Scientific Method

Read *A Case Study in Scientific Inquiry: Investigating Coat Coloration in Mouse Populations*, pp. 12-14 in **Campbell Biology in Focus**, including Figure 1.18 and 1.19.

Observations

1. What information was known about oldfield mice before the hypothesis was tested?

Hypothesis

2. State the hypothesis in one sentence.

3. Who generated the hypothesis and when?

4. Who tested the hypothesis and when?

Experimental Design

5. Use a short phrase to describe each treatment in the experiment.

6. What is the control?

7. Describe the test subjects.

8. Why were these subjects chosen?

Predictions

9. Predict a result that could occur if the hypothesis is false.

10. Predict a result that could occur if the hypothesis is true.

Results

11. Write one sentence describing the results shown in the left-hand graph of Fig. 1.19.

12. Write one sentence describing the results shown in the right-hand graph of Fig. 1.19.

Interpretation

13. What general statement can be made based on the results of this experiment?

Teaching Tips for Peer Leaders

This recitation focuses on reading the textbook to find specific information and on analytical skills, including identifying observations and hypotheses, making predictions from a hypothesis and interpreting graphs.

Start this as an individual activity. Have students read from their physical or e-texts. Give photocopied pages to those students who don't have the book.

Observations & Hypothesis: Give students about 10 minutes to work on questions 1 – 4, then have groups of 2 – 3 students discuss their answers to questions 1 – 4. (5 min)

Experimental Design: Give students 10 min to answer questions 5 – 8, then 5 min to discuss their answers in their 2 – 3 person groups.

Predictions: Give students 5 – 7 min to answer questions 9 and 10 in the 2-3 person groups and report out to entire group.

Results: Give 5 minutes for students to answer questions 11 and 12 and 5 min to discuss.

Interpretation/Inference: Before students answer question 13, explain that an inference drawn from an experiment is NOT simply a summary of the results, but is a statement about what the results mean. It is a generalization drawn from the specific results.

Example of a Result: Animals with body coloration that blends in with the background are captured by predators less frequently than animals with body coloration that contrasts strongly with the background.

Example of an inference (Give this example AFTER students have attempted to make their own inferences.): Camouflage protects animals from predation.

During each discussion period, listen in to 1 or 2 groups and re-direct if needed.

Notes for Faculty

This activity references a specific section in the textbook *Campbell Biology in Focus* by Urry, Cain, Wasserman, Minorsky, Jackson, and Reece, copyright 2014. The example study described is Kaufman, D.W. 1974. Adaptive coloration in *Peromyscus polionotus*: Experimental selection by owls. Journal of Mammology 55:271-283.