



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

- In theoretical contexts.
- 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

- Mathematical models.
- Diagrams.
- 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

- Identifying dependent and independent variables.
- Identifying appropriate controls.
- 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

- An evaluation of the evidence from an experiment.
- An evaluation of the design/methods.

**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).

- Orientation
- Labeling
- Units
- Scaling
- Plotting
- Type
- Trend line

4.B Describe data from a table or graph, including

- Identifying specific data points.
- Describing trends and/or patterns in the data.
- Describing relationships between variables.

5.A Perform mathematical calculations, including

- Mathematical equations in the curriculum.
- Means.
- Rates.
- Ratios.
- 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

- Rejecting or failing to reject the null hypothesis.
- 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

- Biological concepts or processes.
- A visual representation of a biological concept, process, or model.
- Data.