

Content Guidelines/Standards Matrix

College/University The University of Detroit Mercy **Code** DA
Source of Guidelines/Standards Michigan State Board of Education, August 2002 **Program/Subject Area** Biology

Levels of proficiency are identified as follows:

A – Awareness

The biology teacher recognizes/recalls the existence of different aspects of biological science and related teaching strategies.

B – Basic Understanding

The biology teacher articulates knowledge about biological science and related instructional and assessment strategies. The biology teacher demonstrates proficiency in using the knowledge at a fundamental level of competence acceptable for teaching.

C – Comprehensive Understanding

The biology teacher is able to apply broad, in-depth knowledge of the different aspects of biological science in a variety of settings. (This level is not intended to reflect mastery; all teachers are expected to be lifelong learners.)

DIRECTIONS: List required courses on matrix and provide additional narrative to explain how standards are met. If electives are included, they should be clearly indicated. Adjust size of cells as needed.

		Narrative Explaining how Required Courses and/or Experiences Fulfill the Standards for Program	
No.	STANDARD/GUIDELINE		
	Submit a narrative that explains how this program:		
A.	uses the Michigan Curriculum Framework K-12 Science Content Standards and Benchmarks as the critical foundation for teacher preparation, ensuring that Biology teachers have the content knowledge and the ability to teach this curriculum; and	<p>Secondary Minor:</p> <p>The course requirements were specifically designed to provide students with the necessary diversity to provide them with proficiency within the field of biology, as well as provide flexibility to allow students to choose specific areas of interest or expertise.</p> <p>Education students are introduced to the <i>Michigan Curriculum Framework K-12 Science Content Standards and Benchmarks</i> in EDU 400 Introduction to Education. Throughout the semester, the Secondary Teacher Education students observe in a 9-12 grade classroom of the major and/or minor for which they are considering certification. They conduct a field study and write up their findings as a case study. Education courses require students to use the appropriate <i>MCF</i> standards to complete projects, papers, unit and lesson plans. Candidates with a Biology minor will enhance their knowledge of science standards in <i>MCF</i> in EDU 469 Curriculum and Methods of Teaching in Middle and Secondary Schools. The course is designed to increase students' repertoires of instructional strategies. Among the assignments, students are required to create lessons using the appropriate <i>MCF</i> standards and benchmarks. The directions and assessment rubrics require exact <i>MCF</i> references. Additional opportunities for Biology minors to work with the <i>MCF</i> occur in EDU 475 Curriculum and Methods of Teaching in Middle and Secondary Schools II: Science. Students write papers, make presentations, and create projects, units and lesson plans that must reference the appropriate <i>MCF</i> sections. During Student Teaching, EDU 490 Student Teaching in the Secondary Schools, students are expected to work with the secondary school's curriculum and present lessons designed to help secondary students learn the concepts and skills required for them in the <i>MCF</i>.</p>	

001111 1	Narrative Explaining how Required Courses and/or Experiences Fulfill the Standards for Program	
NO.	Standard/Guideline	
A (cont.)	uses the Michigan Curriculum Framework K-12 Science Content Standards and Benchmarks as the critical foundation for teacher preparation, ensuring that Biology teachers have the content knowledge and the ability to teach this curriculum; and	<p>Secondary Major:</p> <p>The required courses were specifically designed to provide students with the necessary diversity to provide them with proficiency within the field of biology, as well as provide flexibility to allow students to choose specific areas of interest or expertise.</p> <p>Education students are introduced to the <i>Michigan Curriculum Framework K-12 Science Content Standards and Benchmarks</i> in EDU 400 Introduction to Education. Throughout the semester, the Secondary Teacher Education students observe in a 9-12 grade classroom of the major and/or minor for which they are considering certification. They conduct a field study and write up their findings as a case study. Education courses require students to use the appropriate <i>MCF</i> standards to complete projects, papers, unit and lesson plans. Candidates with a Biology minor or major will enhance their knowledge of science standards in <i>MCF</i> in EDU 469 Curriculum and Methods of Teaching in Middle and Secondary Schools. The course is designed to increase students' repertoires of instructional strategies. Among the assignments, students are required to create lessons using the appropriate <i>MCF</i> standards and benchmarks. The directions and assessment rubrics require exact <i>MCF</i> references. Additional opportunities for Biology majors to work with the <i>MCF</i> occur in EDU 475 Curriculum and Methods of Teaching in Middle and Secondary Schools II: Science. Students write papers, make presentations, and create projects, units and lesson plans that must reference the appropriate <i>MCF</i> sections. During Student Teaching, EDU 490 Student Teaching in the Secondary Schools, students are expected to work with the secondary school's curriculum and present lessons designed to help secondary students learn the concepts and skills required for them in the <i>MCF</i>.</p>

