# Program Report for the Preparation of Biology Teachers 

## Education Standards and Practices Board

## COVERSHEET

## Institution: University of North Dakota

State__ND
Date Submittted $\qquad$
Name of Preparer Jeff Carmichael, Associate Professor, Biology \& Lars Helgeson, Professor, Teaching and Learning.

Phone \#__ 701-777-3733 $\qquad$ Email Jeffrey_Carmichael@und.nodak.edu Program documented in this report:

Name of Institution's program:__Biology
Grade levels for which candidates are being prepared: 9-12
Degree or award level__B.S. in Biology
Is this program offered at more than one site? $\quad \square$ Yes _- No
If yes, list sites at which the program is offered: $\qquad$

Title of the state license for which candidates are prepared

Program report status:


Rejoinder
Response to national recognition with conditions
State licensure requirement for national recognition:
ESPB requires $80 \%$ of the program completers who have taken the test to pass the applicable state licensure test for the content field, if the state has a testing requirement. Does your institution require such a test? Test information and data must be reported in Section II

X Yes $\square$ No

## REPORT

I. Contextual Information - Provides the opportunity for institutions to present general information to help reviewers understand the program.

## Candidate Information

Directions: Provide three years of data on candidates enrolled in the program and completing the program, beginning wit the most recent academic year for which numbers have been tabulated. Please report the data separately for the levels/tracks (e.g., baccalaureate, postbaccalaureate, alternate routes, master's, doctorate) being addressed in this report.

| Program: <br> Biology | Y of Candidates <br> Enrolled in the <br> Program | \# of Program <br> Completers |
| :--- | :--- | :--- |
| Academic <br> Year | \# |  |
| Sum04- <br> Spr05 | 17 | 2 |
| Sum05- <br> Spr06 | 17 | 7 |
| Sum06- <br> Spr07 | 18 | 1 |

## I. Contextual Information \& Program Response To ESPB Standards

## Program: Biology

## Descriptive Information About the Program

The Department of Biology offers a B.S. in Biology, B.S. in Biology with Pre-Health Science Emphasis, and a B.S. in Fisheries and Wildlife Biology. In addition, there are three options associated with the B.S. in Biology degree: General Biology; Molecular, Cellular and Developmental Biology; Ecology and Evolutionary Biology. Specific department requirements for the degrees and options are listed below.

## FACILITIES

The Department of Biology is housed in Starcher Hall, completed in 1981. In addition to classrooms, three computer laboratories and other specialized teaching laboratories, the building houses a herbarium, three greenhouses, environmental chambers, animal rooms for terrestrial and aquatic organisms, observation rooms, vertebrate and invertebrate museums, a darkroom, and isotope and tissue culture facilities. The Department also maintains two natural areas (virgin prairie and wooded stream valley) for teaching and research.

## INDEPENDENT STUDY

Well qualified majors are urged to participate in independent studies, honors work, or undergraduate research. Normally studies of this nature are initiated by invitation from a faculty member. Students selected for these programs usually carry out their studies in the research laboratories of the individual professors. Research apprenticeships or assistantships financed by private foundation support or faculty research grants may be available for part-time employment. The department participates in the University Honors Program through certain interdisciplinary colloquia, by honors credit in advanced courses, and by independent studies and tutorials in advanced topics.

## Response to Standards

### 13010.1 BIOLOGY

The biology program requires study of zoology, botany, anatomy/morphology, physiology, genetics, ecology/environment, microbiology, cell biology/biochemistry, and evolution. This study includes:

- laboratory and field experiences using a variety of living materials and instrumentation;
- identification of biological phenomena;
- characteristics of living organisms and their relationship with their physical and biotic environment;
- interaction of biology and technology with the ethical and human implications;
- general chemistry I \& II with labs (8 semester hours minimum);
- physics and earth science (4 semester hours each);
- study of mathematics through the pre-calculus level (college algebra and above) and statistics.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Note: Courses preceeded by an asterisk (*) are commonly taken by biology majors seeking Teacher Certification. All other courses listed below are REQUIRED of all biology majors. The courses listed below represent about one-half of the biology courses taken by biology majors. The other courses our students take are electives and thus differ from one student to the next.

Laboratory and field experiences using a variety of living materials and instrumentation;
All biology students are required to take at least six laboratory classes (two at the introductory level and four upper-level labs). The labs listed below incorporate several activites aimed at experimentation with representative organisms from all Kingdoms. In addition, select labs in General Biology as well as most labs in Cell Biology require students to use a variety of instruments.

Biol. 150L- General Biology 1 lab- Students work with yeast (for respiration), aquatic plants (for photysnthesis), and computer-based probes (to monitor oxygen, and carbon dioxide).
Biol. 151L- General Biology 2 lab- Students spend several weeks on diversity and observe seedless vascular plants, seed plants, protists, fungi, and animals. Students also use molecular biology instruments (e.g., electorphoresis) and probes to monitor ultraviolet light.
*Biol. 332L- Ecology lab- Students study the interactions of fish, plants, insects, and other organisms with their environment..
*Biol. 341L- Cell Biology lab- Students learn to use instruments such as spectrophotometers, chromatography, cell culture, PCR, and RFLP.

## Identification of biological phenomena;

Biol. 150- General Biology 1- Students learn (through lectures, investigative case studies, prescribed learning assignments, and group discussions) about fundamental phenomena such as biochemistry, membrane dynamics, cell respiration, photosynthesis, cell cycle, plant form and function, and aninal physiology.
Biol. 151- General Biology 2- Students learn (through lectures, investigative case studies, prescribed learning assignments, and group discussions) about gene expression, genetics, molecular biology, DNA replication, evolution, diversity, and ecology.
Biol. 312- Evolution- Students learn (through lectures and in-class activities) about population genetics, sexual selection, human evolution, speciation, phylogenies, and developmental evolution.
Biol. 315- Genetics- Students learn (through lectures and case studies) about Mendelian genetics, chromosome mapping, transcription and translation, genomics, mutations, and population genetics.
Biol. 332- Ecology- Students learn (through lectures and in-class assignments) about physiological, behavioral, population, community, and ecosystem ecology.

Biol. 341- Cell Biology- Students learn about proteins, control of gene expression, membrane proteins, cytoskeleton, extra cellular matrix, organelle function, and control of the cell cycle.
Biol. 336- Systematic Botany- Students learn about characteristics used to classify plants,
methods of phylogeny reconstruction, species concepts, and analysis of morphological and molecular data.

Characteristics of living organisms and their relationship with their physical and biotic environment;
Biol. 151- General Biology 2- Students learn (from lectures, case studies, and group activities) the interactions of organisms with their environment at the cellular, organismal, population, community, and ecosystem levels.
Biol. 151L- General Biology 2 lab- Students perform lab activities on the interactions of plants, animals, and the levels of atmospheric oxygen and carbon dioxide and also the interactions between organisms and UV light. Students also conduct experiments on the impacts of exotic species and niche partitioning.
Biol. 312- Evolution- Students learn (through lectures and in-class activities) about natural selection, population dynamics, sexual selection, and mechanisms of speciation.
Biol. 332- Ecology- Students learn (through lectures and in-class assignments) about concepts such as heat exchange, water balance, foraging, life histories, competition, geochemical cycles, and landscape ecology.
*Biol. 332L- Ecology lab- Students conduct experiments on flower/pollinator interactions, fish population dynamics, predator-prey interactions, and species diversity.

## Interaction of biology and technology with the ethical and human implications;

Biol. 150- General Biology 1- Students learn (through lectures and investigative case studies) about processed foods and their implications, cancer treatments, stem cell research, invitro fertilization, and the benefits and problems of insecticides such as DDT.
Biol. 151- General Biology 2- Students learn (through lectures, investigative case studies, and group activities) about genetic engineering, evolution, vaccinations, viral diseases, global warming, ozone, pollution, and habitat destruction.
Biol. 315- Genetics- Students learn (through lectures and case studies) about chromosome mapping, human genomes, genomics, and impacts of mutations.
*Biol. 341L- Cell Biology lab- Students learn about skin pigmentation, mode of toxicity of various natural toxins, cellular basis of various diseases, and implications of recent advances in the field of molecular biology.

