	Biol 461	Biol 499D
Diversity	X	X	X				X		X		X	X
Technology	X	X	X	X	X	X	X	X	X	X	X	X
Problem Solving	X	X	X	X	X	X	X	X	X	X	X	X
Ecological Relationship	X	X	X						X	X	X	X
Evolution	X	X	X			X	X	X	X	X	X	X
Physiology	X			X	X		X	X	X	X	X	X
Biology Teaching Methods	X	X	X	X	X	X	X	X	X	X	X	X

The National Science Teachers Association Program Review Matri

Table 6 on the next page.

Table 6. National Science Teachers Association Program Review Matrix

Standard 1 Content
The program prepares candidates to structure and interpret the concepts, ideas and relationships in science that are needed to advance student learning in the area of licensure as defined by state and national standards developed by the science education community. Content refers to concepts and principles understood through science; concepts and relationships unifying science domains; processes of investigation in a science discipline; and applications of mathematics in science research.

Dimensions of the Standard.	Assignments or requirements addressing the standard.*	Evidence of effective preparation.
1.a. Know and understand the major concepts and principles of the teaching discipline(s) as defined by state and national standards of the science education community.		
1.b. Know and understand major concepts and principles unifying science disciplines. (See National Science Education Standard=s A Unifying Concepts@).		
1.c. Design, conduct and report investigations within a science discipline.		
1.d. Apply mathematics in problem-solving and scientific investigation.		

* Identify specific requirements rather than courses, except in 1.a. where courses may represent the requirements. Specific descriptions of assignments and requirements, and where they are found, should be included. Syllabi for courses are generally NOT needed. However information provided should (a) identify where the experience occurs (specific course or other source) and provide the detail needed to show that the assignment or experience addresses the relevant dimension of the standard. Plans of study showing required and elective courses should always be included in the folio.

Standard 2 Nature of Science
The program prepares teachers to engage students in activities to define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community, and contrast science to other ways of knowing. Nature of science refers to characteristics distinguishing science from other ways of knowing; characteristics distinguishing basic science, applied science, and technology; processes and conventions of science as a professional activity; and standards defining acceptable evidence and scientific explanation.

Dimensions of the Standard.	Assignments or requirements addressing the standard.	Evidence of effective preparation.
2.a. Know and understand the philosophical nature of science and the conventions of scientific explanation.		
2.b. Engage K-12 students effectively in studies of the nature of science and conventions of scientific explanation.		

Standard 3 Inquiry
The program prepares candidates to engage students regularly and effectively in science inquiry and facilitate understanding of the role inquiry plays in the development of scientific knowledge. Inquiry refers to questioning and formulating solvable problems; reflecting on, and constructing, knowledge from data; collaborating and exchanging information while seeking solutions; and developing concepts and relationships from empirical experience.

Dimensions of the Standard.	Assignments or requirements addressing the standard.	Evidence of effective preparation
3.a. Know and understand scientific inquiry and its relationship to the development of scientific knowledge.		
3.b. Engage K-12 students effectively in scientific inquiry appropriate for their grade level and abilities.		

Standard 4 Context of Science
The program prepares candidates to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding. The context of science refers to relationships among systems of human endeavor including science and technology; relationships among scientific, technological, personal, social and cultural values; and the relevance and importance of science to the personal lives of students.

Dimensions of the Standard.	Assignments or requirements addressing the standard.	Evidence of effective preparation.
4.a. Know and understand the relationship of science to other human values and endeavors.		
4.b. Engage K-12 students effectively in the study of the relationship of science to other human values and endeavors.		
4.c. Relate science to the personal lives, needs and interests of K-12 students.		

Standard 5 Skills of Teaching
The program prepares candidates to create a community of diverse student learners who can construct meaning from science experiences and possess a disposition for further inquiry and learning. Skills of Teaching refers to science teaching actions, strategies and methodologies; interactions with students that promote learning and achievement; effective organization of classroom experiences; use of advanced technology to extend and enhance learning; and the use of prior conceptions and student interests to promote new learning.

Dimensions of the Standard.	Assignments or requirements addressing the standard.	Evidence of effective preparation
5.a. Use diverse and effective actions, strategies and methodologies to teach science.		
5.b. Interact effectively with K-12 students to promote learning and demonstrate student achievement.		
5.c. Organize and manage science activities effectively in different student groupings.		
5.d. Use advanced technology to teach K-12 students science.		
5.e. Use prior conceptions and K-12 student interests to promote learning.		

Standard 6 Curriculum
The program prepares candidates to develop and apply a coherent, focused science curriculum that is consistent with state and national standards for science education and appropriate for addressing the needs, abilities and interests of students. Science curriculum refers to an extended framework of goals, plans, materials, and resources for instruction and the instructional context, both in and out of school, within which pedagogy is embedded

Dimensions of the Standard.	Assignments or requirements addressing the standard.	Evidence of effective preparation.
6.a. Develop coherent, meaningful goals, plans, and materials and find resources.		
6.b. Relate plans and resources to professionally-developed state and national standards, including the National Science Education Standards.		
6.c. Plan and develop science curriculum addressing the needs, interests and abilities of all preK-12 students.		

Standard 7 Social Context
The program prepares candidates to relate science to the community and to use human and institutional resources in the community to advance the education of their students in science. The social context of science teaching refers to the social and community support network within which science teaching and learning occur; relationship of science teaching and learning to the needs and values of the community; and involvement of people and institutions from the community in the teaching of science.

Dimensions of the Standard.	**Assignments or requirements addressing the standard.**	**Evidence of effective preparation.**
7.a. Know and understand the values and needs of the community and their effect on the teaching and learning of science.		
7.b. Use community human and institutional resources to advance the learning of science in the classroom and field.		

Standard 8 Assessment
The program prepares candidates to use a variety of contemporary assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science. Assessment refers to the alignment of goals, instruction and outcomes; measurement and evaluation of student learning in a variety of dimensions and the use of outcome data to guide and change instruction.