Narrative Explaining how Required Courses and/or Experiences Fulfill the Standards for Program			
NO.	Standard/Guideline	Secondary Minor	Secondary Major
B.	develops an understanding of the interconnectedness of all science, including the major concepts of chemistry, the earth/space sciences, and physics, and relates this understanding to the teaching of biology and the life sciences.	<p>Supportive courses:</p> <p>CHM 107/110 & CHM 108/111, General Chemistry I & II lecture/lab. CHM 227/228 Organic Chemistry I lecture/lab.</p> <p>The courses listed above, especially those above the 100-level, are interwoven with connections between the sciences, and to the relevance of the subject matter to everyday life. Higher level courses routinely involve at least one presentation by students to their peers and the teaching faculty member.</p> <p>As discussed in Section A, the students continue to demonstrate their understanding of the <i>MCF</i> standards and benchmarks in their sequence of Education courses, especially in EDU 400, 469, 475, and during their student teaching.</p>	<p>Supportive Courses:</p> <p>CHM 107/110, CHM 108/111, CHM 227/228, MTH 140 Elementary Functions, BIO 290 Biometric lecture. Discovery based exposure to the statistic science related to biology. PHY 130/131 General Physics I lecture/lab, PHY 132/133 General Physics II lecture/lab.</p> <p>The courses listed above, especially those above the 100-level, are interwoven with connections between the sciences, and to the relevance of the subject matter to everyday life. Higher level courses routinely involve at least one presentation by students to their peers and the teaching faculty member.</p> <p>As discussed in Section A, the students continue to demonstrate their understanding of the <i>MCF</i> standards and benchmarks in their sequence of Education courses, especially in EDU 400, 469, 475, and during their student teaching.</p>

			Narrative Explaining How Required Course and/or Experiences Fulfill the Standards for Program	
No.	Standard/Guideline	Level of Proficiency	Secondary Minor	Secondary Major
1.0	understand the life sciences to include cellular functioning, the organization of living things, concepts of heredity, evolutionary changes, and ecological systems, as illuminated within Strand III of the Science Content Standards and Benchmarks found in the Michigan Curriculum Framework;		<p>BIO 103 Environmental Science. Topic-oriented course examining interrelated problems of population, food supply and demand, pollution, and water resources;</p> <p>BIO 120/121 General Biology I lecture/lab. Emphasis on structure/function at a molecular level via analysis of basic principles, demonstrations and research orientation.</p> <p>BIO 122/123 General Biology II lecture/lab; Continuation of BIO 120/121 focusing on the organismal and environmental levels; BIO 451/452 Plant form & function lecture/lab.</p> <p>Explores diversity of plant kingdom's diversity of anatomy and physiology, such as photosynthesis, water relations, morphogenesis, growth, and taxonomy via demonstrations, research and discovery based labs; (BIO 420 or BIO 448/449)</p> <p>BIO 420 Evolution. Lecture/discussion of organic evolution via examination of driving forces for evolution that cause biodiversity; BIO 448/449 Ecology lecture/lab. Overview of biological and physical processes in ecology via combined lecture, research, field experimentation, and data analysis;(One of BIO 270 or BIO 421/421 or BIO 474/475);</p> <p>BIO 270 Genetics. Lecture and mathematical/statistical analysis of molecular genetics, inheritance, and population study; BIO421/422 Microbiology lecture/lab. Biological survey of microbes employing demonstration and specialized techniques specific to the field. BIO 474/475 Cell & Molecular Biology lecture/lab. Basic concepts and experimentation using principles of biochemistry and cytochemistry in cellular function and interaction.*</p> <p><i>*When these Biology classes are listed for Standards 3 through 11, these explanations are to be applied. Thank you.</i></p> <p>As explained in Standards A and B, the students use the <i>MCF</i> regularly in their Education courses, especially in writing lesson and unit plans and preparing their personal "Science/Management Kit" folders in their science methods</p>	<p>BIO 120/121, BIO 122/123, BIO 451/452, BIO 499 Interactive seminar course directed by faculty and enacted by students via professional presentation and publication formats.*</p> <p><i>*When these Biology classes are listed for Standards 3 through 11, these explanations are to be applied. Thank you.</i></p> <p>BIO 260/261 or BIO 463/464</p> <p>BIO 420 OR BIO 270 OR BIO 375, AND BIO 448/449 OR BIO 421/422 OR BIO 474/475.</p> <p>TOTAL 34 including 6 credits of lab</p> <p>Electives: Described below.</p> <p>BIO 284/285 Animal Behavior w/ lab; BIO 350/351 Histology w/ lab; BIO 365 Human Anatomy; BIO 370/371 Embryology w/ lab; BIO 425 Immunology; BIO 441 Public Health Microbiology; BIO 498 Pathophysiology.</p> <p>As explained in Standards A and B, the students use the <i>MCF</i> regularly in their Education courses, especially in writing lesson and unit plans and preparing their personal "Science/Management Kit" folders in their science methods course, EDU 475.</p>