General chemistry I \& II with labs (8 semester hours minimum);
Required of all biology majors seeking Teacher Certification.
Physics and earth science (4 semester hours each);
Required of all biology majors seeking Teacher Certification.
Study of mathematics through the pre-calculus level (college algebra and above) and statistics.
Required of all biology majors seeking Teacher Certification (including a course in statistics). *Biol. 470- Biometry, or some other statistics course is required of all biology majors.

Assessments
a. Biology Praxis II Exam 0235
b. Biology Department Assessment Exam- This exam is given to all freshmen and senior biology majors and includes 85 multiple-choice questions designed to gauge the extent to which biology majors are meeting the learning goals of the department. Students are encouraged to answer only those questions they feel they know the answers to. A passing score was arbitrarily chosen as $50 \%$ correct for the purposes of this report. The scores reported here are based only on results from seniors.
Results
a. Praxis II results for Biology

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| Program Area | ND Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Biology-20235 | 153 | 7 | 174.7 | $100 \%$ |

## b. Biology Department Assessment Exam Results

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :--- | :--- | :---: | :---: |
| Major area | Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Biology | $50 \%$ | 44 | $55.5 \%$ | $70 \%$ |

Student Work Samples
Please see Hard Copy exams, activities, and other sample items included with this report.

## 13010.2, 13020.2, 13035.2, 13045.2, 13047.2, 13050.2 NATURE OF SCIENCE

The program requires study of the history and philosophy of science as well as the interrelationships among the sciences. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Note: Courses preceeded by an asterisk (*) are commonly taken by biology majors seeking Teacher Certification. All other courses listed below are REQUIRED of all biology majors seeking Teacher Certification. Other courses not listed below are taken as electives.

Biol. 150- General Biology 1- Students learn (through lectures, investigative case studies, prescribed learning assignments, and group discussions) about the scientific method, the types of questions addressed by science, the history of the cell theory and energetic process such as photosynthesis.
Biol. 151- General Biology 2- Students learn (through lectures, investigative case studies, prescribed learning assignments, and group discussions) about the history of genetics and
the structure of DNA, the discovery of viruses and vaccines, and the types of questions addressed by environmental scientists.
Biol. 312- Evolution- Students learn (through lectures and in-class activities) about the nature of scientific evidence and strength of arguments surrounding the evolution-intelligent design debate, the history of evolutionary biology, and the observation of contemporary evolutionary shifts.
Biol. 332- Ecology- Students learn (through lectures and in-class assignments) about concepts such as the history of ecology, methods of addressing ecological questions, and the robustness of large scale data sets.

Assessment
a. Biology Praxis II Exam 0235
b. Biology Department Assessment Exam- This exam is given to all freshmen and senior biology majors and includes 85 multiple-choice questions designed to gauge the extent to which biology majors are meeting the learning goals of the department. Students are encouraged to answer only those questions they feel they know the answers to. A passing score was arbitrarily chosen as $50 \%$ correct for the purposes of this report. The scores reported here are based only on results from seniors and are only based on the questions relating to "ability to analyze and interpret data".
Results
a. Praxis II results for Biology

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| Program Area | ND Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Bilogy-20235 | 153 | 7 | 174.7 | $100 \%$ |

b. Biology Department Assessment Exam Results

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: |
| Major area | Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Biology | $50 \%$ | 44 | $54.3 \%$ | $88.6 \%$ |

Student Work Samples
Please see exams, activities, and other sample items included with this report.

## 13010.3, 13020.3, 13035.3, 13045.3, 13047.3, 13050.3 INQUIRY

The program requires study of the processes of science common to all scientific fields. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Note: Courses preceeded by an asterisk (*) are commonly taken by biology majors seeking Teacher Certification. All other courses listed below are REQUIRED of all biology majors seeking Teacher Certification. Other courses not listed below are taken as electives.

Biol. 150L- General Biology 1 lab- Students complete several inquiry-based experiments that require them to ask questions, design experiments, and interpret data. Some of the activities include: observing the activity of enzymes under different conditions, addressing the respiratory rates of plants versus animals, understanding the role of pigments in plants, and finding out the effect of exercise on blood pressure and heart rate.
Biol. 151L- General Biology 2 lab- Students complete several inquiry-based experiments including effects of antibiotics on bacterial growth, optimal conditions for pillbugs and planaria, and interactions among species grown in the same environment.
*Biol. 332L- Ecology lab- Students conduct inquiry-based experiments on flower/pollinator interactions, fish population dynamics, predator-prey interactions, and species diversity.
*Biol. 470- Biometry- Students are directed through a series of inquiry-based assignments that require them to analyze large data sets (e.g., frog populations, numbers of ticks on mice, respiratory rates in toads) and draw conclusions based on those data.

Assessments
a. Biology Praxis II Exam 0235
b. Biology Department Assessment Exam- This exam is given to all freshmen and senior biology majors and includes 85 multiple-choice questions designed to gauge the extent to which biology majors are meeting the learning goals of the department. Students are encouraged to answer only those questions they feel they know the answers to. A passing score was arbitrarily chosen as $50 \%$ correct for the purposes of this report. The scores reported here are based only on results from seniors and are only based on the questions relating to "key principles of scientific inquiry".
Results
a. Praxis II results for Biology

| Fall, 2006-Summer, 2007 |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Program Area | ND Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |  |
| Bilogy-20235 | 153 | 7 | 174.7 | $100 \%$ |  |

b. Biology Department Assessment Exam Results

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Major area | Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Biology | $50 \%$ | 44 | $80.0 \%$ | $95.5 \%$ |

Student Work Samples
Please see exams, activities, and other sample items included with this report.

## 13010.4, 13020.4, 13035.4, 13045.4, 13047.4, 13050.4 CONTEXT OF SCIENCE

The program requires the study of the effect of social and technological context on the study of science and on the application and valuing of scientific knowledge. 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 program provides the candidate with an understanding of the relationship of science to industry, business, government, and multicultural aspects of a variety of communities. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

Note: Courses preceeded by an asterisk (*) are commonly taken by biology majors seeking Teacher Certification. All other courses listed below are REQUIRED of all biology majors seeking Teacher Certification. Other courses not listed below are taken as electives.

Biol. 151- General Biology 2- Students learn (through lectures, investigative case studies, prescribed learning assignments, and group discussions) about the implications of evolutionary theory, biotechnology, viral diseases, pollutants, global warming, and destruction of ozone.
Biol. 315- Genetics- Students learn (through lectures and case studies) about chromosome mapping, human genomes, genomics, and impacts of mutations.
Biol. 332- Ecology- Students learn (through lectures and in-class assignments) about natural ecological processes and the impact of humans on the species diversity and the environment in general.
Biol. 341- Cell Biology- Students learn (through lectures and in-class assignments) about various defects at the cell level and their impacts on human health and society.
*Biol. 341L- Cell Biology lab- Students learn about skin pigmentation, mode of toxicity of various natural toxins, cellular basis of various diseases, and implications of recent advances in the field of molecular biology.

Assessments
a. Biology Praxis II Exam 0235
b. Biology Department Assessment Exam- This exam is given to all freshmen and senior biology majors and includes 85 multiple-choice questions designed to gauge the extent to which biology majors are meeting the learning goals of the department. Students are encouraged to answer only those questions they feel they know the answers to. A passing score was arbitrarily chosen as $50 \%$ correct for the purposes of this report. The scores reported here are based only on results from seniors.
Results
a. Praxis II results for Biology

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Program Area | ND Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Bilogy-20235 | 153 | 7 | 174.7 | $100 \%$ |

## b. Biology Department Assessment Exam Results

| Fall, 2006-Summer, 2007 |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: |
| Major area | Passing <br> Score | Total Test <br> Takers | Average <br> Score | Percent <br> Passing |
| Biology | $50 \%$ | 44 | $55.5 \%$ | $70 \%$ |

Student Work Samples
Please see exams, activities, and other sample items included with this report.

