

BERGEN COMMUNITY COLLEGE
Student Learning Outcomes Assessment Report

Assessment Report for (Department or Program): Biology

Academic Chair: Bob Highley

Assessment Period: 2012-2014

Submitted by: Mary Flannery (Committee members: Coleen DiLauro, Mary Flannery, John Smalley)

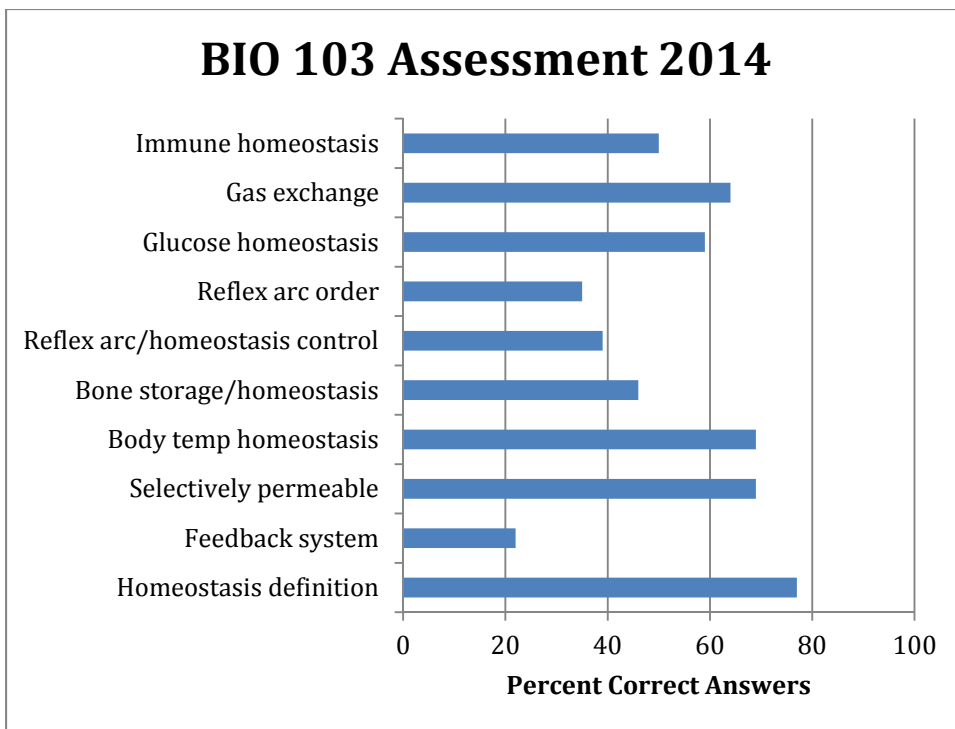
1. Intended Outcome (Goal): To measure students understanding of the concept of homeostasis, a fundamental concept in human biology.
 2. a) Program goal(s) to which the intended outcome relates: Students demonstrate a thorough knowledge and understanding of homeostasis.
 - b) General Education Requirement(s) to which the intended outcome relates: Critical thinking.
 - c) Section(s) of the Strategic Plan to which the intended outcome relates: Continuously assess student learning outcomes and track student satisfaction of their overall college experience; share data extensively and utilize if for program enhancements.
3. a) Means of assessment: A list of 50 questions was compiled targeting homeostasis related student learning objectives from the course syllabus by one member of the committee. The other two committee members, who were currently teaching the course, selected 15 questions each that they believed, reflected the most essential concepts from the curriculum. The ten questions on the quiz were based on common responses.
 - b) Sources of data: The quizzes were distributed to all of the BIO 103 sections during the last 3 weeks of the fall 2013 and spring 2014 semesters. Quizzes were anonymous and instructors returned the packet to the department secretary.
 - c) Desired result: 70% of students should answer each question correctly.
4. Summary of Results: We received a total of 249 student responses. Our results showed that only one question, dealing with the definition of homeostasis, had greater than 70% correct response. The other questions ranged from a low of 22% correct responses for the question related to components of the feedback loop which is the mechanism to maintain homeostasis, to 69% correct responses for understanding the concept of selective permeability of a plasma membrane and skin's role in body temperature homeostasis.

