Progress Toward Biology Program AFIs

*Standard 11 The teacher of biology demonstrates an understanding of science as a human endeavor, of the nature of science, and of science from historical perspectives.*

*AFI 11.1 Assessment 6- does not address the standard to its entirety.*

*Rationale 11.1 It is unclear if the purpose of the standard is understood. The assessment is assessing the ethics of teaching.*

The Biology program is adding to Standard 11 Assessment 1a to join Assessment 6 so that Standard 11 may be addressed in its entirety. Assessment 1a is the Praxis II Subtest 1 Basic Principles of Science score. This subtest measures science from historical perspective as well as the nature of science (see Praxis II Test-at-a-Glance for Biology: Content Knowledge (0235)). Thus, the Praxis subtest assesses two of the three elements of Standard 11: the nature of science and science from historical perspectives.

The remaining part of the standard needing to be assessed is understanding of science as a human endeavor. Assessment 6 measures the remaining element of Standard 11—understanding of science as a human endeavor. In addition, to better convey the alignment of Assessment 6 with the specific element, the title of Assessment 6 is changed to Understanding Science as a Human Endeavor quiz. The revised Assessment 6 with rubric appears below:

**Understanding Science as a Human Endeavor quiz (30 points)**

1. The Eagle Forum and other groups have contended that the Hatch Amendment permits parents to exclude their children from classes including: Soc-Sim, death education, sexuality education and evolution. Respond defending sexuality and evolution education, a solid biology teacher should. [This is a “take-home” question. The answer rubric includes: 1) located and accurately understands actual parameters of the Hatch Amendment, 2) describes the correct legal restrictions (only government-mandated psychometrics), and 3) describes the purpose of the biology lessons and how they fall outside the Hatch Amendment. 3/3 excellent; 2/3 adequate; 1/3 or 0/3 failing.]

2. Arizona Governor Mecham appointed Jim Cooper as state education advisor. Cooper stated that if a student “wants to say the world is flat, the teacher doesn’t have the right to try to prove otherwise. The schools don’t have any business telling people what to believe.” Now, at the end of GB584, respond as a solid science or biology teacher would defending your responsibility to teach science concepts regardless of whether the parent agrees. [This is usually a “take-home” question. The answer rubric includes: 1) describes the “universality” of science, 2) discusses science being rooted in “natural phenomena” and therefore outside supernatural beliefs, 3) distinguishes between requiring students to “understand” and to “believe,” 4) describes the consequences of a critical mass of the population NOT being science literate. Rubric: 3/4 or 4/4 excellent; 2/3 adequate; 1/3 or 0/3 failing.]

3. You applied for a position and were accepted to teach at the American University of Beirut in Lebanon as a biologist. You teach basic biology courses at the University, located in a compound area in central Beirut, to multi-national classes for one semester. On your way home from the University, you are kidnapped by armed militants and taken to an isolated section of the city. Over the next few days, you discover the territory outside your prison is hostile and you therefore have no chance of escape except by voluntary release, your captors
speak very good English--indeed have been trained in U.S. universities, you were captured and are to be executed for your functions as a U.S. teacher, not for simply being an "American" (they executed a Lebanese teacher "teaching U.S. propaganda" the previous week), specific charges are leveled against you:

- as a teacher, you are automatically a propagandist.
- science is like history or sociology, etc...all written differently in different cultures.
- your language partitions the real world into erroneous beliefs.
- you promote your home country's view of the world in photos and films.

-when an event occurs in front of reporters from both countries, your people report it differently from theirs (this they have seen) and they believe you perpetuate such attitudes in the classroom.
- your captors point out that their own teachers imbue course content with cultural bias (your captors have been overseas and see cultural bias everywhere); they have no reason to believe you are different.

However, your captors are absolutely idealistic. They listen carefully to you and to the content of your arguments and will not act contrary to logic. Presently, they find it logical to consider a U.S. teacher a "proto-soldier" who biases people against their beliefs. Your only hope to get out of your situation is to present a convincing counter-argument, and fortunately, you are a science teacher.