## 13010.5, 13020.5, 13035.5, 13045.5, 13047.5, 13050.5 SKILLS OF TEACHING

The program requires the candidate to demonstrate proficiency in methods of teaching science. The program uses varied performance assessments of the candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T\&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

A copy of the syllabus from T\&L 400, Science Teaching Methods is included that requires students to prepare and present demonstrations, assessments, and lesson plans. Students spend time in class observing various styles of presentation for labs, demonstrations, and assessment. Then they develop and present their own lessons, demonstrations, assessments, and grading (using rubrics and gradepower.com (a free website developed by Dr. Helgeson for teachers to use in grading student progress). The syllabus includes a variety of activities by which students learn how to promote the development and use of a variety of science skills, e.g,, measurement, observation, inference, data analysis, data presentation, etc.

Assessments
a. Course Grades
b. Student Teaching Evaluations

Results
a. Course Grades

| Fall 06 \& Fall 07 |  |  |  |  |  |  | A | B | C | D | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| T\&L <br> 400 | - | - | - | - |  |  |  |  |  |  |  |
| $\mathrm{N}=12$ | $12 / 100 \%$ | - | - |  |  |  |  |  |  |  |  |

b. Student Teaching Evaluation

$$
\text { Mid Term } \mathrm{N}=\mathbf{8}
$$

| Biology Fall 06-Spring 07 | Deficient | Developin g | Proficient | Not <br> Observed | Deficient | Developing | Proficient | Not <br> Observed |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1. Demonstrates knowledge of content: | 0\% | 37\%^\% | 63\% | 0\% | 0\% | 0\% | 100\% | 0\% |
| 2. Demonstrates knowledge of human development through appropriate interaction, activities \& attitude: | 0\% | 100\% | 0\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 3. Recognizes individual differences and gives opportunities for diverse learners to learn: | 0\% | 87\% | 13\% | 0\% | 0\% | 63\% | 37\% | 0\% |
| 4. Employs diverse teaching strategies: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 5. Demonstrates competence in employing appropriate technology: | 0\% | 75\% | 25\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 6. Fosters a safe, compassionate, and respectful educational environment that promotes learning: | 0\% | 75\% | 25\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 7. Guides student behavior effectively and appropriately: | 0\% | 87\% | 13\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 8. Express ideas articulately in written and oral communication: | 0\% | 13\% | 87\% | 0\% | 0\% | 13\% | 87\% | 0\% |
| 9. Solicits suggestions and feedback from other and is receptive to them: | 0\% | 37\% | 63\% | 0\% | 0\% | 25\% | 75\% | 0\% |
| 10. Plans and designs creative, organized, effective, and | 0\% | 63\% | 37\% | 0\% | 0\% | 50\% | 50\% | 0\% |


| appropriate <br> lessons and <br> units: |  |  |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 11. Uses <br> appropriate <br> informal and/or <br> formal <br> assessment <br> method to <br> evaluate: | $0 \%$ | $50 \%$ | $50 \%$ | $0 \%$ | $0 \%$ | $37 \%$ | $63 \%$ | $0 \%$ |
| 12. Analyzes <br> own <br> performance and <br> seeks sources of <br> improvement: | $0 \%$ | $50 \%$ | $50 \%$ | $0 \%$ | $0 \%$ | $37 \%$ | $63 \%$ | $0 \%$ |
| 13. Maintains <br> professional <br> conduct- <br> punctuality, <br> interaction with <br> others, <br> preparedness, <br> and initiative: | $0 \%$ | $25 \%$ | $75 \%$ | $0 \%$ | $0 \%$ |  |  |  |
| 14. Established <br> effective <br> relationships <br> with parents, <br> participates in <br> school and <br> community <br> projects: | $0 \%$ |  |  |  |  |  |  |  |

Evaluations at both mid and end student teaching show that the candidates are generally proficient in the teaching of science.

Student Work Samples related to teach are available in the Hard Copy exhibits.

## 13010.6, 13020.6, 13035.6, 13045.6, 13047.6, 13050.6 CURRICULUM

The program provides candidates with information necessary to identify, evaluate, 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. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T\&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both

Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

Students conduct experiments and activities from three major curriculum projects: Project WET, Project Learning Tree, and SEPUP (Science Education for Public Understanding Program. All these curriculum projects are recognized at the national level as exemplary science education programs and all address the National Science Education Standards. Students are required to become members of the National Science Educators Association (NSTA), for which they receive a quarterly newspaper that addresses recent legislation, new curriculum, content and material evaluation of new books and science supplies. In addition students receive information about regional and national science education conferences.

Assessments
a. Course Grades
b. Student Teaching Evaluations

Results
a. Course Grades

| Fall 06 \& Fall 07 |  |  |  |  |  |  | A | B | C | D | F |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| T\&L <br> 400 | - | - | - | - |  |  |  |  |  |  |  |
| $\mathrm{N}=12$ | $12 / 100 \%$ | - | - |  |  |  |  |  |  |  |  |

b. Student Teaching Evaluation

Evaluations at both mid and end student teaching show that the candidate is proficient in the knowledge about teaching of science.

## 13010.7, 13020.7, 13035.7, 13045.7, 13047.7, 13050.7 ASSESSMENT

The program prepares candidates to use a variety of performance assessment strategies to evaluate the intellectual, social, and personal development of the learner in all aspects of science. Where in your program do candidates have the opportunity to address/meet this standard?
T\&L 400 Secondary Science Methods syllabus attached that shows the requirement to develop assessments of student content knowledge, skills, and problem solving strategies.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T\&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

T\&L 400 Secondary Science Methods syllabus attached that shows the requirement to develop assessments of student content knowledge, skills, and problem solving strategies. Students prepare Multiple Choice exam questions, Open ended exam questions with accompanying rubrics, and Performance Based Assessment and Rubrics. The course includes extensive discussion of National and State testing for teachers and high school and middle school students.

## Assessments

a. Course Grades
b. Student Teaching Evaluations

Students are also evaluated by their in-class discussion and performance related to this standard.The professor teaching the course spends a significant amount of time on the problem of relating the type of assessment to the activities in class and to the style of teaching a lesson. In addition students learn how to assign and defend weighted grades using the website gradepower.com. In that web site they learn how to communicate with students about grades, weight and give grades, and student teachers engage in extensive discussion on the philosophies and ideologies related to grades, evaluation, and assessment.

## Results

a. Course Grades

| Fall 06 \& Fall 07 |  | Methods and Materials - Science |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| T\&L <br> 400 | A | B | C | D | F |
| $\mathrm{N}=12$ | $12 / 100 \%$ | - | - | - | - |

b. Student Teaching Evaluation

|  | Mid Term N=8 |  |  |  | Final N=8 |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Biology <br> Fall 06-Spring <br> 07 | Deficient | Developin <br> g | Proficient | Not <br> Observed | Deficient | Developing | Proficient | Not <br> Observed |
| 1. Demonstrates <br> knowledge of <br> content: | $0 \%$ | $37 \% \wedge \%$ | $63 \%$ | $0 \%$ | $0 \%$ | $0 \%$ | $100 \%$ | $0 \%$ |
| 2. Demonstrates <br> knowledge of <br> human <br> development <br> through <br> appropriate <br> interaction, <br>  <br> attitude: | $0 \%$ | $100 \%$ | $0 \%$ | $0 \%$ | $0 \%$ | $37 \%$ | $63 \%$ | $0 \%$ |
| 3. Recognizes <br> individual <br> differences and <br> gives <br> opportunities for <br> diverse learners | $0 \%$ |  |  |  |  |  |  |  |


| to learn: |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 4. Employs diverse teaching strategies: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 5. Demonstrates competence in employing appropriate technology: | 0\% | 75\% | 25\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 6. Fosters a safe, compassionate, and respectful educational environment that promotes learning: | 0\% | 75\% | 25\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 7. Guides student behavior effectively and appropriately: | 0\% | 87\% | 13\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 8. Express ideas articulately in written and oral communication: | 0\% | 13\% | 87\% | 0\% | 0\% | 13\% | 87\% | 0\% |
| 9. Solicits suggestions and feedback from other and is receptive to them: | 0\% | 37\% | 63\% | 0\% | 0\% | 25\% | 75\% | 0\% |
| 10. Plans and designs creative, organized, effective, and appropriate lessons and units: | 0\% | 63\% | 37\% | 0\% | 0\% | 50\% | 50\% | 0\% |
| 11. Uses appropriate informal and/or formal assessment method to evaluate: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 12. Analyzes <br> own performance and seeks sources of improvement: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 13. Maintains <br> professional <br> conduct- <br> punctuality, <br> interaction with others, | 0\% | 25\% | 75\% | 0\% | 0\% | 13\% | 87\% | 0\% |


| preparedness, <br> and initiative: |  |  |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 14. Established <br> effective <br> relationships <br> with parents, <br> participates in <br> school and <br> community <br> projects: | $0 \%$ |  |  |  |  |  |  |  |

