

**2018**  
**Elements of the Assessment Process**  
**Form E-1-A for Boston College Biology Department**

**Biology CORE**

- 1) **Have formal learning outcomes been developed? What are they?** (What specific sets of skills and knowledge does the department expect its majors to have acquired before they graduate?)

Students completing the Natural Science Core will:

1. expand their understanding of the principles, body of knowledge and investigative strategies that comprise science and its technological applications;
2. develop a scientific literacy that will promote curiosity, respect for the scientific method, and general awareness of the limitations of scientific conclusions;
3. recognize the role of scientific discovery, past, present and future, in interrelated topics such as human health, societal well-being and planetary sustainability; and
4. appreciate the role of science in defining their relationship with the natural world and their position within the cosmos.

- 2) **Where are these learning outcomes published? Be specific.** (Where are the department's learning expectations accessible to potential majors: on the web or in the catalog or in your department major handouts?)

Arts and Science CORE Website

- 3) **Other than GPA, what data/evidence is used to determine whether graduates have achieved the stated outcomes for the degree?** (What do you use to assess which of the student learning outcomes are being achieved more or less well?)

**A. Student survey:** The following questions were added to the course evaluations for each of the core courses. Agree (5) to Not Agree (1)

- 1. This course has shown me that even accepted 'truths' in science or medicine or society are open to exploration by shifting perspective and questioning.**

BIOL 1440

65% strongly agree

27 % agree

BIOL1702

71% strongly agree

29% agree

- 2. I have gained confidence that I can take complex questions or topics and apply analysis through a series of sub-questions.**

BIOL1440

55% strongly agree

30% agree

BIOL1702

41% strongly agree

59% agree

**3. This course has challenged my curiosity and helped to develop my critical thinking skills.**

BIOL 1440

67% strongly agree

25% agree

BIOL1702

24% strongly agree

76% agree

Summary of student perceptions of their learning:

In the Human Disease course, it is clear that the students felt the course experience was positive in all the areas around analysis and critical thinking: developing a healthy skepticism, ability to break big questions into smaller units and the importance of curiosity.

In Sustaining the Biosphere, students reported an increase in reflective, critical thinking about their choices and their interactions with Earth and with other beings.

**B. Evaluation of student work.** Faculty teaching in two non-major core courses (BIO1702 and 1440) will agree upon a particular core outcome with which to assess student work. The assessment strategy will be customized for each of the courses.

These two core courses were evaluated for student achievement in areas addressing each of the three survey questions.

**BIOL1702 Human Disease and Chronic Illness  
19 students, all Freshman**

Method of assessment: For their final project, students researched and presented to the class a specific pathogen and its related human disease. Each project was evaluated for its level of achievement in areas addressed in the survey: 5= high achievement; 1= low achievement

Did the project demonstrate that well-known topics in science or medicine still have much to be discovered through continual research?

Average score = 3.42

Did the project demonstrate that complex scientific questions or topics can be reduced to a series of sub-questions?

Average score = 2.6

Did the students use curiosity to further explore their topic through the art of asking questions?

Average score = 3.14

Summary BIOL 1702: Students show marginal improvements in their ability to research a topic of interest, outline the rationale for a given approach and provide a narrative with directed analysis. While the performance evaluation indicates an overall average achievement, there were wide differences in the presentations. 2/7 presentations were clearly excellent. 1/7 was subpar. The rest were in the middle, each with strengths and weaknesses.

**BIOL 1440 Sustaining the Biosphere  
60 students**

Method of assessment: For the final course project, students created an art object that represented their identity as an ecological being, intimately connected with self, other and Earth. Along with this, they submitted a statement on their

creation process, what it meant to them, what they learned, what was surprising about it, and what was difficult.

Each project was evaluated for its level of achievement in areas addressed in the survey and in Learning Goal 4 (appreciating the role of science in defining their relationship with the natural world and their position within the cosmos.): 5= high achievement; 1= low achievement

Did the project demonstrate an understanding of the student's interconnection with Earth?

Average score = 4.6

Did the project show evidence of detailed observation of the natural world?

Average score = 4.65

Did the project demonstrate the ability to be reflective (evidence of multiple levels of questioning observations and reactions)?

Average score = 4.8

Biol1440: Summary- Student survey indicates that students think they have a good understanding of the importance of research to increasing our knowledge, that knowledge continues to expand and that curiosity is an important part of critical thinking. Student work indicates that students can use reflective questions to understand the natural world and their place in it, and can make detailed observations of the natural world.

4) **Who interprets the evidence? What is the process?** (Who in the department is responsible for interpreting the data and making recommendations for curriculum or assignment changes if appropriate?)

Department Core Representative and faculty teaching in the core.

5) **What changes have been made as a result of using the data/evidence?** (Have there been any recent changes to your curriculum or program? Why were they made?)

**BIOL 1702:** This year the following changes were made to increase the quality of the presentation – especially in the area of analysis.

- Students were assigned groups in the beginning, and chose a topic within a few weeks.
- To encourage more critical thinking, all titles were to be in the form of an over-arching question – one to be explored through the presentation
- Students had a mid-semester deadline to provide me an update on their focus and question, which I provided written feedback.
- After spring break, students met as a group with me to talk though their approach – I could also give them directions to include more analysis in the talk
- The biggest challenge for them was starting early enough to explore the topic. It is difficult to give them specific feedback if they have not yet done the basic research.

- I provided each group a written critique- which hopefully will be useful in other classes.

**BIOL1440:** This year, the final course project was directly assessed for evidence of detailed observation of the natural world, and the student's ability to ask probing, reflective questions.

6) **What evidence do you have that the changes have resulted in improved learning outcomes?**

BIOL 1702: While the improvements regarding the assessed specific outcomes were modest, I think the changes made this year (more time, more specific feedback and suggestions in the planning phase were useful and should be continued). Procrastination prevents developing good critical thinking skills. There is not a clear solution to this at the university level. May involve more of an incremental assessment as students move through their projects.

**BIOL1440:** Last year, assessment focused on student narratives about their final class projects. This year, assessment of student work focused on assessment of the student project itself, looking for evidence of attention to detail in the natural world and the ability to be deeply reflective. Students achieved each of these goals.

N/A

7) **Date of the most recent program review.** (Your latest comprehensive departmental self-study and external review.)

2007