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			course, EDU 475 .	
2.0	construct new knowledge by using research, reading and discussion, and reflect in an informed way on the role of science in human affairs; and		<p>BIO 103 Environment Science lecture. Topic oriented course providing environmental information for making intelligent choices for scientific, social, political and economic issues.</p> <p>In EDU 440 School and Society and EDU 514 Society and Education, students reinforce their ability to construct new knowledge about Education and society through research strategies similar to those practiced in biological writing.</p>	<p>BIO 499 Biology and Social Issues. Senior Seminar, in which students learn to research biological literature, read and interpret original resources, and integrate the information into a review article. The second objective of the course is to understand the ways in which the discipline of biology has an impact on society and the ways in which society has an impact upon science.</p> <p>In EDU 440 School and Society and EDU 514 Society and Education, students reinforce their ability to construct new knowledge about Education and society through research strategies similar to those practiced in biological writing.</p>
3.0	understand and develop the major concepts and principles of biology, including concepts in:			
3.1	Cellular Function, including			

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3.1.1	cell theory	B	BIO 120/121 General Biology I lecture/lab, foundational course w/ research-based lab experiences	BIO 120/ 121 General Biology I lecture/lab, foundational course w/ research-based lab experiences; BIO 451/452 Plant Form & Function w/lab; BIO 448/449 Ecology w/ lab, research-based lab experiences; BIO 474 Cell & Molecular Biology, experimental methodology course.
3.1.2	cell types	B	BIO 122/123 General Biology II w/ lab	BIO 122/123 General Biology II w/ lab; BIO 474/475 Cell & Molecular Biology w/ lab; BIO 260/261 Comparative Anatomy w/lab or BIO 463/464 Physiology w/ lab.
3.1.3	cell structure and function	C	BIO 120 General Biology I; BIO 451 Plant Form & Function.	BIO 120 General Biology I; BIO 421 Microbiology; BIO 451 Plant Form & Function; BIO 463/464 Physiology w/ lab; BIO 474 Cell & Molecular Biology.
3.1.4	protein synthesis	C	BIO 120 General Biology I	BIO 120 General Biology I; BIO 474 Cell & Molecular Biology.
3.1.5	cell division (mitosis and meiosis)	C	BIO 121 General Biology Lab I	BIO 121 General Biology Lab I; BIO 421 Microbiology.
3.2	Organization of Living Things, including			
3.2.1	life cycles (including sexual and asexual reproduction)	C	BIO 120/121 &122/123 General Biology lecture w/ labs I & II, survey reproductive cycles among all representative living groups; BIO 451 Plant Form & Function.	BIO 120/121 &122/123 General Biology lecture w/ labs I & II, survey reproductive cycles among all representative living groups; BIO 260/261 Comparative Anatomy, gross comparative level; BIO 421 Microbiology; BIO 451 Plant Form & Function.