Evaluations at both mid and end student teaching show that the candidates are generally proficient in the knowledge about teaching of science and assessment of student learning.

Student Work Samples: I-movies of projects as well as sample of student work are available in Hard Copy Exhibits

## 13010.8, 13020.8, 13035.8, 13045.8, 13047.8, 13050.8 ENVIRONMENT FOR LEARNING

The program prepares candidates to design and manage safe and supportive learning environments in the classroom, laboratory, and field. The program reflects high expectations for the success of all students. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T\&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

T\&L 401 School Science Safety - Science: Prepares students to plan for and communicate about a wide variety of classroom and laboratory safety issues. Health and safety issues are examined for the classroom teacher and the students in all science courses, including electrical safety, biological safety, chemical use, storage and disposal, legal issues, liability reduction and cost control are also addressed in detail.

T\&L 400 Secondary Science Teaching Methods and T\&L 401 School Science Safety address these standards. Syllabi show that students develop observational lists that help them to clarify in their own minds what an ideal laboratory/science environment should be. With regard to safety in the science room students are required to carry out evaluations of classroom in existing schools, assess ventilation within the classroom, assess storage and disposal procedures for chemicals, and to understand the safety requirements in Chemistry, Biology, Physics, Environmental studies, and on field trips. They learn extensively about the law and teacher responsibility in maintaining a safe learning environment.

Students must pass examinations in Safety related to the areas Chemical, Biological, and Physics science safety as part of this course.

## Assessments

a. Course Grades

1. T\&L 400
2. T\&L 401
b. Student Teaching Evaluations
c. Safety Exam Results

## Results

A. 1 Course Grades

| Fall 06 \& Fall 07 | Methods and Materials - Science |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{T} \& \mathrm{~L}$ <br> 400 | A | B | C | D | F |
| $\mathrm{N}=12$ | $12 / 100 \%$ | - | - | - | - |

A. 2 Course Grades

| Fall 07 |  |  |  |  |  |  | School Safety - Science |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| T\&L <br> 400 | A | B | C | D | F |  |  |
| N=5 | $5 / 100 \%$ | - | - | - | - |  |  |

b. Student Teaching Evaluation

|  | Mid Term N=8 |  |  |  | Final N=8 |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Biology <br> Fall 06-Spring <br> 07 | Deficient | Developin <br> g | Proficient | Not <br> Observed | Deficient | Developing | Proficient | Not <br> Observed |
| 1. Demonstrates <br> knowledge of <br> content: | $0 \%$ | $37 \% \wedge \%$ | $63 \%$ | $0 \%$ | $0 \%$ | $0 \%$ | $100 \%$ | $0 \%$ |
| 2. Demonstrates <br> knowledge of <br> human <br> development <br> through <br> appropriate <br> interaction, <br>  <br> attitude: | $0 \%$ | $100 \%$ | $0 \%$ | $0 \%$ | $0 \%$ | $37 \%$ | $63 \%$ | $0 \%$ |
| 3. Recognizes <br> individual <br> differences and <br> gives <br> opportunities for <br> diverse learners <br> to learn: | $0 \%$ |  |  |  |  |  |  |  |
| 4. Employs <br> diverse teaching | $0 \% \%$ | $13 \%$ | $0 \%$ | $0 \%$ | $63 \%$ | $37 \%$ | $0 \%$ |  |


| strategies: |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5. Demonstrates competence in employing appropriate technology: | 0\% | 75\% | 25\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 6. Fosters a safe, compassionate, and respectful educational environment that promotes learning: | 0\% | 75\% | 25\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 7. Guides student behavior effectively and appropriately: | 0\% | 87\% | 13\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 8. Express ideas articulately in written and oral communication: | 0\% | 13\% | 87\% | 0\% | 0\% | 13\% | 87\% | 0\% |
| 9. Solicits suggestions and feedback from other and is receptive to them: | 0\% | 37\% | 63\% | 0\% | 0\% | 25\% | 75\% | 0\% |
| 10. Plans and designs creative, organized, effective, and appropriate lessons and units: | 0\% | 63\% | 37\% | 0\% | 0\% | 50\% | 50\% | 0\% |
| 11. Uses <br> appropriate informal and/or formal assessment method to evaluate: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 12. Analyzes own performance and seeks sources of improvement: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 13. Maintains professional conductpunctuality, interaction with others, preparedness, and initiative: | 0\% | 25\% | 75\% | 0\% | 0\% | 13\% | 87\% | 0\% |
| 14. Established |  |  |  |  |  |  |  |  |


| effective <br> relationships <br> with parents, |  |  |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| participates in <br> school and <br> community <br> projects: | $0 \%$ | $87 \%$ | $13 \%$ | $0 \%$ | $0 \%$ | $37 \%$ | $63 \%$ | $0 \%$ |

Evaluations at both mid and end student teaching show that the candidates are generally proficient in creating a safe and engaging learning environment.

## Student Work Samples

Samples of examinations are included in the Hard Copy Exhibits.
13010.9, 13020.9, 13035.9, 13045.9, 13047.9, 13050.9 PROFESSIONAL PRACTICE

The program prepares candidates to participate in the professional community, improving practice through their personal actions, education, and development. The program uses varied performance assessments of candidate's understanding and ability to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.

T\&L 400 Methods and Materials- Science: Through a partnership with departments in the College of Arts and Sciences and the College of Business, candidates may seek secondary licensure in several areas. Requirements may vary depending upon the field of study, so candidates are advised to keep in close and regular contact with academic advisers from both Teaching and Learning and their academic discipline. Secondary education degrees are offered in science and social studies.

Students enrolled in T\&L 400 are required to become members of the National Science Teachers Association in order to receive either the journal "Science Scope" or "The Science Teacher" and the NSTA quarterly newspaper, and have access to professional conference information. Students in T\&L 400 discuss NSTA journal articles and NSTA newspaper articles that included recent legislation and trends in science education, and these are all discussed in class at great length. The membership in NSTA is in lieu of a textbook for the class as the documents that come with membership provide in-depth reviews of current trends and legislation related to science education. In addition students carry out extensive discussion of their Field Experience (T\&L 486) and complete an evaluation of the Laboratory Safety in their schools and make a list of observations in their assigned Field Experience school laboratories and materials (books and equipment) and curriculum.

## Assessments

a. Course Grades
b. Student Teaching Evaluations

Results
a. Course Grades


| feedback from other and is receptive to them: | 0\% | 37\% | 63\% | 0\% | 0\% | 25\% | 75\% | 0\% |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 10. Plans and designs creative, organized, effective, and appropriate lessons and units: | 0\% | 63\% | 37\% | 0\% | 0\% | 50\% | 50\% | 0\% |
| 11. Uses appropriate informal and/or formal assessment method to evaluate: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 12. Analyzes own performance and seeks sources of improvement: | 0\% | 50\% | 50\% | 0\% | 0\% | 37\% | 63\% | 0\% |
| 13. Maintains professional conductpunctuality, interaction with others, preparedness, and initiative: | 0\% | 25\% | 75\% | 0\% | 0\% | 13\% | 87\% | 0\% |
| 14. Established effective relationships with parents, participates in school and community projects: | 0\% | 87\% | 13\% | 0\% | 0\% | 37\% | 63\% | 0\% |

Evaluations at both mid and end student teaching show that the candidates are generally proficient in establishing positive relationships with community members.