Dimensions of the Standard.	**Assignments or requirements addressing the standard.**	**Evidence of effective preparation**
8.a. Align science goals, instruction and outcomes.		
8.b. Know and use a variety of contemporary science assessment strategies to determine preK-12 student needs and levels of learning and development.		
8.c. Use assessment appropriately to determine, guide and change science instruction.		

Standard 9 Environment for Learning The program prepares candidates to design and manage safe and supportive learning environments reflecting high expectations for the success of all students. Learning environments refers to the physical spaces within which learning of science occurs; psychological and social environment of the student engaged in learning science; treatment and ethical use of living organisms; and safety in all areas related to science instruction.		
Dimensions of the Standard.	**Assignments or requirements addressing the standard.**	**Evidence of effective preparation.**
9.a. Create and maintain a psychologically and socially safe and supportive learning environment.		
9.b. Manage the activities and materials of science safely in storage areas, labs and field.		
9.c. Keep and use living organisms as in the classroom in a safe, ethical and appropriate manner.		

Standard 10 Professional Practice The program prepares candidates to participate in the professional community, improving practice through their personal actions, education and development. Professional practice refers to knowledge of, and participation in, the activities of the professional community; ethical behavior consistent with the best interests of students and the community; reflection on professional practices and continuous efforts to ensure the highest quality of science instruction; and willingness to work with students and new colleagues as they enter the profession.		
Dimensions of the Standard.	**Assignments or requirements addressing the standard.**	**Evidence of effective preparation.**
10.a. Know and participate in professional organizations and activities of the science education community beyond the classroom.		
10.b. Behave ethically and in best interests of preK-12 students and the community.		
10.c. Engage in reflective practices and make continuous efforts to improve in practice.		
10.d. Work willingly with peers, supervisors and others in a professional manner.		

Clinical and Field Experiences for BES 8-12

Clinical and field experiences will be designed to provide candidates with an opportunity to develop knowledge, skills, and dispositions consistent with the units standards and the New Teacher Standards and to demonstrate these in a classroom or through the completion of a variety of written assignments. The intention is to provide a candidate with the opportunity to observe, analyze and practice a variety of teaching and

learning techniques and to be able to locate and use essential professional resources: 1) Learner Goals and Academic Expectations, 2) the appropriate Program of Studies, and 3) Core Content for Assessment. Specific assignments have been designed by the faculty who deliver the courses in this program to ensure that students are engaged in developmentally appropriate ways as they move through the four tiered field experience structure. Self- reflection will be integrated throughout all aspects of the clinical and field experiences so that students extend their ability to make more informed decisions and select and use effective teaching practices.

Student teaching is the exit clinical experience and KTIP standards will frame the student performance expectations. A department affiliated University Supervisor will work closely with a Cooperating Teacher in a public school to ensure that each candidate is progressing at an acceptable rate and level; using observation, dialogue and written assessment and portfolio artifacts as the means for student evaluation. Table 7 below illustrates the Field and Clinical Experiences for the Biology Secondary Teaching Program.

Table 7. Field and Clinical Experiences in the Biology Teaching Program 8-12

Level	Courses	Field Hours Required	Expected Experiences	Actual Hours
I	EDF 207	16	General Observation: Diversity and Exceptionality School Board Meeting or site based council	12 2 2
I	EDF 211	16	Diversity Exceptionality	4 12
I	EDF 311	16	Support Roles Management, Grading, etc. Individual tutoring	12 4
				48 total
II	EDSE 312	43	Observations: General technology skill development	10 33
II	EDSP 332	10	Observations: Exceptionality One on One	 10 5
II	BIOL 402	15	Small Group Teaching, Whole group Assessment	10 5 5
				78 total
III	BIOL 403	52	Content area guided observations Large group and whole class teaching Small group content teaching Participation One on One	5 24 12 8 8
				57 total
IV	Student Teaching	241	Observation Teaching Participation Conferences	40 135 30 36
				241 total

Copies of both BES Methods and Field Experience Syllabi (BIOL 402, 403) are located on the following web site: www.msucoe.org

Table 8. KERA Initiatives and Links to Professional Education Coursework Matrix

Professional

COURSES	Learner Goals and Academic Expectations	Program of Studies P-12	Core Content for Assessment
EDF 207	X		
EDF 211			
EDF 311	X	X	X
EDSP 332	X	X	X
EDSE 312	X	X	X
EDSE 333	X	X	X
EDSE 416	X	X	X

Table 9. KERA Initiatives and Links to Biology Teaching 8 –12 Program Coursework

COURSES	Learner Goals and Academic Expectations	Program of Studies P-12	Core Content for Assessment
BIOL 171			X
BIOL 210	X	X	X
BIOL 215	X		
BIOL 231	X	X	X
BIOL 232	X	X	X
BIOL 304	X		X
BIOL 317	X	X	
BIOL 380		X	X
BIOL 402		X	X
BIOL 403	X	X	X
BIOL 461	X	X	X
BIOL 499D	X	X	X

III. NCATE Themes

Table 10 below shows the integration of the NCATE themes into the overall curriculum, professional education and supervised teaching courses that are part of this program.

