Section: Statistics and Models

Read the passage below and answer the questions that follow.

Although statistical populations are composed of similar individuals, these individuals often have different characteristics. For example, in the population of students in your classroom, each student has a different height, weight, and so on.

As part of their experiments, the Keene High School students measured the lengths of dwarf wedge mussels in a population. By adding the lengths of the mussels and then dividing by the number of mussels, students calculated the average length of the mussels, which in statistical terms is called the **mean**. A mean is the number obtained by adding up the data for a given characteristic and dividing this sum by the number of individuals. For scientists, the mean provides a single numerical measure for a given aspect of a population. Scientists can easily compare different populations by comparing their means.

**IDENTIFYING MAIN IDEAS**

One reading skill is the ability to identify the main idea of a passage. The main idea is the main focus or key idea. Frequently, a main idea is accompanied by supporting information that offers detailed facts about the main idea.

**Read each question and write the answer in the space provided.**

1. Can one individual represent an entire population? Why or why not?

________________________________________________________________________

2. How can scientists compare two different populations?

________________________________________________________________________

3. How is a mean established?

________________________________________________________________________

**In the space provided, write the letter of the term or phrase that best answers each question.**

_______ 4. The mean provides a single numerical measure for one __________ of a population.

   a. individual  
   b. average  
   c. dwarf wedge mussel  
   d. characteristic
Active Reading continued

_____ 5. For which characteristic did Keene High School students establish a mean?
   a. height  
   b. weight  
   c. length  
   d. taste

_____ 6. What did Keene High School students do with this characteristic to determine the mean?
   a. added the data for the characteristic and divided the sum by the number of mussels
   b. added the data for the characteristic and multiplied by the number of mussels
   c. added the data for the characteristic and subtracted it from the number of mussels
   d. added the data for the characteristic with the number of mussels

SEQUENCING INFORMATION
One reading skill is the ability to sequence information, or to logically place items or events in the order in which they occur.

Sequence the statements below to show the steps in the process used in determining the average. Write “1” on the line in front of the first step, “2” on the line in front of the second step, and so on.

_____ 7. Divide the sums of the data by the number of individuals in each population.

_____ 8. Compare the means of the two populations.

_____ 9. Measure and record the characteristic data of all individuals.

_____ 10. Identify a characteristic common to different populations.

_____ 11. Add up the characteristic data from each population.

RECOGNIZING CAUSE AND EFFECT
One reading skill is the ability to recognize cause and effect.

Read the question and write the answer in the space provided.
12. Why does a mean need to be determined for an experiment?
Active Reading

SECTION: SCIENTIFIC METHODS
1. A single variable is tested; a control is used.
2. They study two groups or situations at a time.
3. To pinpoint cause and effect relationships
4. Control group
5. Experimental group
6. Everything except the variable being studied
7. The level of phosphate in the water
8. a
9. Using both helps determine whether or not a hypothesis is correct.
10. Phosphate in the water is killing the mussels.

SECTION: STATISTICS AND MODELS
1. Individuals in a population have different characteristics.
2. By determining a mean
3. By adding up the data for a given characteristic and dividing this sum by the number of individuals for which data was collected
4. d
5. c
6. a
7. 4
8. 5
9. 2
10. 1
11. 3
12. Answers may vary. Sample answer: Scientists can easily compare different populations by comparing their means.

SECTION: MAKING INFORMED DECISIONS
1. d
2. d
3. c
4. c
5. To act on principles or standards we consider important
6. A conceptual model that provides a systematic process for making decisions
7. 4
8. 3
9. 2
10. 5
11. 1
12. Answers may vary but should include a reference to making informed decisions.

Map Skills
1. Maple-beech-birch; oak-hickory
2. Answers may vary but students should notice a general northward migration of tree species.
3. Answers may vary but students should conclude that if the maple tree population declines, this could destroy the maple syrup industry in New England.
4. Answers may vary but students should suggest further modeling and making first-hand observations of actual temperature change and species migration over time.

Quiz

SECTION: SCIENTIFIC METHODS
Matching | Multiple Choice
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1. e | 6. c
2. c | 7. c
3. a | 8. a
4. d | 9. d
5. b | 10. a

SECTION: STATISTICS AND MODELS
Matching | Multiple Choice
--- | ---
1. c | 5. b
2. b | 6. b
3. a | 7. d
4. a | 8. d
9. c | 10. a

SECTION: MAKING INFORMED DECISIONS
Matching | Multiple Choice
--- | ---
1. d | 6. c
2. e | 7. a
3. a | 8. d
4. b | 9. b
5. c | 10. b