## Student Work Samples

T\&L 400 work samples are available in the Hard Copy exhibits.

### 13010.10, 13020.10, 13035.10, 13045.10, 13047.10, 13050.10 <br> TECHNOLOGY

The program requires the study of current, appropriate instructional technologies. The program uses varied performance assessments of candidates’ understanding and abilities to apply that knowledge.

List course number, title and description and any accompanying activities or experiences in which students engage to meet the standard.
Biol. 150- General Biology 1- Students use the following on a routine basis as part of this class: online quizzes, online animations, online threaded discussions, and personal response
systems (clickers).
Biol. 151- General Biology 2- Students use the following on a routine basis as part of this class: online quizzes, online animations, online threaded discussions, and personal response systems (clickers).
Biol. 150L- General Biology 1 lab- Students use CD-ROM based interactive activities for several labs.
Biol. 151L- General Biology 2 lab- Students use CD-ROM based interactive activities for several labs.
Biol. 336- Systematic Botany- Students use computer-based phylogeny reconstruction programs on a normal basis as part of this class.

### 13010.11

Candidate assessment data are regularly and systematically collected, compiled, aggregated, summarized, and analyzed to improve candidate performance, program quality, and program operations. The program disaggregates candidate assessment data when candidates are in alternate route, off-campus, and distance learning programs.

## Teaching \& Learning Undergraduate Assessment Plan

Unit Assessment System for the Elementary Education Program

| Initial Programs Undergraduate | Upon <br> Admission to Teacher Education | Before Entering Student Teaching | Before <br> Program <br> Completion | After Completion |
| :---: | :---: | :---: | :---: | :---: |
| - Elementary <br> - ECE/Elementary <br> - Elementary/Middle | - GPA <br> - PPST Score <br> - Letter of Application <br> - Dispositions | - Critical <br> Tasks <br> (Child <br> Study, <br> Multicultura <br> 1 Teaching, <br> Lesson <br> Plan, <br> Beliefs and <br> Practices <br> Statement) <br> - Praxis II <br> Tests <br> - Dispositions | - Critical <br> Tasks (Midterm <br> Evaluation, <br> Final Evaluation <br> - Dispositions | Assessments: <br> - Graduate Surveys <br> - Principal Surveys |

Data Collection. Data are collected at transition points throughout the program to assess candidate performance, program quality and program operations. The Teaching and Learning Undergraduate Assessment Committee (UGAC) develops an annual schedule for the purposes of data collection. T\&L undergraduate faculty who assess critical tasks, staff in the Office of Advising and Admissions and staff in the Office of Field Experience are responsible for submitting data presented in the table below. The UGAC monitors the collection process and follows up in a timely manner when data is missing.

Data Analysis and Reporting. The UGAC is responsible for submitting an annual report to the undergraduate faculty in the Department of Teaching and Learning, the Chair of Teaching and Learning and the Associate Dean for Teacher Education (NCATE Coordinator) based upon a detailed analysis of data collected over the course of the previous year. The Assessment Committee facilitates an annual Assessment Retreat. Faculty discuss the report at the departmental and individual program level and develop a written plan of action designed to address areas of weakness. Should no areas of weakness be found, a written record of faculty discussion leading to this conclusion is created. In between assessment retreats, the UGAC monitors progress in the implementation of the action plan(s). In subsequent retreats, the action plans are revisited and revised in light of the new round of data analysis.

## Biology Undergraduate Assessment Plan As Applicable

B.S. in BIOLOGY PROGRAM ASSESSMENT (2006-2007)

Prepared by Isaac Schlosser (Department Chair) and Jeff Carmichael

## Program Goals and Anticipated Learning Outcomes

The Biology Department at the University of North Dakota has identified 2 primary student learning goals and several associated learning outcomes associated with the B.S. in Biology Program. These include:

1. Students will possess a sound factual knowledge of the core concepts and techniques in modern biology associated with all levels of organization, from molecules to ecosystems.

By the time students complete a B.S. degree in Biology at the University of North Dakota, they should be able to demonstrate an understanding of:
a. core factual concepts associated with all levels of biological organization,
b. the primary techniques used to study biological processes, and
c. the relationship(s) among core concepts from all levels of biological organization.
2. Students will possess a clear understanding of the creative nature of scientific inquiry, including how new knowledge is created and communicated, and the role critical thinking and ethical considerations play in scientific inquiry.

By the time students complete a B.S. degree in Biology at the University of North Dakota, they should be able to demonstrate an:
a. understanding of key principles of scientific inquiry,
b. ability to design simple experiments and descriptive studies to answer basic biological questions, including the ability to critically evaluate the appropriateness of experimental treatments and sampling strategies,
c. ability to critically analyze and interpret data,
d. ability to critically read and interpret scientific literature to solve problems and answer questions,
e. ability to effectively and persuasively communicate biological information orally, visually and in writing, and
f. understanding of key ethical considerations associated with scientific inquiry.

## Direct Assessment of Student Knowledge - A Value Added Approach

Conceptual Approach to Direct Assessment. In contrast to indirect assessment, which is based on student perceptions of their learning, we also used a value added approach to directly assess the increase in student knowledge associated with the B.S. in Biology degree. Specifically, during the 2007-2007 academic year, we measured freshman vs. senior student performance on an "assessment exam" developed and administered by the Biology Department. The exam consisted of 15 questions used to document demographic characteristics of the student population and 170 multiple choice questions directly assessing changes in freshman vs. senior student knowledge associated with goals 1 a-c and $2 \mathrm{a}-\mathrm{c}$. Questions on the exam represented a gradation of difficulty and were patterned after Advance Placement, ACT, SAT, MCAT, and GRE exams. Because of time constraints in the initial development of the exam, one-half of the exam was given to incoming freshman during the first week of classes during the fall semester. The second half of the exam was given during the first week of classes during the second semester. Seniors were given the entire exam during the second half of their final (spring) semester.

Results from the Direct Assessment Exam. Incoming freshman revealed several striking patterns related to their performance on the "assessment exam". The knowledge of incoming freshman was quite limited, with the overall average on the exam being $26 \%$. The percentage of correct answers for freshman for all goals was relatively consistent, ranging from 20-27\% percent, except for goals 1 b and 2a. Incoming freshman seemed to have a relatively poorer understanding ( $13 \%$ correct) of basic techniques used in modern biology (goal 1b) but a relatively better understanding (59\% correct) of key principles related to scientific inquiry (goal 2a).