Table 10. The Integration of NCATE Themes into the Curriculum and Professional Education for BES 8-12

Courses	NCATE Themes						
	Conceptual Framework	Diversity	Intellectual Vitality	Technology	Professional Community	Evaluation	Perform. Assessment
BIOL 171	X		X	X			
BIOL 210	X		X	X			
BIOL 215	X		X	X			
BIOL 231	X		X	X			
BIOL 232	X		X	X			
BIOL 304	X	X	X	X			
BIOL 317	X		X	X			X
BIOL 380	X		X	X			
BIOL 402	X	X	X	X	X	X	X
BIOL 403	X	X	X	X	X	X	X
BIOL 461	X		X	X			X
BIOL 499D	X	X	X	X		X	X
BIOL Elec.			X				
EDF 207	X	X	X			X	X
EDF 211	X	X	X			X	X
EDF 311	X		X	X		X	X
EDSE 312	X	X	X	X		X	X
EDSP 332	X	X	X			X	X
EDSE 416	X		X		X	X	X
EDSE 499C	X	X				X	X

VIII. ASSESSMENT

A. Assessment of the Candidate

1. Teacher Education Program Admission Criteria

a. Successful completion of 45 semester hours

b. Minimum GPA of 2.5 (documented by official transcript)
c. Three recommendations, at least two from university faculty, citing students disposition for teaching
d. Minimum of 21 on ACT with minimum subtest scores of 10 or ACT of 18 with minimum subtest scores of 10 and PPSI scores of 173 Reading, 172 Math, or Computer Format reading 320, writing, 318, math 318, or 1200 GRE, or SAT 990.
e. Successful completion EDF 207, EDF 211, PSY 154 (Min. "C"), SPCH 108
f. Proficiency on oral and written communication: ENG 100 and ENG 200 (Minimum grade of "C" in each)
g. Demonstrate moral, ethical and social behavior commensurate with the standards of the school community at large.
h. Successful completion of Department Admissions Interview Committee.
i. Transfer students who were recently admitted to a teacher education program may provide evidence of admission in lieu of interview provided they are applying for admission to the same program/major. Transfer students must fulfill all program requirements listed above.
j. All students applying to the TEP must sign a declaration affirming: 1) a commitment to upholding the Professional Code of Ethics for Kentucky, 2) knowledge of the TEP Handbook, 3) requirements for certification, and 4) no felony convictions.

2. Assessment of BES Program

Students completing a concentration of teaching in Biological Science are expected to demonstrate competencies in basic and supplemental performance areas. Competency is required in the following basic areas of Biological Science:

a. Organismic Biology (Botany and Zoology)
b. Genetics
c. Microbiology
d. Cell Biology
e. Physiology
f. Ecology
g. Evolution

In addition to the above basic areas supplemental supporting experiences include:

a. Earth Science
b. Chemistry (inorganic, organic)
c. Physics
d. Mathematics (algebra, trigonometry, statistics)

The Knowledge Domain being very content oriented assesses the knowledge and skill base of the student using traditional methods but the majority of the discipline courses do relate to NTS VII (Engages in Professional Development) and NTS VIII (Knowledge of Content) due to communication between the faculty in the respective areas and those in the College of Education. The professional education courses generally stress the New Teacher Performance Standards I-IX in each specific course. Courses in Biological Science emphasize problem solving as well as assessment by written examinations, written laboratory reports, computer problem solving and oral response. Laboratory intensive courses require interpretation of data via experiments utilizing clinical tools as microscopy, spectroscopy, electrophoresis, physiographs, etc., with students demonstrating competence of manipulation of such laboratory tools. The Teacher Education Program requirements for admission include a minimum GPA of 2.5 (4.0 scale), recommendations from university/college professors, demonstrated proficiency in oral and written English. Supplemental documentation by the New Teacher Standards includes the development of portfolios by the student. Graduates are assessed by the Praxis Exam.

The Program seeks feedback from professors, students in the program, graduates of the program and teachers in the field. Graduates and other teachers often communicate ideas and experiences that help to improve the quality of courses and assessment strategies. The overall assessment strategies for the BES curriculum are shown in Table 11 on the next page.

Table 11. Assessment Strategies for BES Curriculum

Assessment Strategies	Biology Courses												
	171	210	215	231	232	304	317	380	402	403	461	Elec	499D
Tests and Quizzes	X	X	X	X	X	X	X	X	X	X	X	X	X
Papers	X		X			X	X	X	X		X		X
Investigative Lab Reporting	X	X	X			X	X	X	X	X	X	X	
Oral Presentations			X			X	X	X	X	X	X		X
Use of Informal Assessments	X	X	X			X	X		X	X	X	X	X
Effective Use of Computer, Videography						X	X	X	X	X	X		X
Journals, Observations, Logs	X		X			X	X	X	X	X	X	X	
Develop Active Learning Activities			X				X		X	X			
Develop Interdiscipline Activities			X				X		X	X	X		
Develop Collaborative Plans									X	X			X
Develop Lesson Plans									X	X			
Develop Classroom Manangement Plan									X	X			
Supervised Peer Teach									X	X			X
Supervised Small Group Teaching									X	X			
Develop Assessment Reports									X	X	X		
Video With Critique									X	X			
Professional Program Self Analysis									X	X			
Professional Development Plan									X	X			
Portfolio Development Disk									X	X			
Praxis Content Knowledge	X	X	X	X	X	X	X	X	X	X	X	X	X
On Demand Tasks/Concept									X	X			X

3. ON-GOING CANDIDATE ASSESSMENT

Candidates will be monitored each semester by their advisor. The following will be reviewed and weighed when evaluating a candidate progress:

- General Education Course Completion
- GPA status throughout the entire program
- Successful completion of TEP admission prerequisites
- Timely application for consideration for admission to TEP
- Progress completing professional education and program course requirements
- Fulfillment of PRAXIS Test taking requirement prior to student teaching and follow-up
- Completion of the Major Field Tests administered during the Biology Capstone Course

4. PROGRAM EXIT REQUIREMENTS

Students must:

- Achieve and maintain a GPA of at least 2.5 (Official Transcript)
- Successfully complete the supervised teaching courses/experience (Observation evaluations by university supervisor and cooperating teacher and school principal)
- Successfully complete the exit portfolio requirements (A minimum of 2 program faculty will evaluate portfolio documents in conjunction with New Teacher Standards and appropriate performance expectations)
- Complete the PRAXIS content area PLT Examinations
- Successfully complete disposition evaluations
- Successfully complete on-demand tasks

B. PROGRAM ASSESSMENT

University Process for Assessment

The assessment of the BES Secondary Education Teaching Program is on going and includes the use of data and feedback systems associated with Morehead State University's Assessment Plan. This annual assessment plan has been developed to ensure that all academic programs have: 1) Identified and stated explicit links with the vision, mission and goal statements of the institution, 2) Cited explicit links to the BES secondary program goals, 3) Articulates specific program assessment measures and acceptable levels of student performance in relation to each assessment, 4) Includes actual student performance data (aggregate when possible) as

well as a system for interpreting student data, and 5) Finally, the evaluation must addresses the need for change (any aspect of the program), when appropriate, as well as the means and time frame to be used to accomplish the change. Recommendations for change might for example, be linked to changes in course content or assessments, or curriculum requirements, or the development of additional student support opportunities.

