Name _____ Class _____ Date _____

Active Reading

Ch. 2

Section: Scientific Methods

Read the passage below and answer the questions that follow.

Experiments should be designed to pinpoint cause-and-effect relationships. For this reason, good experiments have two essential characteristics: a single variable is tested, and a control is used. The **variable** (VER ee uh buhl) is the factor of interest, which, in the example in which Keene High School students hypothesized that phosphate in the river was killing dwarf wedge mussels, would be the level of phosphate in the water. To test for one variable, scientists usually study two groups or situations at a time. The variable being studied is the only difference between the groups. The group that receives the experimental treatment is called the **experimental group.** In our example, the experimental group would be those mussels that receive phosphate in their water. The group that does not receive the experimental treatment is called the **control group.** In our example, the control group would be those mussels that do not have phosphate added to their water. If the mussels in the control group thrive while most of those in the experimental group die, the experiment's results support the hypothesis that phosphates from fertilizer are killing the mussels.

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. What are two essential characteristics of a good experiment?

   _____

   _____

2. How do scientists usually test for one variable?

   _____

   _____

   _____

3. How should experiments be designed?

   _____

   _____

| Active Reading *continued*

VOCABULARY DEVELOPMENT

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

4. The group that does *not* receive an experimental treatment is called the

_____.

5. The group that receives the experimental treatment is called the

_____.

RECOGNIZING SIMILARITIES AND DIFFERENCES

One reading skill is the ability to recognize similarities and differences between two phrases, ideas, or things. This is sometimes known as comparing and contrasting.

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

6. What do a control group and an experimental group have in common?

_____

_____

7. In the experiment discussed in the passage, what is the variable?

_____

RECOGNIZING CAUSE AND EFFECT

One reading skill is the ability to recognize cause and effect.

In the space provided, write the letter of the term or phrase that best completes the statement.

_____ 8. The differences observed between control groups and experimental groups can help identify _____ relationships.
   a. cause-and-effect   **c.** conditional
   b. inverse-and-converse   **d.** unconventional

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

9. What is the effect of using both a variable and a control in an experiment?

_____

_____

10. In the example used in this passage, what would the students know if the mussels in the experimental group died?

_____

_____

Skills Worksheet

Active Reading

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

_____ **5.** For which characteristic did Keene High School students establish a mean?

    a. height   **c.** length

    b. weight   **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?

_____

_____

_____

_____

Skills Worksheet

Active Reading

Section: Making Informed Decisions

Read the passage below and answer the questions that follow.

Forming an opinion about an environmental issue is often difficult and may even seem overwhelming. It helps to have a systematic way of analyzing the issues and deciding what is important. One way to guide yourself through this process is by using a decision-making model. A **decision-making model** is a conceptual model that provides a systematic process for making decisions.

In a simple decision-making model, the first step is to gather information. In addition to watching news reports and reading newspapers, magazines, and books about environmental issues, you should listen to well-informed people on all sides of an issue. Then consider which values apply to the issue. Explore the consequences of each option. Finally, evaluate all of the information and make a decision.

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.

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

_____ 1. Which of the following can help you when you want to form an opinion or make a decision?
  a. having many friends so they can tell you what they think
  b. listening to the opinions of all the adults around you
  c. finding one source of information that can tell you all you need to know
  d. having a systematic way of analyzing issues

_____ 2. Which of the following sources should you use when gathering information to help you make a decision about environmental issues?
  a. the TV news   **c.** books and magazines
  b. local newspapers   **d.** all of the above

_____ 3. What is a good system of analyzing issues?
  a. using a cause-and-effect chart
  b. determining the mean for a population
  c. using a decision-making model
  d. performing experiments

_____ **4.** Whose opinions should you seek when you are trying to make a decision?
  a. your relatives' and teachers'
  b. your friends'
  c. well-informed people's on all sides of the issue
  d. well-informed people's on the side of the issue that best matches your values

VOCABULARY DEVELOPMENT

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

5. The suffix *-ate* means "to act on." If the word *values* means "principles or standards we consider important," what is the meaning of the word *evaluate*?

_____

_____

6. What is a decision-making model?

_____

_____

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 of the decision-making model. 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.** Evaluate all the information.

_____ **8.** Explore the consequences of each option.

_____ **9.** Consider which values apply to the issue.

_____ **10.** Make a decision.

_____ **11.** Gather information from many sources.

RECOGNIZING CAUSE AND EFFECT

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

12. What is one effect of using a decision-making model?

_____

_____