Course Outcomes Guide (COG)

Course Title: Biology 110, Human Biology **Date: October 10, 2014**

Course Team: Cindy Dove, adjuncts: Mindy Rouzer, Gregg Mason, Michael Chase, Eileen Stein

Expected Learning Outcomes:
The student will:

1. Apply a knowledge of basic chemistry and basic cell biology to understand how the human body functions.
2. Use a basic knowledge of the structure and function of each body system to understand how homeostasis is maintained.
3. Relate fundamental knowledge of the human body in homeostasis to clinical applications and common medical disorders.
4. Explore current areas of medical research and their relationship to social and ethical issues.
5. Access, process, analyze and synthesize scientific information.

Assessment (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)
The adjuncts and lead instructor worked together to develop and refine a common cumulative exam that is given at the end of each semester. This involved looking at course outcomes, and developing course objectives.

For general education assessment, a five question scientific analysis supplement is given with the cumulative exam. It involves reading a passage and answering questions about it.

Validation (What methods have you used or will you use to validate your assessment?)
The test currently does not have external validation. However, all adjunct faculty worked together to develop the exam. The full-time and adjunct faculty believes that it reflects the content of the class. The general education assessment is used in the other biology courses.

Results (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)
Please see the results in the attached data sheet.

Item analysis Comprehensive final
Areas of weakness:
-Students struggled with the concept of innate immune system.
-lower respiratory anatomy

Item analysis General Education component
Students struggled with question #2 and #4. This question was also difficult for Bio103 (Anatomy and Physiology I) students.

We need to include more scientific reasoning in this course. I will need to work with the adjuncts to address this.

Follow-up (How have you used or how will you use the data to improve student learning?)
Faculty have begun using Wiley Plus to assign homework. This will encourage more time on task.

Budget Justification (What resources are necessary to improve student learning?)
This project has been hampered by not having any full-time faculty with a dedicated mission to focus on this class. Release time to complete extra projects will become necessary as the class enrollments continue to grow.

Course: BIO 110 **SLOA Data** **Faculty Team: C. Dove**

	SU 2009	FA 2009	SP 2010	SU 2010	FA 2010	SP 2011	SU 2011	FA 2011	SP 2012	SU 2012	FA 2012	SP 2013	SU 2013	FA 2013	SP 2014	SU 2014
# Active students	21	101	105	27	140	135	20	113	107	39	153	126		117	97	40
%W	9.5	20.8	15.2	22.2	17.9	17.0	0	8	22.4	20.5	18.3	19.0	Need	Data	from	PIE
*% walk-away Fs No final exam/grade = F																
% Success (A,B,C)	85.7	69.7	78.1	70.4	76.4	75.6	100	80.5	72	66.7	81.7	81.0				
Mean Common Lab Practical Score	NO LAB COMPONENT OF THIS COURSE															
Common Comprehensive Final Exam Score								72% N=55	**	**	68% N=89	68.5% N=104	Data recorded on wrong form	73.9% N=117		71.5% n=40
Gen Ed Questions											65% N=89	59% N=104	66.4% N=97	62.3% N=117	68.2% N=97	66.5% N=40
Mean course grade	2.67	2.21	2.50	2.52	2.52	2.51	3.30	2.77	2.53	2.08	2.61	2.53				
Item Analysis **Weakest Content Areas**												SEE COG				See COG

*% Walk-away Fs = Did not take the final exam and received a grade of F.

****not recorded on proper scantron forms**

*****General Education Assessment**

Solutions are mixtures that contain a solid, or a *solute*, dissolved in fluid, or a *solvent*. For example, in a solution containing salt and water, salt is the solute. All molecules in a solution have *kinetic energy* and move randomly. As a result, molecules in solution will always travel from areas of high concentration toward areas of low concentration until all molecules are randomly distributed and their concentration is equal throughout. In other words molecules move randomly, and will always travel down a *concentration gradient* toward *equilibrium*.

Osmosis occurs whenever water molecules travel across a *semi-permeable membrane*. Generally, semi-permeable membranes allow water molecules, but not salts, to cross. If two solutions with different salt concentrations are separated by a semi-permeable membrane, osmosis will occur until the concentration of water and salt is equal on both sides of the membrane. At *equilibrium*, these solutions are *isotonic*, or have the same concentration of solvent and solute.

A scientist wants to determine how much salt (NaCl) potato cells contain. Knowing that all cells are enclosed by a semi-permeable membrane, the scientist predicts that if a potato is submerged in a salt solution it will either lose water or gain water by osmosis, depending on the relative concentration of salt in the potato cells compared to the surrounding solution. To test this hypothesis, the scientist prepared several solutions with different NaCl concentrations. Then, she cut a potato into pieces of equal size. Each piece was weighed and then immersed in NaCl solutions of different concentrations for exactly one hour. At the end of the hour, the potato piece was removed from the NaCl solution and reweighed. The results of this experiment are summarized in Table 1 below:

Table 1

NaCl in solution (%)	Initial weight (g)	Final Weight (g)	change in weight (%)
0.00	2.80	3.25	+ 16
0.50	2.72	2.80	+ 3
1.00	2.74	2.47	- 10
1.50	2.81	2.30	- 18
2.00	2.82	2.20	- 22
3.00	2.77	2.08	- 25
5.00	2.78	2.00	- 28

1. According to data presented, what was the final weight of the potato piece when it was submerged in a 1.5% NaCl solution?
   a) 2.30 g
   b) 2.47 g
   c) 2.81 g
   d) 2.80 g
   e) 0.18 g

2. By looking at the data in Table 1, you could conclude that the potato pieces are isotonic to salt solutions with a concentration of _____ NaCl.
   a. between 0% and 0.50%
   b. between 0.50% and 1.00%
   c. between 1.00% and 1.50%

d. between 2.00% and 3.00%
e. greater than 5.00%

3. How would the weight of the potato piece be affected if it was submerged in a 10% NaCl solution for one hour?
   a. The final weight of the potato piece would be decreased by more than 28% of the original weight.
   b. The final weight of the potato piece would be increased by more than 28% of the original weight.
   c. The final weight of the potato piece would have decreased by less than 28% of the original weight
   d. The final weight would be more than 2.00 g
   e. There is not enough information given to determine an answer to this question.

4. A potato piece was placed in a 0% NaCl solution for one hour and its weight increased. From this observation you could conclude that ____.
   a. the potato piece released water because it contained less NaCl than the solution in which it was submerged.
   b. the potato piece absorbed water because it contained more NaCl that the solution in which is was submerged.
   c. the potato piece absorbed water because it contained less NaCl that the solution in which it was submerged.
   d. the potato piece was isotonic to the solution.
   e. none of the above.

5. Apply your understanding of what happened to the potato to a different vegetable: celery. How could you increase the water concentration in the cells of wilted celery in your refrigerator?
   a. Place the celery in 5.00% salt water.
   b. Place the celery in 2.00% salt water.
   c. Place the ce1ery in 1.00% salt water
   d. Place the celery in plain water with no salt.
   e. Heat the celery.

Gen Ed Results

The average score for the Bio103 students who took the general education questions was 73%. The item analysis is broken down below.

Question	**% Correct**	**Level of question**
1	90	knowledge
2	38	application
3	61	analysis
4	46	evaluation
5	61	synthesis