Aggregate Data for Program Assessment

- Student Exit Portfolio Assessment: A criterion based performance data collection sheet will be used to record individual student scores in relation to each NTS. The Summary Sheet will aggregate individual student performance data, making it possible to determine program strengths and weaknesses.
- Observation Data: Data will be collected by the University Supervisor, Cooperating Teacher and, when appropriate, the Principal. Individual and aggregate data will be recorded and used to guide program improvement.
- On-demand task student performance on criteria elements

IX. PROGRAM FACULTY

The professional program faculty is listed in Figure 12 on the next page. This listing includes all faculty members instructing classes that may include students in the Biology Teacher Education Program.

Table 12. Professional Program Faculty

Name	Highest Degree	Area of Specialization	Responsibilities to the Program	Relationship to Institution
Darrin DeMoss	Ph.D.	Human Physiology	Teach classes	Associate Professor, full time to university, part-time to program
Gerald DeMoss	Ph.D.	Zoology	Teach classes, Dean College of Science and Technology	Professor, full-time to university, part-time to program
David Eisenhour	Ph.D.	Icthyology	Teach classes	Assistant professor, full-time to university, part-time to program
Geoff Gearner	Ph.D.	Microbiology	Teach classes	Professor, full-time to university, part-time to program
David Magrane	Ph.D.	Animal Physiology	Teach classes, Chair Biological and Environmental Sci.	Professor, full-time to university, part-time to program
Les Meade	Ph.D.	Zoology	Teach classes	Professor, full-time to university, part-time to program
Sean O'Keefe	Ph.D.	Entomology	Teach classes	Assistant Professor, full-time to university, part-time to program
David Peyton	Ph.D.	Genetics	Teach classes	Assistant Professor, full-time to university, part-time to program
Brian Reeder	Ph.D.	Ecology	Teach classes	Professor, full-time to university, part-time to program
Allen Risk	Ph.D.	Botany	Teach classes	Associate Professor, full time to university, part-time to program
David Saxon	Ph.D.	Physiology	Teach classes	Professor, full-time to university, part-time to program
David Smith	Ph.D.	Environmental Science	Teach classes	Assistant Professor, full-time to university, part-time to program
Cynthia Trombino	Ph.D.	Ornithology, Teacher Education	Teach classes, advise students	Assistant Professor, full-time to university, part-time to program
Craig Tuerk	Ph.D.	Biochemistry	Teach classes	Associate Professor, full time to university, part-time to program
Carol Wymer	Ph.D.	Plant Physiology	Teach classes	Assistant Professor, full-time to university, part-time to program

Secondary Professional Education Core Course Faculty

Faculty NAME	**Highest Degree**	**Area of Specialization**	**Professional Core Program Responsibilities**	**Full-time MSU Full-time Program**	**Full-time MSU – Part-time Program**	Part-time **MSU – Part-Time Program**
Karen Hammons	MA	Curriculum	EDF 207	ERSE		
Paul McGhee	Ph.D.	Educational Administration	EDF 207		ERSE/ LSE	
Anna Pennell	Ph.D.	Critical Theory	EDF 207	ERSE		
Wayne Willis	Ph.D.	Foundations of Education	EDF 207		ERSE	
Lola Aagaard-Boram	Ph.D.	Foundations of Education	EDF 211	LSE		
Beverly Klecker	Ph.D.	Educational Psychology	EDF 311	LSE		
Ron Skidmore	Ph.D.	Educational Psychology	EDF 211 EDF 311	LSE		
Lesia Lennex	Ed.D	Educational Technology	EDSE 312	LSE		
Edith Lombardo	Ed.D	Special Education	EDSE 332	ERSE		
Timothy Thomas	Ph.D.	Curriculum Instruction	EDSE 333	LSE		
			EDSE 499c			
			EDSE 416			

* Teaching assignments for EDSE 499c, The Teacher in Today's School and EDSE 416, Student Teaching are program specific.

AREA OF CONCENTRATION
BIOLOGICAL SCIENCE TEACHING (8-12)

Student Name _____ Date of First Meeting _____

General Education Requirements **48 Hours**

Required Core

ENG 100	Writing I	3 hours _____
SPCH 108	Fundamentals of Speech	3 hours _____
MATH 100	Level (141,152,174, or 175)	3 hours _____
CIS 101	Computers for Learning (or equivalent)	3 hours _____
ENG 200	Writing II	3 hours _____
		15 hours total

Area Studies (2002- 2004 catalog)

A. Humanities

Elective	3 hours _____
Elective	3 hours _____
Elective	3 hours _____

B. Natural and Mathematical Sciences

Requirements are met in	3 hours _____
the course of pursuing the	3 hours _____
Area of Concentration.	3 hours _____

C. Social and Behavioral Sciences

PSY 154	3 hours _____
Elective	3 hours _____
Elective	3 hours _____

D. Practical Living

Elective	3 hours _____

E. Integrated Capstone

BIOL 499D	Capstone: Evolution	3 hours _____
		33 hours total

Professional Education Course Requirements (A GPA of 2.5 required)

EDF 207	Foundations of Education	3 hours _____
EDF 211	Human Growth & Development	3 hours _____
EDF 311	Learning Theories for Teachers	3 hours _____
EDSE 312	Teaching Skills & Media	3 hours _____
EDSP 332	Teaching the Exceptional Student	2 hours _____
EDSE 499C	Teaching in Today's School	2 hours _____
EDSE 416	Student Teaching	12 hours _____
		28 hours total

