



# 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.