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3.2.2	Systems	C	BIO 122/123 General Biology II; BIO 451 Plant Form and Function.	BIO 122/123 General Biology II; BIO 260/261 Comparative Anatomy; BIO 451 Plant Form and Function.
3.2.3	classification	C	BIO 120/121 & 122/123 General Biology lecture w/ labs I & II; BIO 451 Plant Form & Function.	BIO 120/121 & 122/123 General Biology lecture w/ labs I & II; BIO 260/261 Comparative Anatomy w/ lab or BIO 463/464 Physiology w/lab; BIO 451 Plant Form & Function.
3.2.4	growth and development	B	BIO 120 & 122 General Biology lectures I & II, foundational survey; BIO 451 Plant Form & Function.	BIO 120 & 122 General Biology lectures I & II, foundational survey; BIO 260/261 Comparative Anatomy w/ lab or BIO 463/464 Physiology w/lab;; BIO 451 Plant Form & Function.
3.2.5	photosynthesis	C	BIO 120 General Biology I lecture; BIO 451 Plant Form & Function	BIO 120 General Biology I lecture; BIO 451 Plant Form & Function; BIO 474 Cell & Molecular Biology, molecular level involving model systems.
3.2.6	cellular respiration	C	BIO 120 General Biology I	BIO 120 General Biology I; BIO 474 Cell & Molecular Biology.
3.2.7	living and nonliving	C	BIO 120/121 & 122/123 General Biology lecture w/ labs I & II.	BIO 120/121 & 122/123 General Biology lecture w/ labs I & II; BIO 290 Biometrics; BIO 448/449 Ecology w/ lab; BIO 474/475 Cell & Molecular Biology w/ lab.
3.3	Concepts of Heredity, including			
3.3.1	Mendelian genetics	C	BIO 120/121 General Biology I.	BIO 108 Science of Life; BIO 120/121 General Biology I; BIO 474 Cell & Molecular Biology.
3.3.2	molecular genetics (structure of DNA)	C	BIO 120 General Biology I	BIO 120 General Biology I; BIO 421/422 Microbiology; BIO 463 Physiology; BIO

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				474/475 Cell & Molecular Biology.
3.3.3	modern genetics (electrophoresis, genetic engineering, DNA fingerprinting, etc.)	C	BIO 120 General Biology I.	BIO 120 General Biology I; BIO 270 Genetics; BIO 421/422 Microbiology; BIO 474 Cell & Molecular Biology.
3.3.4	population genetics	B	BIO 120 & 122 General Biology I & II	BIO 120 & 122 General Biology I & II; BIO 474/475 Cell & Molecular Biology w/ lab.
3.4	Evolutionary Changes, including			
3.4.1	diversity/speciation	B	BIO 121 General Biology I lab; BIO 122 General Biology II; BIO 452 Plant Form & Function lab.	BIO 108 Science of Life; BIO 121 General Biology I lab; BIO 122 General Biology II; BIO 260/261 Comparative Anatomy w/ lab or BIO 463/464 Physiology w/lab;; BIO 420 Evolution; BIO 448/449 Ecology w/ lab; BIO 452 Plant Form & Function lab.
3.4.2	adaptation and natural selection	C	BIO 122 General Biology II	BIO 122 General Biology II; BIO 260/261 Comparative Anatomy w/ lab or BIO 463/464 Physiology w/lab;; BIO 448/449 Ecology w/ lab.
3.4.3	fossils/ancient life	A	BIO 121 General Biology lab I; BIO 122 General Biology lecture I	BIO 121 General Biology lab I; BIO 122 General Biology lecture I; BIO 260/261 Comparative Anatomy w/ lab or BIO 463/464 Physiology w/lab;; BIO 452 Plant Form & Function lab.

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3.4.4	extinction	B	BIO 122 General Biology lecture II	BIO 108 Science of Life; BIO 122 General Biology lecture II; BIO 260/261 Comparative Anatomy w/ lab or BIO 463/464 Physiology w/lab.
3.5	Ecological Systems, including			
3.5.1	community relationships, including predator/prey and symbiosis	C	BIO 448/449 Ecology w/ lab.	BIO 421 Microbiology; BIO 448/449 Ecology w/ lab.
3.5.2	population	B	BIO 448/449 Ecology w/ lab.	BIO 448/449 Ecology w/ lab.
3.5.3	transfer of energy (food chains/webs)	C	BIO 120 General Biology I w/ lab.	BIO 120 General Biology I w/ lab
3.5.4	biogeochemical cycles	C	BIO 448/449 Ecology w/ lab.	BIO 108 Science of Life; BIO 421 Microbiology; BIO 448/449 Ecology w/ lab.
3.5.5	human impact	C	BIO 448/449 Ecology w/ lab.	BIO 448/449 Ecology w/ lab.
3.6	Human Biology, including			
3.6.1	anatomy and physiology	C	BIO 122/123 General Biology II w/ lab	BIO 122/123 General Biology II w/ lab; BIO 421/422 Microbiology w/ lab; BIO 260/261 Comparative Anatomy or BIO 463/464 Physiology.
3.6.2	disease and immunology	B	BIO 122/123 General Biology II w/ lab.	BIO 122/123 General Biology II w/ lab; BIO 463 Physiology.

