Chapter One Reading and Study Guide NAME:

 PERIOD:

**Ch. 1.1 What is Science?**

Driving Question: What is Science?(p. 3)

1. What are the three goals of science? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What three features make science different from other subjections?
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What’s an observation? (p. 4)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Define data. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a logical interpretation based on prior knowledge and experience.
2. Define hypothesis (p.5)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A hypothesis is only useful if it can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Hypotheses may arise from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Why does a hypothesis have value even if it is wrong? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Read “A Scientific View of the World.” (p.6) Describe below an event that happened to you that you thought about in a scientific way. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1-2 How Scientists Work**

Driving Question: How do scientists use the scientific method?

1. Aristotle made extensive observations about the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. According to the "Recipe for Bees" (Figure 1-7) what did you have to kill during the winter? \_\_\_\_\_\_\_\_\_\_\_
3. What is spontaneous generation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What was Redi's hypothesis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. The factors in an experiment that can change are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(p.9)
6. A hypothesis should be tested by an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in which only one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is changed at a time.
7. The variable that is deliberately changed is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable (independent variable).
8. The variable that is observed is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable (dependent variable).
9. In the image below, which jar (X or Y) would have developed maggots? \_\_\_\_\_\_\_\_\_\_\_\_\_
10. What was the purpose of the gauze in the experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. Which of the jars above was the control jar? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Scientists use data to draw a valid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(p.10)
13. Redi's results refuted the hypothesis of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



1. Number the following steps in the correct order.

\_\_\_\_\_\_\_\_ Forming a hypothesis
\_\_\_\_\_\_\_\_ Drawing a conclusion
\_\_\_\_\_\_\_\_ Recording and analyzing results
\_\_\_\_\_\_\_\_ Asking a question
\_\_\_\_\_\_\_\_ Setting up a controlled experiment

1. Scientists publish their results in journals in order to: a) get paid b) allow other scientists to check their work
2. What did Anton van Leeuwenhoek call the tiny moving objects he saw in water? (p. 11) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Spallanzani's experiment showed that the living things that entered the gravy came from where? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Name one reason why a controlled experiment may not be possible: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. If a hypothesis becomes very well supported, scientists may consider it a \_\_\_\_\_\_\_\_\_\_\_\_\_\_(p. 14)
6. In science, the word \_\_\_\_\_\_\_\_\_\_\_\_\_, applies to a well-tested explanation that unifies a broad range of\_\_\_\_\_\_\_\_\_\_\_.
7. Describe a question from any part of your life (school, home, work, sports, food, friends, etc) that could be tested with science. Remember the class example*: Students who eat breakfast will do better on math tests than students who don’t.* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1-3 Studying Life**

Driving question: What makes things alive?

1. What does the word biology mean? (p.15) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. List the 8 characteristics of living things (see page 15):
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Circle the letter of each sentence that is TRUE about cells.
a. A cell is the smallest unit of an organism that is considered alive.
b. A multicellular organism may contain trillions of cells.
c. A living thing that consists of a single cell is a multicellular organism.
d. Organisms are made up of cells.

4. A type of asexual reproduction where a portion of the organism splits off to form a new organism is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (figure 1-16)

5. What is metabolism? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Plants, some bacteria, and most algae obtain their energy directly from \_\_\_\_\_\_\_\_\_\_\_.

7. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a signal to which an organism responds.

8. Give 2 examples of external stimuli: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9. The process by which organisms maintain constant internal conditions if referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (p.20)

10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is any change in a kind of organism over time.(p.19)

1. A biologist who studies animals is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

12. A plant biologist is referred to as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

13. Someone who studies ancient life is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Levels of Organization: (see figure 1-21)

14. The smallest functional unit of life is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

15. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ community and its nonliving surroundings.

16. An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an individual living thing.

17. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the part of Earth that contains all ecosystems.

**1-4 Tools and Procedures**

Driving question: How do scientists work?(p. 24)

1. Researchers need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ each other's experiments and most experiments involve \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, scientists need a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ system of measurement.

2. The \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ is a decimal system of measurement whose units are based on certain \_\_\_\_\_\_\_\_\_\_\_\_\_\_ standards and multiples of \_\_\_\_\_\_\_\_\_\_\_.

3. The meter is used to measure \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. kg stands for what unit of measurement? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. One way to record data from an experiment is by using a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ table.
Then, the data may be plotted on a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to make it easier to interpret.

6. See Figure 1-24: At what time of day is the rate of water released by leaves equal to the rate absorbed by roots? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are devices that produce magnified images by focusing visible \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rays.(p. 26)

8. \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ allow light to pass through the specimen and use two lenses to form an image.

**ANALYZING DATA (p.27)**

9. What variable did the researcher change during the experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10. What do the shapes of the curves tell you about the changes in population size? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

11. Before you start any activity, \_\_\_\_\_\_\_\_\_\_ all the steps, and make sure that you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the entire procedure, including any \_\_\_\_\_\_\_\_\_\_ precautions that must be followed.

12. What is the single most important rule for your safety? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. It is essential that you \_\_\_\_\_\_\_\_\_\_\_ your hands thoroughly after every scientific activity.