Save yourself. (Provide responses to all of the above bulleted concerns)

[Rubric: 1) describes the “universality” of science being rooted in “natural phenomena” and therefore beyond national and ethnic boundaries, 2) indicates lessons are based in common experiences [lab, field work] that do not change across borders, 3) indicates science consequences [better medicine, technology, etc.] improve all societies regardless of politics and culture, 4) describes the consequences of a critical mass of the population anywhere NOT being science literate. Rubric: #1 is essential, 3/4 or 4/4 excellent; 2/3 adequate; 1/3 or 0/3 failing.]

Standard 12 The teacher of biology demonstrates an understanding of the concepts and processes unifying science domains.

AFI 12.1 The rubric is a course description and not an assessment of how the candidate meets the standard. Assessment 3 does not demonstrate candidate shows how to unify science domains.

Rationale 12.1 The rubric provided does not describe if candidate can unify science domains. As of the writing of the addendum, the Biology program is still working on how to address this AFI. This will be provided the Onsite Review Team.

Standard 17 The teacher of biology designs and manages safe and supportive learning environments.

AFI 17.1 Assessment 6-it is not clear how the candidate is proficient in the standard.

Rationale 17.1 It is unclear how the candidates taking a blood sample demonstrates an ability to design and manage safe and supportive learning environments.

To bolster the assessment of Standard 17, the Biology program has added a second measure to the blood lab activity. The important activity of conducting a blood lab with use of sharp tools, presence of blood, and need for appropriate behavioral and class expectations is reflective of the
care and concern the Biology teacher must exercise in order to design and manage a safe and supportive learning environment. To augment the blood lab, the Biology program has added a second measurement—a test on the handling of hazardous materials in the classroom and laboratory. The new measure is called the Haz-Mat Test (for Hazardous Materials Test). The Standard 17 Data Table will present one score which will be the sum of scores from the Blood Lab activity and the Haz-Mat Test. The acceptable level of performance will be 80% as the acceptable level of performance.

The description of the Haz-Mat Test appears below:

B. Haz-Mat Test (35 points)

1. Why is it important to keep MSDS sheets for all of the chemicals in your lab (aside from it being required by EPA and KDHE regulations)?
2. You use a “sharps” container for disposal of scalpel blades, lancelets, etc. that may be biohazards. The sharps container has filled up. How do you dispose of it in accordance with regulations?

Class problem [all require use of Material Safety Data Sheets (MSDS) sheets]:

3. You have the MSDS notebook for all of your chemicals readily at hand in your classroom lab. Each of you have drawn a lab chemical scenario. Provide the correct response, QUICKLY!
   • Student spills a few grains of sodium cyanide (a P-1 chemical) and a little is pressed into a fresh cut on his finger! [Immediate administration of amyl nitrate]
   • Having converted all of your preserved animals-in-jars from formaldehyde to 70% isopropyl alcohol, how do you dispose of the 40% formalin? [Combines with bleach until no smell; flush down drain.]
   • You discover a sealed bottle of carbon tetrachloride in the chemical closet that has never been opened. You have no use for it. It is just another name for dry cleaning fluid, and used to be used in fire extinguishers for oil-based fires. It will evaporate away in a few minutes. Can you simply evaporate it away? [No! It must be disposed of through a chemical redistributor. It becomes the wartime nerve gas phosgene upon contact with water.]
   • You will be using standard petroleum ether as the solvent for thin layer chromatography. What precautions must you take in the classroom laboratory? [Lid to prevent evaporation; evaporate will crystallize and crystals will explode. Highly flammable; no open fires in room.]
   • You find bottles of liquid picric acid or perchloric acid in your chemical storage room. They are old and although the lids were never opened, it is obvious that the liquid level is down from leakage. You do not need these chemicals. How do you dispose of them? [This is an emergency situation; these evaporates also crystallize and present an immediate hazard of explosion. This requires a hazmat team.]

The score of the combined Blood Lab and Haz-Mat Test is the measure for Standard 17. The total number of points is 55. The criterion for success for the Blood Lab is that candidates must repeat the process until they score the full 20 points. On the Haz-Mat Test, which will be first administered during the Fall, 2011 semester, the criterion for success is 25, or 70%.