- Question 1 Targeted the definition of homeostasis: 77% of the students knew that homeostasis is the condition of equilibrium (balance) in the body's internal environment which is a fundamental principle.
- Question 2 Feedback systems are the means by which the body regulates homeostasis: 22% of students failed to recognize the function of the components of the feedback system which is the mechanism for maintaining homeostasis.
- Question 3 "Selective permeability" is the means by which individual cells regulate their internal environment: 69% of students were aware that some chemicals can move easily through the plasma membrane while other chemicals do not.
- Question 4 Skin's role in homeostasis of body temperature: 69% of students were able to identify perspiration as a regulatory mechanism for control of body temperature.
- Question 5 Bone's role in storing minerals and adipose which functions in homeostasis: Only 46% of students could correctly identify triglycerides in adipose tissue and the minerals calcium and phosphorus as substances that are stored in bones.
- Question 6 Nervous system's mechanism for regulating protective homeostatic parameters is the reflex arc: Only 39% of students were able to correctly identify the sensory receptors as the structures that monitor body conditions.
- Question 7 Sequence of the reflex arc: Only 35% of students were able to recognize the correct sequence of events in a reflex arc.
- Question 8 Homeostasis of blood glucose levels: 59% of students were able to distinguish the antagonistic hormones insulin and glucagon as the regulators of blood glucose levels.
- Question 9 Diffusion of oxygen and carbon dioxide in the lungs: 64% of students could discern that oxygen diffuses from the alveoli into the blood and carbon dioxide diffuses from the blood into the alveoli.
- Question 10 Disruptions in homeostasis of the immune system: 50% of students realized that lack of resistance is known as susceptibility.

5. After analyzing the data, our committee had possible proposals to address the reasons why nine of the ten questions failed to meet the benchmark:

1. Clarification of Student Learning Objectives Based on the results, especially dealing with the components of the feedback loop and the reflex arc, it seems that the learning objectives may not be clear and concise in the syllabus. In particular we will review and revamp the specific learning objectives for each individual body system to target each body system's responsibility in homeostasis.

2. Address the significance of assessment of an individual course: As we were evaluating the individual student responses to the assessment, we were struck by the fact that we had packets in which all of the students scored 0-20 on the quiz. We postulated that the exercise of assessing the course was not being taken seriously. We are currently examining specific processes to address this:
- Offer students some incentive to take the assessment seriously, not just fill in any answers.
 - Impress upon all faculty (especially adjuncts) to take the assessment seriously and insure anonymity.



BIO 103 ASSESSMENT: Complete the following questions on the scantron provided.

1. This is the condition of equilibrium (balance) in the body's internal environment.

- a) palpation
- b) metabolism
- c) homeostasis
- e) differentiation

2. This is the structure of a feedback system that receives output from the control center.

- a) receptor
- b) stimulus
- c) response
- d) effector

3. Plasma membranes are _____, which means that some chemicals move easily through plasma membrane while other chemicals do not.

- a) selectively permeable
- b) concentration graded
- c) electrically graded
- d) electrical insulators

4. When a person's body becomes too warm, how does the integumentary system work with other body systems to maintain homeostasis?

- a) Increased secretion of perspiration helps cool the body.
- b) Fewer waste products are secreted in sweat, so the kidneys work harder.
- c) Blood vessels in the skin constrict and increase blood flow to the core.
- d) Infections increase because the skin becomes more permeable.

5. Which of the following substances are stored in the structure of adult bones for use by other tissues in the body?

- a) calcium
- b) phosphorous
- c) triglycerides
- d) all of the above

6. Which of the following parts of a reflex arc monitors body conditions?

- a) Sensory receptor
- b) Integrating center
- c) Motor neuron
- d) Effector
- e) Interneuron

7. Which of the following lists the components of an autonomic reflex arc in the proper sequence of activation?

- a) receptor – sensory neuron – integrating center – motor neuron – effector
- b) receptor – motor neuron – integrating center – sensory neuron – effector
- c) effector – sensory neuron – integrating center – motor neuron – receptor
- d) integrating center – receptor – sensory neuron – motor neuron – effector
- e) receptor – sensory neuron – motor neuron – effector – integrating center

8. The hormones that are involved in blood glucose homeostasis are:

- a) Parathyroid hormone (PTH) and calcitonin
- b) Insulin and glucagon
- c) Aldosterone and cortisol
- d) Testosterone and estrogens

9. This is direction of diffusion of gases at the alveoli of the lungs.

- a) Oxygen into blood , Carbon dioxide into blood
- b) Oxygen out of blood , Carbon dioxide into blood
- c) Oxygen into blood , Carbon dioxide out of blood
- d) Oxygen out of blood , Carbon dioxide out of blood

10. Lack of resistance is also known as:

- a) Pathogenic
- b) Innate
- c) Specific
- d) Susceptibility