Core Requirements:

BIOL 171	Principles of Biology	4 hours _____
BIOL 210	Zoology	4 hours _____
BIOL 215	Botany	4 hours _____
BIOL 231	Human Anatomy	3 hours _____
BIOL 232	Human Physiology	3 hours _____
BIOL 304	Genetics	3 hours _____
BIOL 317	Microbiology	4 hours _____
BIOL 380	Cell Biology	3 hours _____
BIOL 402	Integrated Biology, Mathematics, and Science Teaching Methods	3 hours _____
BIOL 403	Integrated Biology, Mathematics, and Science Field Experience in Teaching	3 hours _____
BIOL 461	Ecology	3 hours _____
BIOL 499D	Capstone: Evolution	3 hours _____
BIOL ____	Field Elective (Group C)	3 hours _____
		43 hours total

Supplemental Requirements (sequence I or sequence II)

CHEM 101	Survey of General Chemistry (sequence I)	4 hours _____
CHEM 201	Survey of Organic Chemistry (sequence I)	4 hours _____
CHEM 301	Fundamentals of Biochemistry (sequence I) **or**	4 hours _____
CHEM 111	Principles of Chemistry I (sequence II)	4 hours _____
CHEM 112	Principles of Chemistry II (sequence II)	4 hours _____
CHEM 301	Fundamentals of Biochemistry (sequence II)	4 hours _____
PHYS 201	Elementary Physics I	3 hours _____
PHYS 201A	Elementary Physics I Lab	1 hour _____
GEOS 108	Physical Geology	4 hours _____
MATH 174	Pre-Calculus or equivalent **or**	3 hours _____
MATH 141	Plane Trigonometry and	3 hours _____
MATH 152	College Algebra	3 hours _____
MATH 353	Statistics or equivalent	3 hours _____
		24-27 hours

Professional Education Courses

EDF 207	Foundations in Education	3 hours _____
EDF 211	Human Growth and Development	3 hours _____
EDF 311	Learning Theories in the Classroom	3 hours _____
EDSE 312	Educational Methods and Technology	3 hours _____
EDSE 332	Teaching the Exceptional Student	2 hours _____
EDSE 499C	Teacher in Today's School	2 hours _____
EDSE 416	Student Teaching	12 hours _____
		28 hours total

TEP Academic Requirements:

1. Overall GPA of 2.5
2. Fulfill one of the following:
    a. Minimum of 21 on the ACT
    b. With a minimum ACT of 18, take the PPST and score at least 320 on Reading, 318 on Math and 318 on Writing.

c. Minimum of 1200 on the GRE or 990 on the SAT

Departmental Requirements:

Portfolios: Contains documents of representative works that demonstrate the level of competence in relation to each of the New Teacher Standards. Completed as a final project for BIOL 402 and 403.

On demand tasks include proper utilization and application of scientific method and procedures in capstone course (BIOL 499D)

PRAXIS Exams-Program Specific Requirements:

Official documentation of all scores for Biological Science Teaching (PRAXIS 0231 and 0233 and secondary PLT) must be submitted to the faculty advisor prior to Student Teaching. Successfully completion is required for Teacher Certification in Kentucky.

Student's Name _____Date Official Check Sheet Processed _____

Second Major or Minor _____ Advisors Name _____

Student's Signature _____ Date _____

12/03/02

APPENDIX

LISTING OF ALL BIOLOGY COURSES REQUIRED FOR THE AREA OF CONCENTRATION IN BIOLOGY TEACHING 8-12

BIOL 171. Principles of Biology. (3-2-4); I, II, III. *Prerequisite: Composite ACT of 20 or above or minimum grade of C in BIOL 105 or BIOL 160*. Minimum Math ACT score of 20 or completion of MATH 093 (minimum grade of C) is recommended. General biological principles; emphasis on cell function, energetics, homeostasis, genetics, evolution, and ecology. *This course satisfies the area studies-natural and mathematical sciences for general education.*

BIOL 210. General Zoology. (2-4-4); I, II. *Prerequisites: BIOL 171.* A survey of animals from Protozoa to Mammalia with emphasis on phylogeny, evolution, comparative morphology, and physiology.

BIOL 215. General Botany. (2-4-4); I, II, III. *Prerequisite: BIOL 171.* Structure and physiology of vegetative and reproductive plant organs; introduction to plant genetics and plant kingdom in terms of structure, ecology, and evolution.

BIOL 231. Human Anatomy. (3-0-3); I, II, III. *Prerequisite: Composite ACT score of 19 or above, or BIOL 105 or equivalent.* A study of functional human anatomy. NOT ACCEPTABLE as credit for the major or minor in biology. *This course satisfies the area studies-natural and mathematical sciences for general education.*

BIOL 232. Human Physiology. (3-0-3); I, II, III. *Prerequisite: BIOL 231 or equivalent.* Physiology of the various systems of the human body as particularly related to health. NOT ACCEPTABLE as credit for biology majors and minors (non-teaching).

BIOL 301. Fundamentals of Biochemistry. (3-2-4); I, II. *Prerequisite: CHEM 201 or CHEM 112.* Chemistry of simple and complex biomolecules such as amino acids, proteins, carbohydrates, lipids, and nucleic acids. Biosynthesis and metabolic cycles; gene composition (DNA, RNA, etc.). NOT ACCEPTED as credit for chemistry minors. Crosslisted as CHEM 301.

BIOL 304. Genetics. (2-2-3); I, II, III. *Prerequisite: BIOL 171.* Mendelian inheritance, chemical nature of DNA and chromosomes, regulation of gene expression, experimental techniques in genetics, human genetic disorders and population genetics.

BIOL 317. Principles of Microbiology. (2-4-4); I, II. *Prerequisites: BIOL 171 and CHEM 112 or CHEM 201.* Fundamental and applied aspects of microbiology. Prokaryotic cell structure and morphology, diversity, metabolism, and genetics emphasized; virology and immunology introduced. Microbiological techniques, scientific inquiry, bacterial identifications, and recombinant DNA technology stressed in the laboratory.