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3.6.3	health habits	B	EDU 473 Curriculum and Methods of Teaching Secondary Science: See Course Goal #8 and topics for Week of Feb. 12	EDU 473 Curriculum and Methods of Teaching Secondary Science: See Course Goal #8 and topics for Week of Feb. 12
3.6.4	resource management	B	BIO 103 Environmental Science.	BIO 499 Biology and Social Issues.
3.6.5	human population growth and diversity	B	BIO 103 Environmental Science; BIO 122 General Biology II lecture.	BIO 122 General Biology II lecture; BIO 499 Biology and Social Issues.

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	The preparation of high school biology teachers will enable them to:		
4.0	develop an understanding and appreciation for the nature of scientific inquiry;	<p>BIO 103 Environmental Science; BIO 120 & 122 General Biology I; BIO 451 Plant Form and Function. The classroom activities and laboratory experiences in these Biology courses are designed to promote inquiry-based investigations.</p> <p>The assignments, projects, presentations, discussions, and other instructional practices in the Education courses continue the candidates' involvement in scientific inquiry. They graduate understanding that decision-making throughout the field of education must be data driven.</p>	<p>BIO 120 & 122 General Biology I; BIO 290 Biometrics; BIO 448/449 Ecology w/ lab; BIO 451 Plant Form and Function. The classroom activities and laboratory experiences in these Biology courses are designed to promote inquiry-based investigations.</p> <p>The assignments, projects, presentations, discussions, and other instructional practices in the Education courses continue the candidates' involvement in scientific inquiry. They graduate understanding that decision-making throughout the field of education must be data driven.</p>
5.0	relate the concepts of biology to contemporary, historical, technological and societal issues; in particular, relate concepts of biology to current controversies, such as those around cloning, medical	<p>BIO 103 Environmental Science; BIO 121 General Biology I lab; BIO 451 Plant Form and Function.</p> <p>The relationship of biological concepts to societal issues, especially in regard to health related issues, is learned through reading text and selected articles, lectures and discussions, in class exercises, computer and WEB based projects, a short paper, and quizzes and examinations in BIO 103 Environmental Science. CHM 108 General Chemistry, one of the required supportive classes, enhances students'</p>	<p>BIO 121 General Biology I lab; BIO 290 Biometrics; BIO 448/449 Ecology w/ lab; BIO 451 Plant Form and Function; BIO 499 Biology and Social Issues.</p> <p>In BIO 122 General Biology II and its laboratory class (BIO 123), students reach an understanding of human's place in the ecosystem. CHM 108 General Chemistry, one of the required</p>