Results from the exam for graduating seniors revealed a significant improvement in performance associated with virtually all goals, but with considerable variation among the goals in the magnitude of improvement. Although senior students scored less than hoped, they more than doubled the overall average performance on the exam ( $55 \%$ correct) compared to freshman. The change in performance ranged from an increase of only $36 \%$ in the understanding of key
principles associated with scientific inquiry (goal 2a) to a nearly four fold increase in the understanding of basic techniques used in modern biology (goal 1b). The small increase associated with scientific inquiry seems to be associated with the fact that incoming freshman already had a fairly good understanding of basic concepts associated with the nature of science, rather than a lack of progress once within the program. In general, the largest percent increases in performance occurred in student factual knowledge of core concepts (goal 1a), but again there was considerable variation in the extent of the increase among subject areas. The largest increases in performance occurred in the core areas associated with chemistry/genetics/molecular biology (40.9\%), cell biology (37.5\%), and ecology (38.0\%). The smallest increase in student performance occurred in the core area of evolution (23.8\%). Interestingly, our evolution course is the only course in any of these areas (chemistry, genetics, cell biology, and ecology) that does not have either a laboratory or recitation/problem section associated with the lecture. Lastly, compared to increased factual understanding, relatively smaller percent increases in knowledge occurred in association with higher level thinking skills, including the ability of students to understand the relationship among concepts from different levels of biological organization (goal 1 c: 27.4\%), design experiments (goal 2b: 23.8\%), and critically analyze and interpret data (goal 2c: 27.2\%).
Future initiative for direct assessment of leaning outcomes 2 d-f. Three learning outcomes (goal 2 d-f) were not evaluated by the assessment exam. These outcomes are associated with critically reading and interpreting scientific literature, communicating biological information, and understanding key ethical considerations associated with scientific inquiry. These learning outcomes are not easily assessed by a multiple choice exam. During the summer of 2007, our Assistant Chair for Curriculum and Assessment (ACCA), Jeff Carmichael, was provided support by the Provost's office to develop a mechanism for assessing these learning outcomes. Specifically, he will be developing a College Learning Assessment Tool (CLAT) to gauge the extent to which goals 2d-f are being met by the undergraduate curriculum in biology. These goals can be assessed through the use of CLAT's, similar to ones described recently by Hersh (2005). Briefly, an integrative "performance task" CLAT will provide students with a mini library of various documents related to a particular problem related to modern biology (e.g., the use of DDT as a pesticide in various countries, or, the development of chemotherapeutic drugs from rare or endangered plants. Students will then be asked, for instance, to write a letter either to the "Secretary-General of the United Nations" outlining their recommendation on allowing the use of DDT, or, to the president of a pharmaceutical company outlining their recommendation on the development of a new drug. Students will be expected to identify the strengths, weaknesses, and limitations of alternative points of view and courses of action. They will also be able to identify ethical dilemmas that are integral to the issue at hand. A grading rubric is being developed that will focus on the level at which learning goals 2 d-f are addressed. The standardized rubric will allow direct comparisons between first-year and senior-level students, as well as between annual cohorts of students. The ACCA will be responsible for evaluation of all CLAT's.

## II. Multicultural/Native American /Diversity Standard

The program requires the study of multicultural education including Native American studies and strategies for teaching and assessing diverse learners.

This response is prepared for all programs approved by ESPB. If you are reviewing an undergraduate or initial program only, please read the sections of this response headed Initial Programs. For Advanced or Professional Programs, please read the sections of this response headed Advanced Programs. Syllabi, vita and cited electronic work samples referred to in the report may be found in the folder labeled "MC-Diversity Standard."

## MULTICULTURAL EDUCATION/NATIVE AMERICAN STUDY

## Initial Programs

## Opportunity to Address/Meet Standard

T\&L 433: Multicultural Education: All candidates in the Teacher Education Program at the University of North Dakota are required to complete this course (There is also a correspondence course with the same prefix and title which is offered to those who are in non-UND programs. Rarely, an exception is made for a candidate in the program who is unable to take the on-campus course.)
Course Description
This class takes an anthropological view of multicultural education. It will help students better understand students in culturally diverse classrooms as well as prepare them to teach about cultural diversity. This class examines several cultures but is particularly interested in American Indians of North Dakota. Those original groups include: Lakota, Dakota, and Nakota, Chippewa, and the three affiliated tribes: Mandan, Hidatsa, and Arikara (see attached sample syllabus TL 433).

Assessments/Results

1. Critical Task: Multicultural Teaching is submitted and assessed in LiveText, an on-line data management system. This Critical Task is a research paper based upon an issue in multicultural education. The paper includes a lesson plan which is assessed to determine candidates' ability to apply what they have learned related to diversity. The task was piloted in the spring of 2007 and assessed formally for the first time in the fall of 2007.

## Initial Programs Critical Task Assessment Results for Multi-Cultural Teaching

Fall 2007 N=90

| Teaching \& Learning Standards |
| :--- | :---: | :---: | :---: |
| 1.2 Teacher candidate uses tools of inquiry |
| to develop content knowledge. |$\quad$ Does Not Meet \(\left.\begin{array}{c}Fulfills <br>

Expectations\end{array}\right)\)

Standards 1.3 and 6.6 especially target candidates knowledge and dispositions related to diversity. As indicate in the table $84 \%-86 \%$ of candidates meet or exceed expectations in these categories.
2. Mid-Term Showcase: Candidates work in pairs to create a showcase of a culture that includes engaging hands on learning activities.

| Fall 2007 | Multicultural Ed |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| TL433: Section 1: Midterm <br> Showcase Scores | A | B | C | D | F |
|  | $\# 30$ | $0 \%$ | $0 \%$ | $0 \%$ | $0 \%$ |
| $\mathrm{~N}=30$ | $100 \%$ |  |  |  |  |

3. Native American Reservation Field Trip: The class participates in a field trip, to an

American Indian reservation school K-12. Each candidate is expected to write a 3-5 page paper reflecting on the field experience. At a minimum, the student should provide answers to the following questions after the field experience: (a) What does education and learning experiences mean to these students; (b) Is the educational system ensuring that the diverse needs of those students are met?

The field trip reflection assessment rubric covers three areas:
(a) Focus (i.e. relevant, specific and clear response to the above questions.... 10 points);
(b) Perspective (i.e. the student reflects on the field trip from a diverse/multiple perspective... 10 points );
(c) Language/Grammar (i.e., the students uses appropriate diversity terminology/ language as well as correct grammar... 5 points).

| TL 433 Section 1:Fall 2007 | A | B | C | D |
| :---: | :---: | :---: | :---: | :---: |
| Field Trip Reflection Scores (N=30) | $\# 26$ | $\# 4$ | $\# 0$ | $\# 0$ |
|  | $87 \%$ | $13 \%$ |  |  |

## Student Work Samples

1. For candidate work related to the critical task (\#1 above), please click on the any of the documents below:

- Sample 1 Does Not Meet Expectations
- Sample 2 Meets Expectations
- Sample 3 Exceeds Expectations

2. A variety of student work samples related to the showcase will be available in the hard copy exhibit room.

Advanced Programs
Opportunity to Address/Meet Standard

EFR 506: Multicultural Education: Candidates who have not taken T\&L 433 as undergraduates are encouraged to take this course. As described in the catalog the course is a "review of the conceptual, historical, and theoretical aspects of multicultural education. A major goal will be to provide educators with the processes for incorporating multicultural education into their own education environments to meet the needs of their culturally diverse students and to increase the cultural awareness and sensitivity of all students. North Dakota/Native American issues are primary elements of this course" (pg.249). (Also, see attached sample syllabi: EFR 5061; EFR5062.

## Assessments/Results:

Course Grades

| Sections 1-4: SU, 2007 |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Course EFR 506: Multicultural Education | A | B | C | D | F |
| $\mathrm{N}=28$ | $\# 26$ | $\# 1$ | $\# 0$ | $\# 0$ | $\# 1$ |
|  | $93 \%$ | $3.5 \%$ | $\%$ | $\%$ | $3.5 \%$ |

As indicated by the majority of A's and B's in the chart above, candidates taking this course met or exceeded course goals.

## STRATEGIES FOR TEACHING AND ASSESSING DIVERSE LEARNERS

Initial Programs
Opportunity to Address/Meet Standard
T\&L 315: Education of Exceptional Students: All candidates in our Early Childhood Education, Elementary Education and Middle Level programs are required to take this course(see attached syllabus T\&L 315).

Course Description: "An orientation course, especially for classroom teachers, stressing the identification, characteristics and educational problems of exceptional children" (college catalog p.184).

TEAM Methods: Candidates in Elementary Education, Early Childhood Education and Middle Level Education take a series of methods related courses that require them to demonstrate an ability to accommodate instruction for students with special needs. Initially, candidates are presented with a case of a virtual student. They view a video and review an IEP and create a lesson plan with accommodations for this student (see IEP of Nathan). Next, candidates complete a 60 -hour field experience. They select a lesson for assessment that includes accommodations for one or more students in their field experience setting.