BIOL 380. Cell Biology. (2-2-3); I, II, III. *Prerequisites: BIOL 171 and CHEM 201 or 326, plus eight additional hours of biology.* Integration of biological, chemical, and physical aspects of the cell. Emphasis on molecular processes.

BIOL 402. Integrated Biology, Mathematics, Physical Sciences Teaching Methods. (2-2-3); I. *Prerequisites: Admission to the Teacher Education Program and completion of at least 20 hours in biology. Corequisite: BIOL 403.* Methods course for students who desire to become teachers of middle school science and secondary school biology, physical science or mathematics. The course provides integrated and content specific clinical experiences designed to prepare the student for student teaching and their subsequent role as a classroom teacher**. Crosslisted as MATH 402 and BIOL 402.**

BIOL 403. **Integrated Biology, Mathematics, and Physical Science Field Experiences in Teaching (1-4-3); I. *Prerequisites: Admission to the Teacher Education Program and completion of at least 20 hours in biology. Corequisite: BIOL 402E.*** Course provides structured field experiences for students

who desire to become teachers of secondary school biology, mathematics, or physical science. This course provides guided field experiences to acclimate the student into the culture of teaching. **Crosslisted as MATH 403E and SCI 403E.**

BIOL 461. Ecology. (2-2-3); I. ***Prerequisites: BIOL 210, BIOL 215, MATH 152 or higher, MATH 353, eight hours of college chemistry.*** Interrelations of organisms and environment. Some all-day field trips required.

BIOL 499D. Principles of Evolution. (3-0-3); I, II. ***Prerequisite: Senior standing with a completion of a minimum of 23 hours of biology from the biology major including BIOL/CHEM 301 and BIOL 380.*** Major principles of evolutionary biology are illustrated by using examples from molecular, cellular, and organismal biology; history of evolutionary theory, population genetics, natural selection, speciation, and macroevolutionary patterns. *This course satisfies the integrative component for general education for students completing a major in biology.*

Select any <u>one</u> of the following:

BIOL 437. Ornithology. (1-4-3); II. ***Prerequisite: BIOL 210.*** Anatomy, physiology, classification, and identification of birds; life histories, habits, migration, and economic importance of native species. Field trips required.

BIOL 450. Aquatic Entomology. (1-4-3); II. ***Prerequisite: BIOL 210.*** Survey of aquatic insects, their ecology, their biology, and how they are used as environmental biomonitors. Emphasis is placed on using taxonomic keys for insect identification and field sampling techniques. Extensive field work is expected, some all-day field trips required.

BIOL 505. Invertebrate Zoology. (1-4-3); II. ***Prerequisite: BIOL 210.*** Emphasis on the comparative morphology, physiology, ecology, and evolution of invertebrate phyla. The origin of major invertebrate groups and discussions over their relationships are also covered. Field work required.

BIOL 510. Limnology. (2-2-3); II. ***Prerequisites: BIOL 210, BIOL 215, MATH 152 or higher, eight hours of college chemistry.*** Ecology and biota of inland waters. Some all-day field trips required.

BIOL 530. Ichthyology. (1-4-3); I in even years. ***Prerequisite: BIOL 210.*** The anatomy, physiology, systematics, ecology, zoogeography, natural history, evolution and conservation of fishes. Emphasis on collection, identification, and classification of freshwater fishes native to eastern North America and marine fishes of the Atlantic and Gulf coasts. Field trips required.

BIOL 531. Herpetology. (1-4-3); II in odd years. ***Prerequisite: BIOL 210.*** The anatomy, physiology, taxonomy, ecology, distribution, natural history, and evolution of amphibians and reptiles. Emphasis on collection, identification, and classification of those herptiles found in eastern North America. Field trips required.

BIOL 535. Mammalogy. (1-4-3); I. ***Prerequisite: BIOL 210.*** Mammals of eastern North America with emphasis on mammals of southeastern North America. Taxonomy, adaptation, natural history, and methods of skin preparation. Field trips required.

ANNUAL UNIT PLAN-2002-2003

Biological and Environmental Sciences

MISSION:

The mission of the Department of Biological and Environmental Sciences is to provide progressive, flexible, and high quality programs of instruction allowing students successfully completing courses, units of instruction and degrees, to be competitive and productive professionals in modern society. Being a broad-based department, it supports other science based curricula, the University's general education studies, as well as specific pre-professional programs, teacher training, and the development of practicing biologists and environmental scientists. The faculty continually pursues academic education, professional development, and research in the belief that learning is a life-long process. Academic excellence and student success, excellent advising, support of enrollment and retention programs, and the development of productive partnerships are departmental goals that reflect a commitment to quality academic programs and contribute significantly to the Department's mission.

Section I. Support of University Strategic Plan, *Pride & Promise*-2001-2006.

The Unit Plan of the Department encompasses Goal 1 (Academic Excellence and Student Success), Goal 2 (Excellence in Student Support), Goal 3 (Enrollment Growth and Retention Gains), and Goal 5 (Enhanced Reputation and Productive Partnerships) through the major Goals of the Department's Unit Plan and the Strategic Activities. The major emphasis of this narrative outline will be on academic excellence and student success.

Goal 1: Academic Excellence and Student Success

Objective 1.1 – Provide quality undergraduate and graduate academic learning experiences for all students.

Strategy: 1.1.1 – Reevaluate and assess the curricular requirements for the biology major and the areas of concentrations for environmental sciences and biology teaching.

The Department performed a folio assessment matrix on core concepts and compared these to two national assessment exams, the Major Field Test and the PRAXIS II. Results indicated that there were two weaknesses in the non-teaching major and teaching area, physiology and evolution, and the curriculum has been adjusted by including a course in physiology in the biology teaching core and strengthening the evolution covered in the capstone course. Recent catalog revisions have strengthened the undergraduate biology curriculum, and the realignment of course offerings in the biology teaching area of concentrations has been

completed. Finally, the biology teaching area has been reviewed as part of the NCATE requirements.

