

# TOPIC 1.2

## Where do living things come from?

### Key Concepts

- Living things come only from other living things.
- Scientists debate about whether viruses are living things or not.

### Curricular Competencies

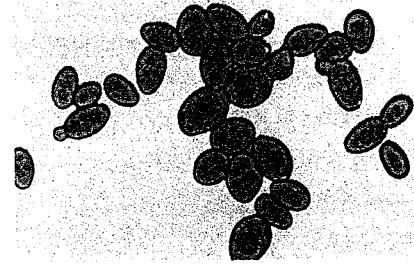
- Collaboratively plan a range of investigation types to answer questions or solve problems.
- Seek patterns and connections in data from investigations and secondary sources.
- Use scientific understandings to identify relationships and draw conclusions.
- Demonstrate an awareness of assumptions and identify information given and bias in your own work and secondary sources.

**F**or thousands of years, people observed that maggots (fly larvae) seemed to appear suddenly in rotting meat that had been left out. Frogs and salamanders seemed to appear suddenly when it rained. A “recipe” for making mice called for mixing dirty shirts with grains of wheat. Based on observation alone, the idea that living things could come into being, spontaneously, from meat, mud, and dirty clothes made sense. As the processes and tools of scientific inquiry began to develop from the 1600s onward, ideas about where living things come from began to change.

# Starting Points

Choose one, some, or all of the following to start your exploration of this topic.

- 1. Identifying Preconceptions** Reflect on the observation that maggots appear in rotting meat. What questions would you ask about where the maggots come from if you made this observation yourself? What hypothesis could you come up with to investigate it? Discuss how you would plan an experiment to test your hypothesis.
- 2. Analyzing Information** Examine the photograph on the right. How might this photo support the idea that life only comes from pre-existing life? How do you think the development and use of microscopes helped scientists investigate this idea?
- 3. Evaluating** The “recipe” for making mice seems to work. Mice often do appear in a mixture of wheat grains and a dirty shirt. Explain why their appearance is not evidence that living things can come from lifeless matter.



## Key Terms

There are two key terms that are highlighted in bold type in this Topic:

- cell theory
- virus

Flip through the pages of this Topic to find these terms. Add them to your class Word Wall along with their meaning. Add other terms that you think are important and want to remember.

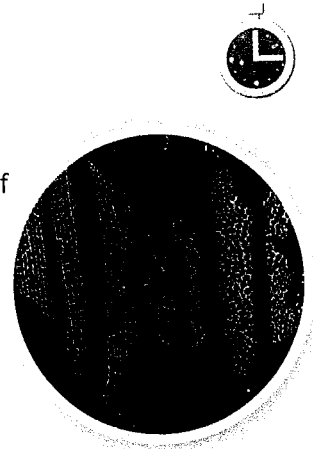
## CONCEPT 1

# Living things come only from other living things.

### Activity

#### Viewing Cells

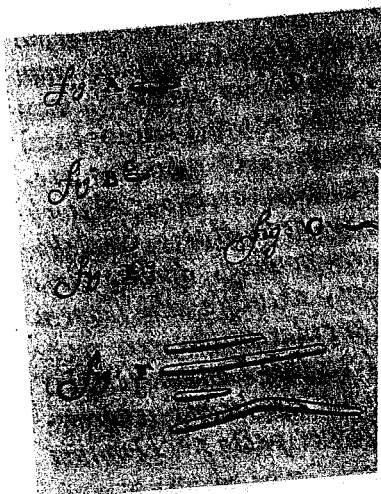
Imagine you are a scientist more than 300 years ago and you make your own microscope. You look at a thin strip of bark from a cork oak tree and see the image shown in **Figure 1.6**. How would you describe these structures? What questions would you have after looking at the bark? How might you try to answer these questions?



