



Science Practices

Science Practice 1

Concept Explanation 1

Explain biological concepts, processes, and models presented in written format.

Science Practice 2

Visual Representations 2

Analyze visual representations of biological concepts and processes.

Science Practice 3

Questions and Methods 3

Determine scientific questions and methods.

SKILLS

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.

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.

3.A Identify or pose a testable question based on an observation, data, or a model.

3.B State the null and 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 Practices (cont'd)

Science Practice 4

Representing and Describing Data 4

Represent and describe data.

Science Practice 5

Statistical Tests and Data Analysis 5

Perform statistical tests and mathematical calculations to analyze and interpret data.

Science Practice 6

Argumentation 6

Develop and justify scientific arguments using evidence.

SKILLS

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.

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.

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.