Strategy: 1.1.2 – Recruit outstanding faculty as teachers and researchers and provide them with excellent mentors from the senior faculty.

The six new Standing One Faculty hired between the years of 1997 – 2001 have tenured mentors within the department assigned and actively working with their development. Their teaching is being evaluated and they are improving to the high level of expectation of the Department. All are actively engaged in research involving students at either the graduate or undergraduate level. All new faculty have been trained in proper advising procedures and have been assigned a specialty area within BES.

Strategy: 1.1.3 – Provide faculty enrichment through professional development activities to enhance individual academic training.

The Department will continue to support professional development activities including professional society activities, consulting, basic and applied laboratory and field investigations.

Strategy: 1.1.4 – Establish clear student outcome goals for all academic programs and effectively utilize outcomes assessments to develop continuous, quality improvement goals for all programs.

The Program Review, submitted in October, 1998 relates to specific outcome goals for the three undergraduate and one graduate program(s) assessed. The next Program Review will be in the fall of 2002, and programs within the unit are assessing student learning outcomes and program strengths and weaknesses. The Department of BES will continue to use the national Major Field Test to evaluate biology content of our graduating seniors. Results this past year show that students scored at the 70^{th} percentile, but for the last three years the average was at the 85^{th} percentile for Biology majors in all areas tested. Environmental Science students scored at the 78^{th} percentile in ecology and evolution. Several Departmental courses and seminars require oral and written performances, and upper division courses are encouraged to include both oral and/or written components. The Departmental capstone course is assessing student content knowledge through written and oral evaluations communication skills, and a lab skill assessment to measure “what a biology graduate should be able to do” when they leave the institution.

Strategy: 1.1.5 – Provide a technological, quality physical environment in both lecture and laboratory settings, expose students to modern instrumentation and equipment.

The facilities are in very good condition and students are exposed to excellent quality equipment and instrumentation. A ten-year plan for laboratory equipment replacement has been developed for prioritizing the systematic replacement of technology and instruments as they wear out. Several items have already been replaced through this plan. All five of the lecture rooms in BES have been equipped with computer connected projection systems. Two laboratories now have computers for student experimentation and research applications.

Objective 1.2 – Achieve goals and objectives of the Teacher Education Reform.

Strategy: 1.2.1 – Increase faculty participation in teacher education activities and in the secondary school systems of our service region.

The Department of BES had two faculty members in the spring semester of 2002 participating in the "Professors in the Schools" program, the university-wide initiative of the Teacher Education Reform effort. This collaborative effort will strengthen the relationship between the school systems and teachers within our service region. This joint venture will provide an opportunity to reduce the problems of the students' transition into MSU. Five other faculty members gave individual presentations in area high schools.

Strategy: 1.2.2 – Increase collaborative efforts in the preparation of pre-service teachers.

The Departments of BES, Physical Sciences, and Mathematics have completed the process leading to the development of two new and innovative courses for students majoring in biology, physical sciences, and mathematics teaching. These courses will be cross-listed and team taught between faculty of these three departments and will provide opportunities for pre-service teachers to gain pedagogical content knowledge from the enriched environment of an interdisciplinary approach to teaching and learning. These courses (BIOL, MATH, SCI 402 and 403) are currently (fall 2002) being taught for the first time.

Objective 1-3. Establish new endowments and ensure optimal use of all endowments.

Strategy: 1-3-1 – Support existing endowments so that they reach the spendable income level and can be effectively utilized.

Recent scholarship endowments have reached the spendable level for dispersion. The Charles M. Rhodes Endowment for Science Fellowship

in biology for African-American graduate students is expected to be available for use in 2003. The Matt Pryor Research Endowment has reached a fundable level, thus will be available for supporting student research in 2003. The Allen Lake Professorship is also approaching a level of utilization. The Robert L. Coleman Endowment for Sciences Enhancement, which supports a professorship in biology, was awarded for the second time in 2002 and will continue to support research efforts among the current BES faculty.

Objective 1-4. Increase international experiences for students and faculty.

Strategy: 1.4.1 – Provide opportunities for students and faculty to be exposed to teachers from other countries.

In the fall of 2001, a visiting professor from Nigeria, finished the calendar year instructing students in BES and gaining new knowledge in biology and more specifically in his field of microbiology. Also, in the fall semester of 2001, a visiting Chinese scholar had the opportunity to engage students and faculty in both biochemistry and microbiology.

Strategy: 1.4.2 – Encourage students and faculty to participate in courses offered abroad.

Three students took advantage of the Cooperative Center for Students Abroad (CCSA) Program and took courses in Australia in 2001.

Goal 2. Excellence in Student Support

Objective 2.1 – Implement a comprehensive academic advising and career counseling system for all students including non-traditional and distance learning students.

Strategy: 2.1.1 – Maintain knowledgeable academic and career advising system, academic clubs, and expose students to professionals in the field.

BES faculty will maintain and constantly upgrade advising knowledge in regard to and career opportunities. Several advisors have made visits to professional schools this past year to support this strategy. Advisors are required to assess student performances and advise accordingly. The Department has active clubs for majors in pre-medicine, pre-dentistry, pre-physician assistant, environmental science and biology. Scientists are invited to the Department to present research in a seminar series offered each spring semester, and health professionals associated with professional schools (Medical, Pharmacy, Dentistry, and Chiropractic

are brought to campus to explain the acceptance requirements for their programs and answer students questions and concerns.

Goal 3. Enrollment Growth and Retention Gains

Objective 3.1 – Determine and implement strategies to position the University to meet enrollment and retention goals.

Strategy: 3.1.1 – Improve the quality and diversity of students entering the BES programs.

