APPENDIX 4: DEPTH OF KNOWLEDGE LEVELS

Level 1

Level 1 requires students to recall facts, definitions, or simple procedures or processes. This level involves rote responses, using well-known formulas or following a set of clearly defined one-step procedures. The following are some examples of Level 1 performances:

- Recognize a fact, term, or property
- Use words or diagrams to represent a scientific concept or relationship
- Provide a standard scientific representation

Level 2

Level 2 requires students to make some decisions as to how to approach the question or problem. This level involves comparing, classifying, organizing, estimating, ordering, or displaying data. Typically this involves multi-step procedures. The following are some examples of Level 2 performances:

- Explain the relationship between terms, properties, or variables
- Describe examples and non-examples of biology concepts
- Select a procedure according to specified criteria and perform it

Level 3

Level 3 requires students to solve problems with more than one possible answer and justify responses. Experimental design involves more than one dependent variable. Students draw conclusions from observations, citing evidence, and developing a logical argument for concepts; explaining phenomena in terms of concepts, and using concepts to solve non-routine problems. The following are some examples of Level 3 performances:

- Identify research questions and design investigations for a scientific problem
- Develop a scientific model for a complex situation
- Form conclusions from experimental data

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Level 4

Level 4 requires students to make several connections and apply one approach among many to solve problems. Students are involved in developing generalizations from obtained results and formulating strategies to solve new problems in a variety of situations. Extended time is required to complete problem solving, but tasks are non-repetitive. The following are some examples of Level 4 performances:

- Based on provided data from a complex experiment that is novel to the student, deduce the fundamental relationship between several controlled variables
- Conduct an investigation, from specifying a problem to designing and performing an experiment, to analyzing data and formulating conclusions

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