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	research, and genetically-modified food, as well as other issues;	<p>understanding. In BIO 122 General Biology II and its laboratory class (BIO 123), students reach an understanding of humans' place in the ecosystem.</p> <p>As the discovery of new biological concepts reaches the public (e.g. pharmaceutical) and implementation (e.g. animal cloning, bio-chemical attacks) occurs, they impact society, the schools, and what is taught to elementary and secondary students. Through the interactive lecture and discussion format of EDU 440 School and Society and EDU 514 Society and Education, study of the impact of such issues on school finance and curriculum will facilitate the candidates' understanding of the connection of biological and bio-chemistry concepts to current and other issues.</p>	<p>supportive classes, enhances students' understanding.</p> <p>In BIO 499, students learn to research biological literature and how to use it to review a biological related article. They also consider the ways in which society has an impact upon science and articulate their own value systems with regard to scientific issues while considering other views.</p> <p>As the discovery of new biological concepts reaches the public (e.g. pharmaceutical) and implementation (e.g. animal cloning, bio-chemical attacks) occurs, they impact society, the schools, and what is taught to elementary and secondary students. Through the interactive lecture and discussion format of EDU 440 School and Society and EDU 514 Society and Education, study of the impact of such issues on school finance and curriculum will facilitate the candidates' understanding of the connection of biological and bio-chemistry concepts to current and other issues.</p>
6.0	apply mathematics, including statistics, to investigations in biology/life sciences and the analysis of data;	<p>BIO 121 General Biology I lab</p> <p>Use of quantitative mathematical analysis occurs in the listed classes (homework assignments, in-class experiments and exercises, projects, papers, exams) with a variety of biology/life topics.</p> <p>Education courses continue the candidates' development of their ability to analyze data to inform their teaching practices. In EDU 475 Curriculum and Methods of Teaching in Secondary Schools II: Science, their projects and papers must include demonstration of their use of data for teaching and</p>	<p>BIO 121 General Biology I lab;</p> <p>BIO 290 Biometrics;</p> <p>BIO 421/422 Microbiology w/ lab;</p> <p>BIO 448/449 Ecology w/ lab</p> <p>Use of quantitative mathematical analysis occurs in the listed classes (homework assignments, in-class experiments and exercises, projects, papers, exams) with a variety of biology/life topics.</p> <p>Education courses continue the candidates' development of their ability to analyze data to</p>

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		assessing their secondary students.	inform their teaching practices. In EDU 475 Curriculum and Methods of Teaching in Secondary Schools II: Science, their projects and papers must include demonstration of their use of data for teaching and assessing their secondary students.
7.0	understand and promote the maintenance of a safe science classroom as identified by the Council of State Science Supervisors, and including the ethical and appropriate use and care for living organisms and scientific equipment, and the safe storage, use, and disposal of chemicals;	<p>The unique requirements for safety in a Biology classroom and laboratory are studied and demonstrated in the science methods course, EDU 475 Curriculum and Methods of Teaching Secondary Science (See Course Goal #8 and topics for Week of Feb. 12).</p> <p>During their Student Teaching experience, candidates are expected to follow and enforce the policies of the school to which they are assigned.</p>	<p>The unique requirements for safety in a Biology classroom and laboratory are studied and demonstrated in the science methods course, EDU 475 Curriculum and Methods of Teaching Secondary Science (See Course Goal #8 and topics for Week of Feb. 12).</p> <p>During their Student Teaching experience, candidates are expected to follow and enforce the policies of the school to which they are assigned.</p>
8.0	locate resources, design and conduct inquiry-based open-ended investigations in biology, interpret findings, communicate results, and make judgments based on evidence;	<p>BIO 121 General Biology I lab;</p> <p>In BIO 121, students are required to write their experiments on the exercise sheets in their manuals. The experiment on cold acclimation must be written as a formal lab report according to a rubric.</p> <p>In order for Teacher Education candidates to teach these skills to their secondary students, they must attain the research skills unique to biology in the Biology classes. The Education courses require students to use basic research skills to investigate educational issues and to create curriculum, units, and lessons for their potential secondary students (EDU 400, 469, 475) and to demonstrate their</p>	<p>BIO 121 General Biology I lab; BIO 448/449 Ecology w/ lab;</p> <p>In BIO 121, students are required to write their experiments on the exercise sheets in their manuals. The experiment on cold acclimation must be written as a formal lab report according to a rubric. In BIO 448/449, students study concepts in the discipline of ecology, design an ecological study using scientific methods, do a scientific literature search, perform appropriate statistical analysis of data, and write scientific research papers.</p> <p>In order for Teacher Education candidates to teach</p>