As we strengthen our ties to the secondary school systems, BES faculty will become a recruiting resource and encourage high caliber students to enroll in our programs. A program will also be put into place in which BES faculty travel to schools in the region and present an exciting laboratory session and talk about the successes of the Department. Also, letters were written to students with ACT scores >24 and already at MSU, but with undeclared majors. Four of these high quality students were recruited, and this process will continue in the future. In 2003, the Charles M. Rhodes Endowment for Science Fellowships will become available to African-American graduate students. We will be contacting schools with a predominant African-American population and marketing this award.

Strategies 3.1.2 – Develop a comprehensive retention plan to increase the success of under-prepared students entering into the BES programs.

A special section of a 3 hour introductory general biology course (BIOL 160) has been dedicated for science majors who have an ACT less than 20 or after attending the first half of the core introductory biology course (BIOL 171, 4 hours) find themselves under-prepared. These students may transfer into BIOL 160 and thereby still be making progress and having their course load decreased only by 1 credit hour. This course is currently in its third year of operation. In the fall semester of 2001 and the spring semester of 2002, 146 students availed themselves of this opportunity, and 76 received grades of C or higher. The Department is currently developing a tracking process to determine how those students perform in subsequent BES courses, and if they transfer to other programs, or leave the University. All professors who teach these introductory majors courses hold individual review sessions weekly to enhance the students success in these sections. Additionally, five MSU 101 sections, which are offered to students majoring in BES programs, are used to identify and resolve early problems in freshman students, as well as thoroughly examine the specific program in BES they have selected.

FOR

Biology	Bachelor of Science
(Instructional Degree Program)	(Degree Level)
2001-2002	September 12, 2002
(Assessment Period Covered)	(Date Submitted)

Expanded Statement of Institutional Purpose Linkage:

Institutional Mission Reference:
As a principal degree program of the university, the BS in Biology supports the major focus of the university in providing undergraduate education in the biological sciences.

College/University Goal(s) Supported:
All graduates majoring in Biology at the baccalaureate level will have developed a depth of understanding of biology.

Intended Educational (Student) Outcomes:

1. Students completing the program will have command of biological concepts presented in the core course disciplines.

2. Students will understand the scientific method of inquiry relevant to the biological sciences. They will also be able to communicate (oral and written) this scientific information.

3. Students completing pre-professional tracts will be competitive in gaining acceptance into professional programs

ASSESSMENT REPORT
FOR

Biology	**Bachelor of Science**
(Instructional Degree Program)	**(Degree Level)**
2001-2002	**September 12, 2002**
(Assessment Period Covered)	**(Date Submitted)**

Intended Educational (Student) Outcome: *NOTE: There should be one form C for each intended outcome listed on form B. Intended outcome should be restated in the box immediately below and the intended outcome number entered in the blank spaces.*

____ 1. Students completing the program will have command of biological concepts presented in the core course disciplines.

First Means of Assessment for Outcome Identified Above:

____1a. Means of Program Assessment & Criteria for Success: Students will take the MFAT covering biology as part of the Capstone course requirements. An average total score for students on this test that is at or near the 50th percentile will be acceptable.

____1a. Summary of Assessment Data Collected:
The MFAT was administered in the Fall and Spring 2002 Capstone courses. The average total score for the 36 students was 159. This total score average has a rank of 70th percentile (comparison to the 184 institutions that administered the MFAT) which exceeds the Department's goal of 50th percentile.

____1a. Use of Results to Improve Instructional Program: This criterion has been met, so no action is needed at this time. Monitoring of this criterion will continue.

Second Means of Assessment for Outcome Identified Above:

____1b. Means of Program Assessment & Criteria for Success: The average subscore performance on each of the four sections (1. cell biology, 2. molecular biology & genetics, 3. organismal biology and 4. population biology, evolution & ecology) of the MFAT that is at or near the 50th percentile will be acceptable.

____1b. Summary of Assessment Data Collected: Average subscores are: cell biology = 63 (89th percentile), molecular biology & genetics = 56 (54th percentile), organismal biology = 55 (55th percentile) and population biology, evolution & ecology = 58 (72nd percentile).

____1b. Use of Results to Improve Instructional Program: This criterion has been met, so no action is needed at this time. Monitoring of this criterion will continue.

ASSESSMENT REPORT
FOR

Biology	Bachelor of Science
(Instructional Degree Program)	**(Degree Level)**
2001-2002	**September 12, 2002**
(Assessment Period Covered)	**(Date Submitted)**

Intended Educational (Student) Outcome:

NOTE: There should be one form C for each intended outcome listed on form B. Intended outcome should be restated in the box immediately below and the intended outcome number entered in the blank spaces.

____2. Students will understand the scientific method of inquiry relevant to the biological sciences. They will also be able to communicate (written and oral) this scientific information.

First Means of Assessment for Outcome Identified Above:

____**2a. Means of Program Assessment & Criteria for Success:** As part of the Capstone course, students will be assigned activities which test their ability to understand the scientific method of inquiry relevant to biology and communicate this scientific information. An average evaluation of student performance on these assignments (written and oral) must be at or above 70%.

____**2a. Summary of Assessment Data Collected:** In the Capstone course, students were assessed through three different type of activities. PowerPoint oral presentations emphasizing scientific inquiry were evaluated at the mean score of 87.5%. All 32 students who gave presentations achieved scores greater than the 70% minimum requirement. Term papers emphasizing scientific inquiry were evaluated at the mean score of 87.8%. All 32 students who submitted term papers achieved scores greater than the 70% minimum requirement. Students were also assessed in their ability to perform a range of common laboratory procedures such as using a microscope, using a spectrophotometer, and preparing serial dilutions. Students were evaluated at the mean score of 91.4% and all 32 students achieved scores greater than the 70% minimum requirement.

____**2a. Use of Results to Improve Instructional Program:** This criterion has been met. Monitoring of this criterion will continue. During the last assessment period it was suggested that, while the average student performance on these assignments was at the expected level, the program should provide additional opportunities for students to strengthen their oral communications skills. This suggestion has been implemented by the addition of oral presentations as part of BIOL 215. It is too early to determine the impact of this change on student performance in the Capstone course.