Integration of Special Needs: The secondary education program has developed an integrated approach to guide candidates’ knowledge about and skill in teaching diverse learners (see Integration of Special Needs within the Secondary Education Program document).

Assessments/Results

Course Grades

| Fall 06 - Spring 07 |  |  |  |  |  |  |  | A | B | C | D | F |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Course TL 315: Education of Exceptional Students | $\# 148$ | $\# 34$ | $\# 7$ | $\# 4$ | $\# 4$ |  |  |  |  |  |  |  |
| $\mathrm{~N}=197$ | $75 \%$ | $18 \%$ | $3 \%$ | $2 \%$ | $2 \%$ |  |  |  |  |  |  |  |

Over $93 \%$ of candidates from spring 2006 to fall of 2007 met or exceeded expectations related to the content of TL315 as demonstrated by the percent of A's and B's awarded.

TEAM Methods: Candidates development and implement a lesson plan and during the 60 hour field experience tied to the methods semester that is submitted and assessed in LiveText, an on-line data management system. INTASC Standard 3 and Program Standard 3.1 are assessed to determine candidates’ abilities to accommodate all learners needs.

Results from fall 2006-spring 2007 are presented in the table below:

| Standard: 3.2 TAAL INTASC 3 Teacher <br> candidate plans and adapts instruction for <br> individual needs | Not Met | Met | Exceeds |
| :--- | :--- | :--- | :--- |
| Fall 2006 | $6.4 \%$ | $70.2 \%$ | $23.4 \%$ |
| Spring 2007 | $13.8 \%$ | $74.2 \%$ | $12 \%$ |

During the 2006-2007 academic year 87.2\%-94.6\% of candidates met or exceeded the standard related to adapting instruction. The faculty reviewed data in May of 2007 and were disappointed in the lower results in the spring semester. It was at this point that the case of Nathan was developed for implementation in the fall of 2007. We hope to see improvements during the 07-08 academic year.

Integration of Special Needs: Candidates development and implement a lesson plan and during the 60 hour field experience tied to the methods semester that is submitted and assessed in LiveText, an on-line data management system. INTASC Standard 3 and Program Standard 3.1 are assessed to determine candidates’ abilities to accommodate all learners needs. The Lesson Plan for secondary programs is submitted and scored only in the fall since this is when the methods courses are offered. At the time of this report, no results are available. Results for fall 2007 will be available in the spring of 2008.

Student Teaching Evaluations: Mid-term and final evaluations during the student teaching semester provide additional evidence that candidates in all of our programs address the needs of diverse learners in their classrooms. Cooperating Teachers and University Supervisors complete these evaluations at mid and end term during the student teaching semester. The results for candidates' in the area of exceptionalities in the fall 2006 and spring 2007 are presented in the table below:

| INTASC Standard 3: Teacher candidate plans and adapts instruction for individual needs |  |
| :--- | :--- |


|  | Mid Term N = 86 |  |  |  | Final N=86 |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Fall 06- <br> Spring 07 | Deficient | Developing | Proficient | Not <br> Observed | Deficient | Developing | Proficient | Not <br> Observed |


| All <br> Programs | $0 \%$ | $30 \%$ | $58 \%$ | $12 \%$ | $0 \%$ | $10 \%$ | $75 \%$ | $15 \%$ |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |

As noted in the evaluations $85 \%-88 \%$ of candidates during student teaching are able to adequately address this standard. In addition, $20 \%$ of candidates moved from the developing to proficient category by the end of the their student teaching assignment.

## Advanced Programs

Opportunity to Address/Meet Standard
EFR 506: Multicultural Education: Candidates who have not taken T\&L 433 as undergraduates are encouraged to take this course. The emphasis of the course may vary dependent upon the semester. For example, in the summer of 2007 one section of EFR 506 emphasized issues in special education within the context of the multicultural framework (see syllabus EFR 506).

Assessment /Analysis
Course Grades

| Course | A | B | C | D | F |
| :--- | :---: | :---: | :---: | :---: | :---: |
| EFR 506: Multicultural Education: Sec3: SU, 2007 | $\# 12$ | $\# 1$ | $\#$ | $\#$ | $\# 1$ |
| N=14 | $86 \%$ | $7 \%$ | $0 \%$ | $0 \%$ | $7 \%$ |

As indicated by the majority of A's and B's in the chart above, candidates taking this course met or exceeded course goals.

Other important diversity aspects are part of the curriculum in the required courses of EFR 500: Philosophical Foundations of Education, TL 540: Philosophies and Theories of Curriculum, and TL 542: Models of Teaching. In addition, the candidate is required to take an additional three credits of foundations. Typically, they are advised to take EFR 505:
Social Foundations of Education or EFR 507 Gender and Education; in either of these latter two courses, candidates study multicultural education, diversity education, and socioeconomic aspects related to access, equality, and equity.

TL 590 ST: Children's Literature in the Classroom. In this course, candidates in the reading specialist and elementary education advanced programs read multicultural literature and critique literature used in classrooms to determine its resonance with all students.
Further, students complete projects which explore Native American Literature. The syllabus for TL590ST states the following goal:

- Expand your knowledge of the wealth of literature available for diverse children in classrooms (NBPTS \#2)

The goal is met through reading and discussing articles and children's literature and by assignments. Sample readings and assignments are provided to illustrate candidate experiences.

Sample articles on diverse learners (cultural, racial, gender, socioeconomic)

- Enteneman, J., Murnen, T. J., \& Hendricks, C. (2005). Victims, bullies, and bystanders in K-3 literature. The Reading Teacher, 59, pp. 352-364.
- Livingston, N. \& Kurkjian, C. (2005). Circles and celebrations: Learning about other cultures through literature. The Reading Teacher, 58, pp. 696-703.
- Louie, B. L. Guiding princiles for teaching multicultural literature. The Reading Teacher, 59, pp. 438-448.
- Wason-Ellam, L. (1997). "If only I was like Barbie." Language Arts, 74(6), pp. 430-437.
- Yenika-Agbaw, V. (1997). Taking children’s literature seriously: Reading for pleasure and social change. Language Arts, 74(6), pp. 446-453.

Multicultural and gender-based literature assigned for the course and read by candidates:

- Curtis, C. P. (1995). The Watsons Go To Birmingham. Yearling. ISBN: 0440414121
- DiCamillo, K. (2000). Because of Winn-Dixie. Scholastic. ISBN: 043925051X
- Erdrich, L. (1999). The Birchbark House. Scholastic. ISBN: 0439203406
- Munsch, R. (1980). The Paper Bag Princess. Annick Press. ISBN: 0920236162
- Ryan, P. M. (2000). Esperanza Rising. Scholastic.

Artifacts supplied to illustrate multicultural course experiences are listed here and supplied for perusal.

- PowerPoint by candidate-Contemporary Native Americans and Literature
- Character Comparison between Esperanza in Esperanza Rising and Opal in Because of Winn-Dixie
- Key Discussant Grade Report on Birchbark House with bibliography of Native America book resources and teaching ideas
- Multicultural Book Analysis

TL 590 ST: Writing in the Elementary School Classroom. In part this course is designed to increase candidates' ability to effectively teach diverse children to write, respecting development, culture, gender, and individuality. Though meeting a goal such as this is integrated throughout the semester, specific course readings and activities are devoted to the goal. Readings on gender and writing, specifically paying attention to boys, and culturally conscious writing instruction is also addressed. Multicultural and gender-based readings include the following:

- Dworin, J. E. (2006). The family stories project: Using funds of knowledge for writing. The Reading Teacher, 59(6), 510-520.
- Dyson, A. H. (1998). Fold processes and media creatures: Reflections on popular culture for educators. The Reading Teacher, 51(5). 392-402.
- Fletcher, R. (2006). Boy writers: Reclaiming their voices. (Chapter 10). Portland, ME: Stenhouse Publishers.
- Fu, D. \& Shelton, N.R. (2007). Including students with special needs in a writing workshop. Language Arts, 84(4), 325-336.
- Newkirk, T. (2000). Misreading masculinity: Speculations on the great gender gap in writing. Language Arts, 77(4), 294-300.
- Rubin, R. \& Carlan, V. G. (2005). Using writing to understand bilingual children’s literacy development. The Reading Teacher, 58(8), 728-739.

