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| 2019 CED SCIENCE PRACTICES | SKILLS |
| Science Practice 1  Concept Explanation  Explain biological concepts, processes, and models presented in written format. | 1.A  Describe biological concepts and/or processes. |
| 1.B  Explain biological concepts and/or processes. |
| 1.C  Explain biological concepts, processes, and/or models in applied contexts. |
| Science Practice 2  Visual Representations  Analyze visual representations of biological concepts and processes | 2.A  Describe characteristics of a biological concept, process, or model represented visually. |
| 2.B  Explain relationships between different characteristics of biological concepts, processes, or models represented visually a. In theoretical contexts. b. In applied contexts. |
| 2.C  Explain how biological concepts or processes represented visually relate to larger biological principles, concepts, processes, or theories. |
| 2.D  Represent relationships within biological models, including a. Mathematical models. b. Diagrams. c. Flow charts. |
| Science Practice 3  Questions and Methods  Determine scientific questions and methods. | 3.A  Identify or pose a testable question based on an observation, data, or a model. |
| 3.B  State the null or alternative hypotheses, or predict the results of an experiment. |
| 3.C  Identify experimental procedures that are aligned to the question, including a. Identifying dependent and independent variables. b. Identifying appropriate controls. c. Justifying appropriate controls. |
| 3.D  Make observations, or collect data from representations of laboratory setups or results. (Lab only; not assessed) |
| 3.E  Propose a new/next investigation based on a. An evaluation of the evidence from an experiment. b. An evaluation of the design/methods. |
| Science Practice 4  Representing and Describing Data Argumentation 6 | 4.A  Construct a graph, plot, or chart (X,Y; Log Y; Bar; Histogram; Line, Dual Y; Box and Whisker; Pie).  a. Orientation  b. Labeling  c. Units  d. Scaling  e. Plotting  f. Type  g. Trend line |
| 4.B  Describe data from a table or graph, including  a. Identifying specific data points.  b. Describing trends and/or patterns in the data.  c. Describing relationships between variables |
| Science Practice 5  Statistical Tests and Data Analysis Perform statistical tests and mathematical calculations to analyze and interpret data. | 5.A  Perform mathematical calculations, including  a. Mathematical equations in the curriculum.  b. Means.  c. Rates.  d. Ratios.  e. Percentages. |
| 5.B  Use confidence intervals and/ or error bars (both determined using standard errors) to determine whether sample means are statistically different. |
| 5.C  Perform chi-square hypothesis testing. |
| 5.D  Use data to evaluate a hypothesis (or prediction), including  a. Rejecting or failing to reject the null hypothesis.  b. Supporting or refuting the alternative hypothesis. |
| Science Practice 6  Develop and justify scientific arguments using evidence. Represent and describe data. | 6.A  Make a scientific claim |
| 6.B  Support a claim with evidence from biological principles, concepts, processes, and/or data. |
| 6.C  Provide reasoning to justify a claim by connecting evidence to biological theories. |
| 6.D  Explain the relationship between experimental results and larger biological concepts, processes, or theories. |
| 6.E  Predict the causes or effects of a change in, or disruption to, one or more components in a biological system based on  a. Biological concepts or processes.  b. A visual representation of a biological concept, process, or model.  c. Data |