

Appendix A

Question coding scheme developed by Marbach-Ad and Sokolove (2000, p. 858-859),

Category 0: Questions that do not make logical or grammatical sense, or are based on a basic misunderstanding or misconception, or do not fit in any other category. (This is a “catch all” category that instructors can readily subdivide for teaching purposes for example, when grading written questions. In this case we chose not to subdivide the category in order to focus on the characteristics of desirable questions.)

Category 1a: Questions about a simple definition, concept, or fact that could be looked up in the textbook (i.e., “what is meant by the polarity of the membrane?”).

Category 1b: Questions about a more complex definition, concept, or fact explained fully in the textbook (i.e., “what does it mean when it says air moves through a bird's lungs?”).

Category 2: Ethical, moral, philosophical, or sociopolitical questions (i.e., “Carbon monoxide is a very deadly gas binding to hemoglobin much faster than oxygen. If it is so deadly, why are there no carbon monoxide detectors throughout the dorm halls?”).

Category 3: Questions for which the answer is a functional or evolutionary explanation. (In this case students begin by asking a question that relates to function and could, in principle, be answered in functional terms “Why do people have an appendix?”) however, the deeper answer is more often related to evolution than to function (the human appendix is a vestigial organ).

Category 4: Questions in which the student seeks more information than is available in the textbook (i.e., “What causes the ‘rumbling’ in your stomach when you are hungry?”).

Category 5: Questions resulting from extended thought and synthesis of prior knowledge and information, often preceded by a summary, a paradox, or something puzzling. (i.e., “In chapter 35 it says that caffeine, if taken excessively, can disrupt motor coordination and mental coherence which can cause depression. I know that Coca-Cola has some amount of caffeine in it. Does this mean that excessive consumption of it could lead to depression . . . ?”)

Category 6: Questions that contain within them the kernel of a research hypothesis (i.e., “I have heard that some people snore so badly that they stop breathing during their sleep. What correlation is there, if any, between “heavy snorers” and a higher instance of apnea during REM sleep. Can the attention their nervous system is devoting to a dream, interfere the regulation of respiration?”).