One artifact supplied to illustrate linguistic/cultural study of writers is a whole class effort to identify ways to support ELLs in the writing classroom. Candidates reviewed numerous
books and articles, identified resources, and gleaned specific practical ideas for supporting young writers. The series of charts that evolved from that activity are supplied as an example of the type of learning event that is integrated in the course to learn about supporting multicultural learners in writing.

## Programs for Other School Professionals

In addition to the instruction and assessment in the above programs, the following coursework in Educational Leadership and School Counseling attend to multicultural and diversity issues.

## Educational Leadership:

Opportunity to Address/Meet Standard: Courses
EDL 514: Personnel, Supervision, and Staff Development: Various in-depth discussions regarding diversity occur (e.g., Native American and the BIA system). EDL 516 Policy and Educational Finance: Candidates conduct research on various schools, locations, and issues. An example of a research project may be an exploration of the funding for a Native American school.
EDL 519: The Principalship: Principals from various schools (including Indian Reservations) discuss the complexity of education and how it affects students, teachers, and communities.
EDL 501: Leadership, Planning, and Organizational Behavior: Studies include shaping school culture, addressing individual and group needs, setting goals and priorities according to the context of the community.
EDL 511: Personal Communications and Ethics: Discussions are held on how culture, age, and socioeconomics influences education.

## Assessments Include:

Exams
Research Papers
Portfolios

## School Counseling:

Opportunity to Address/Meet Standard: Courses
Coun 518: Group Theory and Process: Addresses the principles and practices of support, task, psycho-educational, and therapeutic groups with various populations in a multicultural context. Includes study of professional issues relevant to group processes, involves participation and leading group experiences.

Coun 531: Psychology of Women, Gender, and Development: This course presents current research and trends in developmental theory, particularly theories pertaining to psychological development of women and men. Issues such as abuse, ageism, depression, eating disorders, emotional experience and expression, heterosexism, feminism, and multiculturalism will be examined as related to the practice of psychology. Learning methods include writing, music, film, group discussion and creative projects.

Coun 532: Multicultural Counseling: "This course offers an introduction to counseling theories and interventions appropriate for American ethnic and non-ethnic minority clients. The values suppositions of various cultural groups will be examined"(college catalog p. 24).

Assessments Include:
Papers
Exams
Presentations
Counselor Preparation Comprehensive Examination (CPCE)
Student Internship Evaluation Forms

## CURRICULUM EXHIBIT FORM BASIC PROGRAM <br> EDUCATION STANDARDS AND PRACTICES BOARD

SFN 14381 (05-06)

| Institution: University of North Dakota |  | Major: Biology |
| :---: | :---: | :---: |
| Credits are: | Semester x | Quarter |
| Credits required for degree: 125 |  |  |
|  |  |  |
| General Studies | Teaching Specialty | Professional Education |
| Must total at least 39 credits | Credits required: 71-72 | Must total at least 32-34 credits |
| Behavioral Sciences (9 Min) | 40 Major hours including: |  |
| Electives in at least 2 areas from the following departments: | Biol 150 \& 150L Gen Biology I (4) | T\&L 325 Exploring Teaching in Secondary Schools (3) T\&L 345 Curriculum Development (3) |
|  | Biol 151 \& 151L Gen Biology II (4) |  |
| from the following departments: | Biol 312 Evolution (3) |  |
| $\begin{array}{\|l} \text { Antrropology, A\&S, } \\ \text { Communication, CSD, } \end{array}$ | Biol 315 Genetics (3) | T\&L 350 Dev \& Ed of Adolescent (3) |
| Economics, Geography, History, | Biol 332 Ecology <br> Biol 341 Cell Biology | T\&L 386 Field Experience (Optional 1) |
| Honors, Humanities, Indian | 20 hours Biology Electives including | T\&L 401 School Lab Safety (1) |
| Studies, Music, Nursing, | Biol 336 Systematic Botany (4) |  |
| Nutrition, Political Science, | MBio 302 General Microbiology (4) | T\&L 433 Multicultural Ed (3) |
| Psychology, Recreation and |  | T\&L 460 Micro Teaching (3) |
| Leisure, Rehab Services, | No more than one biology course intended for non-majors (all UND | T\&L 486 Field Experience (1) |
| Sociology, Social work, Space |  | T\&L 488 Senior Seminar (1) |
| Studies, T\&L. 9 credits Total | 200-level biology courses) will count toward 40 -hour major. At least 4 | T\&L 495 Independent Study (Optional 1) |
| Humanities | upper-division biology courses with laboratories must be included in the | T\&L 487 Student Teaching (16) |
| Electives from at least 2 areas in the following departments: Art, EHD, English, Fine Arts, History, | laboratories must be included in the 40-hour major. Up to 2 life-sciences |  |
|  | related courses from other |  |
|  |  |  |
| honors, Indian Studies, IT, | $\text { toward the } 40 \text { hour major. }$ |  |
| Languages, Music, Philosophy, |  |  |
| Political Science, Religion and | All 300 or 400 biology courses will |  |
| Theater Arts. 9 credits Total | some of which include: |  |
| Natural Sciences (9 Min) | Biol 333 Population Biology (3) |  |
| Electives in at least 2 areas and |  |  |
| 1 lab science from the followingdepartments: Anthropology, | Biol 336 Systematic Botany (4) Biol 338 Animal Behavior (2) |  |
|  | Biol 338 Animal Behavior Lab (1) |  |
| departments: Anthropology, Atmospheric Sci, Biology, | Biol 350 Plant Form/Function (3) |  |
| Chemistry, Computer, Sci, | Biol Entomology (4) |  |
| Economics, Geography, | Biol 364 Parasitology (2) |  |
| Geology, Honors, Humanities, IT, | Biol 364L Parasitology Lab (1) |  |
| Mathematics, Nutr and Dietetics, | Biol 367 Cytology (3) |  |
|  | Biol 369 Histology (2) |  |
| Sociology and Space Studies 9 credits Total | Biol 370 Vertebrate Zoology (3) |  |
|  | Biol 371 Anatomy and Adaptations |  |
|  | Biol 420 Neuroscience (3) |  |
| Symbolic Systems (9 Min) | Biol 425 Ichthyology (3) |  |
| Engl 110 Composition (3) | Biol 427 Ornithology (3) |  |
| Comm 110 Public Speaking (3) | Biol 428 Mammalogy (3) |  |
| And one additional course used | Biol 431 Wildlife Management (4) |  |
| to satisfy the "Communition" | Biol 433 Aquatic Ecology (3) |  |


| general education requirement. 9 credits Total | Biol 438 Fisheries Management (3) <br> Biol 442 Physiology of Organs and <br> Systems (3) <br> Biol 442 Physiology of Organs and <br> Systems Lab (1) <br> Biol 450 Molecular Genetics (2) <br> Biol 470 Biometry (3) <br> Biol 477 Concepts of Biology (2) <br> No More than a combined total of 10 credits from the following can count towards the 40 hour major: <br> Biol 489 Senior Honors Thesis (1-15) <br> Biol 492 Research (1-4) <br> Biol 494 Directed Studies (1-4) <br> Required in other Departments: <br> Phys 211 College Physics I (4) <br> Phys 212 College Physics II (4) <br> Chem 121/121L General Chem I (4) <br> Chem 122/122L General Chem II (4) <br> Math 146 Applied Calculus (3) <br> Or Math 166 Calculus II (4) <br> Chem 240 Organic Chemistry <br> BMB BioChem Lecture <br> Biol 470 Biometry, or some other approved statistics-based couse <br> A Minimum of 4 hrs of Earth Science is required (4) |  |
| :---: | :---: | :---: |



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