

**Elements of the Assessment Process**  
**Form E-1-A for Boston College Departments/Programs**

**Department/Program** Biology Department 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 dept 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, BIOL1100 F20 (General Biology) (questions below; see next page for responses)—

The image shows a screenshot of a student survey for BIOL1100 F20. It contains four questions, each with a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'. The questions are:

- 1. This course has helped me understand my relationship with the natural world.
- 2. This course has helped me recognize the role of scientific discovery in societal well-being.
- 3. This course has helped me to understand that science is a human endeavor, and has introduced me to some important scientists and their discoveries.
- 4. This course has exposed me to the role of science in modern life.

Each question has five radio buttons corresponding to the scale points 1 through 5.

# 50 responses



Accepting responses

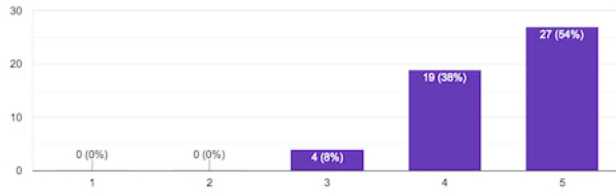
Summary

Question

Individual

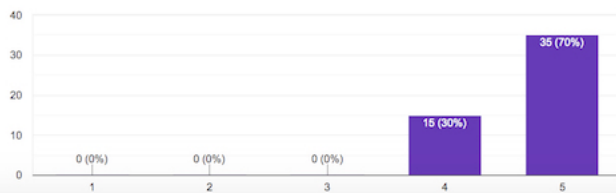
This course has helped me understand my relationship with the natural world.

50 responses



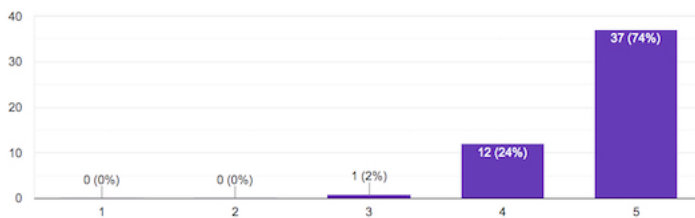
This course has helped me recognize the role of scientific discovery in societal well-being.

50 responses



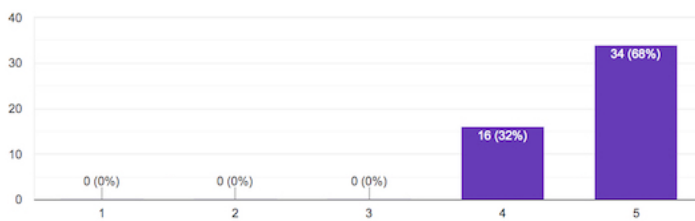
This course has helped me to understand that science is a human endeavor, and has introduced me to some important scientists and their discoveries.

50 responses



This course has exposed me to the role of science in modern life.

50 responses



B) Questions added to final exam, BIOL1100 F20 (not used in exam or final grade)

1. What can you conclude from the great increase in the presence of **antibiotic-resistant** bacteria in modern hospitals?

- a) Over-use of antibiotics directly CAUSES the EXACT mutations that give bacteria resistance to antibiotics.
- b) Over-use of antibiotics SELECTS for bacteria that ALREADY HAVE mutations that provide antibiotic resistance.
- c) The increase in antibiotic-resistant bacteria in hospitals is not related to antibiotic over-use.

**91.4% correct**

2. Which of the following statements is **FALSE** concerning fundamental aspects of life on earth?

- a) On earth today, all cells have come from the division of other cells ("*Omni cellula e cellula*"), not through "spontaneous generation."
- b) The biochemical reactions that take place in cells today are **NOT** consistent with the known laws of chemistry and physics.
- c) The properties of our genetic code provide evidence that all life on earth is related, and is descended from a single common cellular ancestor.

**80.5% correct**

3. Which of the following is **CORRECT** concerning our current knowledge of life in our galaxy (that is, in the *Milky Way* galaxy)?

- a) Many planets in our galaxy definitely contain, or have contained, life as we know it.
- b) No other planets in our galaxy, besides Earth, have life as we know it.
- c) The question of life on other planets in our galaxy is currently unanswered, as we do not have enough certain evidence (proof) one way or the other.

**92.7% correct**

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?)

The instructors in the course - they examine student responses and align with performance expectations.

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?)

(Plans for next offering: further emphasize scientific reasoning and literacy, in light of current pandemic. Also, emphasize how life on earth is fully consistent with the known laws of chemistry and physics.)

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

**Increase in Part B scores.**

7) **Date of the most recent program review.** (Your latest comprehensive departmental self-study and external review.) **2019-21 (in progress)**