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		ability to teach the skills during their Student Teaching semester. The Education Department’s “Conceptual Framework” clearly states that all graduates will be life long learners and professional educators who are scholars, inquirers, and ethical professionals.	these skills to their secondary students, they must attain the research skills unique to biology in the Biology classes. The Education courses require students to use basic research skills to investigate educational issues and to create curriculum, units, and lessons for their potential secondary students (EDU 400, 469, 475) and to demonstrate their ability to teach the skills during their Student Teaching semester. The Education Department’s “Conceptual Framework” clearly states that all graduates will be life long learners and professional educators who are scholars, inquirers, and ethical professionals.
9.0	demonstrate competence in the practice of teaching through investigative experiences by demonstrating the application of the scientific processes, and in assessing student learning through multiple processes;	<p>BIO 121 General Biology I lab; BIO 451 Plant Form and Function.</p> <p>The mixture of lecture, lab, small group learning, problem solving, library research, and student presentations in the Biology courses demonstrates these principles.</p> <p>The mission of the UDM Teacher Education Program emphasizes the conceptualization of the role of the teacher as having three dimensions: developing teachers who behave professionally as scholars, inquirers, and moral agents. The Education courses seek to prepare students who are skilled in decision-making and in ethical, critical, and reflective thinking (inquirers) and who use the research-knowledge base for teaching, integrated with the liberal arts and sciences disciplines (scholars). As explained in Standards A, B, 7.0 and 8.0 of this matrix plus in Part C Varied Instructional Approaches of Section 2, the major assignment of EDU 400 is an investigative experience requiring the application of scientific processes. They conduct a field/case study that relies on observation, analysis, and written explanations and conclusions. While the research required in courses such as EDU 420 or 525</p>	<p>BIO 121 General Biology I lab; BIO 448/449 Ecology w/ lab; BIO 451 Plant Form and Function.</p> <p>The mixture of lecture, lab, small group learning, problem solving, library research, and student presentations in the Biology courses demonstrates these principles.</p> <p>The mission of the UDM Teacher Education Program emphasizes the conceptualization of the role of the teacher as having three dimensions: developing teachers who behave professionally as scholars, inquirers, and moral agents. The Education courses seek to prepare students who are skilled in decision-making and in ethical, critical, and reflective thinking (inquirers) and who use the research-knowledge base for teaching, integrated with the liberal arts and sciences disciplines (scholars). As explained in Standards A, B, 7.0 and 8.0 of this matrix plus in Part C Varied Instructional Approaches of Section 2, the major assignment of EDU 400 is an investigative experience requiring the application of scientific processes. They</p>

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9.0(cont.)	demonstrate competence in the practice of teaching through investigative experiences by demonstrating the application of the scientific processes, and in assessing student learning through multiple processes;	<p>(Philosophy and Policy Studies) and in EDU or 514 (Schools/Education and Society) does not result in physical science findings that research in Biology demands, similar processes and methods are adhered to as candidates study and report their findings about aspects of education practice. In the methods courses (EDU 469, 475), candidates learn how to apply the appropriate investigative practices to assessing their students' learning and reporting their findings to parents and school officials. In EDU 475, students demonstrate to the class one lesson which includes assessment. The class discusses the entire lesson and how student performance is evaluated. Multiple intelligence and processes articles are distributed and discussed in class. One of their "teaching/management kit" folders contains materials about how they will assess students. Handouts are given and explained on various types of assessment, which they are expected to apply in appropriate assignments. Examples of how to write rubrics are demonstrated and practiced, especially in terms of the MEAP tests. Students also learn how to write mid-term and final examinations. Their field experience for EDU 475 includes the candidates teaching two lessons which demonstrate the application of scientific processes. The education technology courses (EDU 459 and 460) place emphasis on authentic assessment using various processes. During the candidates' student teaching experience (EDU 490, 474, or 484), they are required to apply these principles and processes to their involvement in assessing secondary students' progress according to the high school's policies.</p>	<p>conduct a field/case study that relies on observation, analysis, and written explanations and conclusions. While the research required in courses such as EDU 420 or 525 (Philosophy and Policy Studies) and in EDU or 514 (Schools/Education and Society) does not result in physical science findings that research in Biology demands, similar processes and methods are adhered to as candidates study and report their findings about aspects of education practice. In the methods courses (EDU 469, 475), candidates learn how to apply the appropriate investigative practices to assessing their students' learning and reporting their findings to parents and school officials. In EDU 475, students demonstrate to the class one lesson which includes assessment. The class discusses the entire lesson and how student performance is evaluated. Multiple intelligence and processes articles are distributed and discussed in class. One of their "teaching/management kit" folders contains materials about how they will assess students. Handouts are given and explained on various types of assessment, which they are expected to apply in appropriate assignments. Examples of how to write rubrics are demonstrated and practiced, especially in terms of the MEAP tests. Students also learn how to write mid-term and final examinations. Their field experience for EDU 475 includes the candidates teaching two lessons which demonstrate the application of scientific processes. The education technology courses (EDU 459 and 460) place emphasis on authentic assessment using various processes. During the candidates' student teaching experience (EDU 490, 474, or 484), they are required to apply these principles and processes to their involvement in</p>

