Assessment Plan for Fields of Study

Program Information	
Field of Study	Natural Science (FSNS)
Initial semester in which data will be collected	Spring 2010

Members of Assessment Working Group	
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Program Mission Statement

The mission of Natural Science Fields of Study courses is to enhance students' appreciation of science as well as their understanding of the challenges associated with conducting scientific research as the embark on their undergraduate majors. Courses within FSNS are designed to expose students to scientific methodology involved in studying the physical universe from all levels of organization, including inanimate and living systems. Students enrolled in these courses will learn to value the importance of the scientific process and will gain experience formulating and testing hypotheses. These goals will be accomplished through a laboratory course selected from one of the three areas of science represented at the University of Richmond (Chemistry, Physics, or the Biological Sciences).

Means of Assessment and Targets

Learning Outcome 1

Outcome Description	Students will be able to demonstrate knowledge and understanding of content material within the course discipline.
Target	At most 30% of students will have an "unacceptable" rating.
Data Source	All students taking a course for FSNS credit will be assessed on this objective by the instructor as described in the process document.
Means of Assessment	Students' achievement of this objective will be assessed using an embedded assessment item selected by the instructor. This may take the form of a lab report or research paper or other assignment or examination question –whatever is determined to be most appropriate for this learning objective.

Means of Scoring	Student work will be scored using a standardized rubric by faculty members teaching the courses. Scores will be reported for each category on the rubric in raw numbers for each scale point category. See attached rubric.
Learning Outcome 2	
Outcome Description	Students will be able to recognize testable hypotheses, will demonstrate the ability to formulate good scientific hypotheses, and will understand how to design appropriate tests of hypotheses in a field-specific context.
Target	At most 30% of students will have an "unacceptable" rating.
Data Source	All students taking a course for FSNS credit will be assessed on this objective by the instructor as described in the process document.
Means of Assessment	Students' achievement of this objective will be assessed using an embedded assessment item selected by the instructor. This may take the form of a lab report or research paper or other assignment or examination question –whatever is determined to be most appropriate for this learning objective.
Means of Scoring	Student work will be scored using a standardized rubric by faculty members teaching the courses. Scores will be reported for each category on the rubric in raw numbers for each scale point category. See attached rubric.
Learning Outcome 3	
Outcome Description	Students will analyze and interpret data using discipline-specific tools.
Target	At most 30% of students will have an "unacceptable" rating.
Data Source	All students taking a course for FSNS credit will be assessed on this objective by the instructor as described in the process document.
Means of Assessment	Students' achievement of this objective will be assessed using an embedded assessment item selected by the instructor. This may take the form of a lab report or research paper or other assignment or examination question –whatever is determined to be most appropriate for this learning objective.
Means of Scoring	Student work will be scored using a standardized rubric by faculty members teaching the courses. Scores will be reported for each category on the rubric in raw numbers for each scale point category. See attached rubric.
Learning Outcome 4	
Outcome Description	Students will be able to interpret their knowledge in meaningful and appropriate ways as they draw conclusions about the significance of scientific data.
Target	At most 30% of students will have an "unacceptable" rating.
Data Source	All students taking a course for FSNS credit will be assessed on this objective by the instructor as described in the process document.

Means of Assessment	Students' achievement of this objective will be assessed using an embedded assessment item selected by the instructor. This may take the form of a lab report or research paper or other assignment or examination question –whatever is determined to be most appropriate for this learning objective.
Means of Scoring	Student work will be scored using a standardized rubric by faculty members teaching the courses. Scores will be reported for each category on the rubric in raw numbers for each scale point category. See attached rubric.
Plan for Use and Dissemination	
How will data be used to make decisions?	Individual faculty teaching a course being assessed will compare the course results to the aggregate results for the entire set of assessed courses to see if one or more of the learning objectives are not being met by a sufficient/expected number of students. Adjustments to the course will be made by the instructor to enhance attainment of the learning objectives in subsequent offerings of the course. If the General Education Committee sees that in the aggregate the targets are not being met, then it may initiate workshops and other activities involving all faculty teaching in the field of study. The goal will be to enable faculty to consider ways to increase the number of students obtaining the learning objectives.
How will results be shared?	Results from individual courses will be submitted via an on-line system to an individual designated by the General Education Committee. That individual will create a summary report for the General Education Committee's use. All instructors teaching in the field of study will receive a copy of the report. The report will be posted on the Office of Institutional Effectiveness Web site and shared with senior academic administrators.

Assessment Rubric: Field of Study: Natural Science (FSNS)

Learning Objective #1: Students demonstrate in-depth knowledge and understanding of content material within the course

Unacceptable: Limited or no evidence of higher order thinking with confused demonstration of understanding of the material.

Marginal: Some placement of ideas in appropriate disciplinary context. Limited evidence of higher order thinking.

Proficient: Some indication of higher order thinking demonstrating mastery of the material.

Exemplary: Clear indication of higher order thinking demonstrating mastery of the material.

Learning Objective #2: Student demonstrates ability to formulate and test good scientific hypotheses.

Unacceptable: Formulates non-testable hypotheses and provides no indication of an understanding of the importance of elegance/clarity in hypothesis formation. Consistently designs poor experiments.

Marginal: Formulates non-testable hypotheses but contains elements indicative of some understanding of the importance of elegance/clarity in hypothesis creation. Designs weak experiments

Proficient: Formulates hypotheses that are testable but lack some clarity or contain some confounding variables. Usually applies appropriate methodologies.

Exemplary: Formulates elegant and easy to test hypotheses with no confounding variables. Applies appropriate methodologies.

Learning Objective #3: Students analyze and interpret data using discipline-specific tools.

Unacceptable: Fails to identify or apply appropriate quantitative/qualitative methodologies.

Marginal: Inconsistently identifies and irregularly applies appropriate quantitative/qualitative methodologies

Proficient: Typically identifies and usually applies appropriate quantitative/qualitative methodologies

Exemplary: Consistently identifies and correctly applies appropriate quantitative/qualitative methodologies

Learning Objective #4: Students interpret knowledge in meaningful and appropriate ways as they draw conclusions about the significance of scientific data.

Unacceptable: Draws incorrect conclusions and misunderstandings the significance of data/findings.

Marginal: Extrapolates beyond the data creating nonviable interpretations of data at hand.

Proficient: Conclusions are generally solid, but may lack some clarity or consistency with data.

Exemplary: Draws logical conclusions that follow from data in a manner indicating clear understanding of significance.