

Section 1–2 How Scientists Work (pages 8–15)

TEKS FOCUS: 2A Ask questions, form hypotheses; 2D Communicate conclusions; 3A Analyze hypotheses, theories; 3C Impact of research on scientific thought; 3F History; 5B Cell differentiation

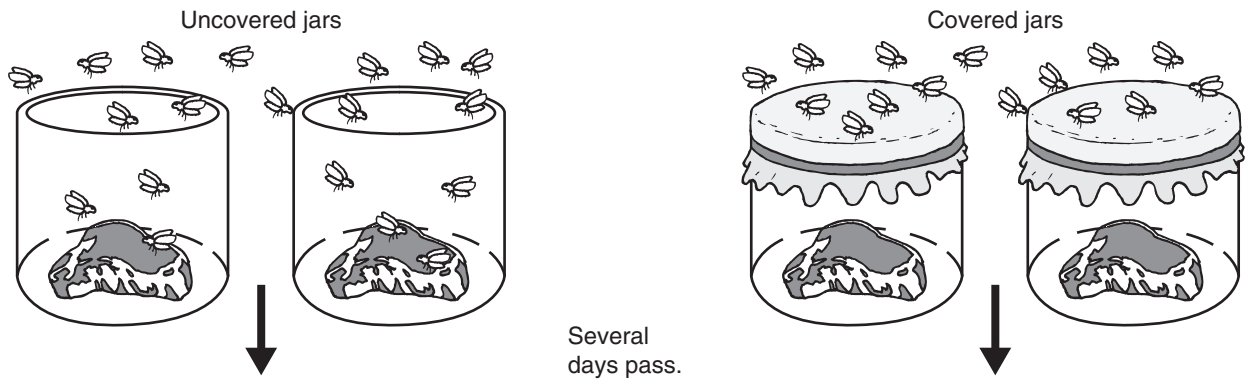
This section explains how scientists test hypotheses. It also describes how a scientific theory develops.

Designing an Experiment (pages 8–10)

1. The idea that life can arise from nonliving matter is called _____.
2. What was Francesco Redi’s hypothesis about the appearance of maggots?

3. What are variables in an experiment? _____
4. Ideally, how many variables should an experiment test at a time? _____
5. When a variable is kept unchanged in an experiment, it is said to be _____.
6. What is a controlled experiment? _____
7. The illustration below shows the beginning of Redi’s experiment. Complete the illustration by showing the outcome.

Redi’s Experiment on Spontaneous Generation



8. Complete the table about variables.

VARIABLES

Type of Variable	Definition
Manipulated variable	
Responding variable	

9. In Redi’s experiment, what were the manipulated variable and the responding variable?

10. For what do scientists use the data from a controlled experiment? _____

11. When scientists look for explanations for specific observations, what do they assume about nature? _____

Publishing and Repeating Investigations (pages 10–13)

12. Why do scientists assume that experimental results can be reproduced?

13. What did Anton van Leeuwenhoek discover? _____

14. What did John Needham conclude from his test of Redi’s findings? _____

15. What did Spallanzani do to improve upon Redi’s and Needham’s work? _____

16. How did Pasteur settle the spontaneous generation argument? _____

When Experiments Are Not Possible (page 14)

17. In animal field studies, why do scientists usually try to work without making the animals aware that humans are present? _____

18. When a controlled experiment is not possible, why do scientists try to identify as many relevant variables as possible? _____

How a Theory Develops (pages 14–15)

19. The theory that new organisms come from existing organisms is called _____.
20. In science, what is a theory? _____

21. Is the following sentence true or false? A theory may be revised or replaced by a more useful explanation. _____

Reading Skill Practice

A flowchart can help you remember the order in which a set of events has occurred or should occur. On a separate sheet of paper, create a flowchart that represents the process that Redi carried out in his investigation of spontaneous generation. This process is explained under the heading *Designing an Experiment* on pages 8–10. For more information about flowcharts, see Organizing Information in Appendix A of your textbook.