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No.	Standard/Guideline	Secondary Minor	Secondary Major
			assessing secondary students' progress according to the high school's policies.
10.0	create and maintain an educational environment in which conceptual understanding will occur for all science students; and	Students learn how to create and maintain a positive classroom environment for conceptual understanding of Biology principles and skills in EDU 401/402 and in the methods courses: EDU 469 and 475 . In the education technology courses (EDU 459 and 600), project based learning based on research with emphasis on constructivism and scaffolding is required; thereby providing the candidates with strategies to create and maintain a positive learning environment for all students. SED 460 Education and Mainstreaming of Exceptional Persons is required for all Education candidates. The principles of mainstreaming and the instructional methodologies and approaches to meet the needs of the various exceptionalities within the "least restrictive environment" and/or general classroom setting are examined and explored. Objective 9 identifies that candidates will demonstrate the ability to present concepts and manage special education students at different levels and within the regular classroom. In their student teaching assignments (EDU 490, 474, 484), part of the candidates' assessments is their ability to provide such a learning environment for their secondary students.	Students learn how to create and maintain a positive classroom environment for conceptual understanding of Biology principles and skills in EDU 401/402 and in the methods courses: EDU 469 and 475 . In the education technology courses (EDU 459 and 600), project based learning based on research with emphasis on constructivism and scaffolding is required; thereby providing the candidates with strategies to create and maintain a positive learning environment for all students. SED 460 Education and Mainstreaming of Exceptional Persons is required for all Education candidates. The principles of mainstreaming and the instructional methodologies and approaches to meet the needs of the various exceptionalities within the "least restrictive environment" and/or general classroom setting are examined and explored. Objective 9 identifies that candidates will demonstrate the ability to present concepts and manage special education students at different levels and within the regular classroom. In their student teaching assignments (EDU 490, 474, 484), part of the candidates' assessments is their ability to provide such a learning environment for their secondary students.
11.0	demonstrate competence in the practice of teaching as defined within the Entry-Level	The Education program is built around the <i>Entry-Level Standards for Michigan Teachers (ELSMT)</i> . Assignments are required to reference the <i>ELSMT</i> . The portfolio that UDM students prepare throughout their	The Education program is built around the <i>Entry-Level Standards for Michigan Teachers (ELSMT)</i> . Assignments are required to reference the <i>ELSMT</i> . The portfolio that UDM students prepare throughout their Education program is designed to demonstrate

		Narrative Explaining how Required Courses and/or Experiences Fulfill the Standards for Program	
No.	Standard/Guideline	Secondary Minor	Secondary Major
	Standards for Michigan Teachers, as observed during the directed teaching experience.	<p>Education program is designed to demonstrate their acquisition of the Entry-Level standards. For example in EDU 469, students create a variety of “Portfolio Quality Assignments” that must reference the MDE web sites and demonstrate use of the materials and standards offered. In EDU 459 and 600 (Education Technology), the objectives are set using ELSMT standards. In addition to related lectures and discussions, the students are expected to use and reference these standards in their assignments, written and class presentations. In EDU 475 Science Methods, the students begin their personal collection of folders for their “teaching management kit.” Students are required to use the MDE sites as basis for their field experience and observation write ups and for their lesson/unit plans that are part of the course. Lectures and classroom discussions help students understand the ELSMT standards and how to incorporate them into their assignments.</p>	<p>their acquisition of the Entry-Level standards. For example in EDU 469, students create a variety of “Portfolio Quality Assignments” that must reference the MDE web sites and demonstrate use of the materials and standards offered. In EDU 459 and 600 (Education Technology), the objectives are set using ELSMT standards. In addition to related lectures and discussions, the students are expected to use and reference these standards in their assignments, written and class presentations. In EDU 475 Science Methods, the students begin their personal collection of folders for their “teaching management kit.” Students are required to use the MDE sites as basis for their field experience and observation write ups and for their lesson/unit plans that are part of the course. Lectures and classroom discussions help students understand the ELSMT standards and how to incorporate them into their assignments.</p>