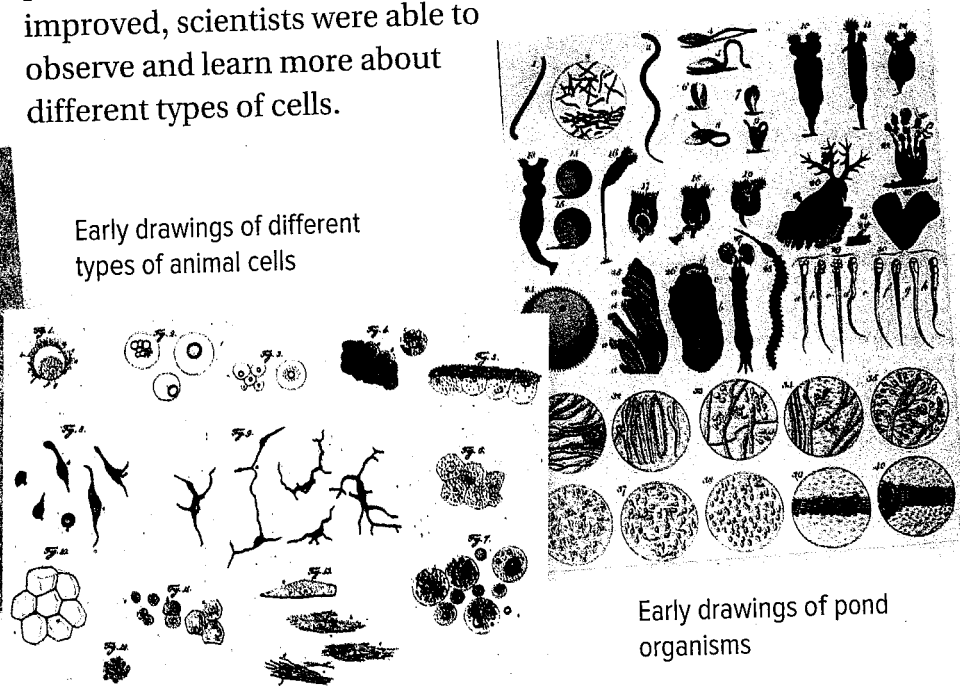
**Figure 1.6** These are drawings that Robert Hooke made after viewing tree bark with the microscope that he designed.

**Figure 1.7** Drawings of different organisms and cells as seen under the microscope by scientists who were pioneers in this field. What ideas and questions do you have, and what conclusions might you propose, from looking at these organisms and cells?

**R**obert Hooke was a British scientist in the 17th century. In the 1660s, he created a microscope to observe tree bark. He called the structures that he saw cells, which is the term still used today to describe the structures that living things are made of. Around the same time, other scientists also made their own microscopes and observed single-celled organisms living in pond water (**Figure 1.7**). As technology for making microscopes improved, scientists were able to observe and learn more about different types of cells.



Early drawings of bacteria



Early drawings of different types of animal cells

Early drawings of pond organisms

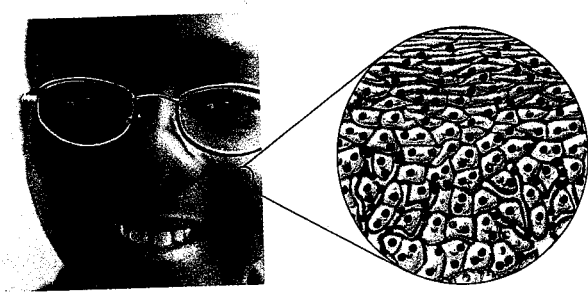
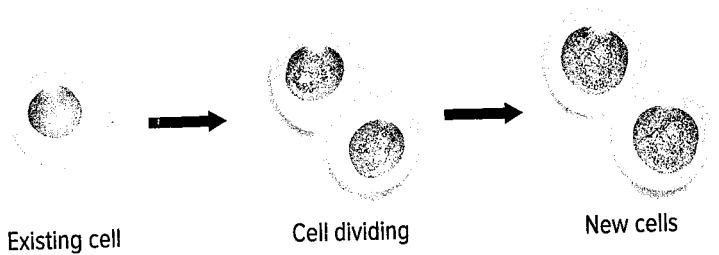
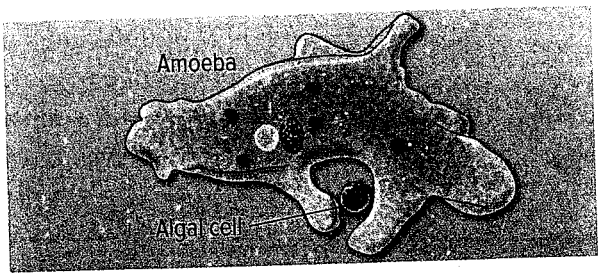
# The Cell Theory

By the middle of the 1800s, scientists had made extensive observations of the cells of plants, animals, and other kinds of organisms. Based on the evidence they collected, scientists agreed on three important statements about cells and their connection with living things. These statements appear in **Table 1.1**. Taken together, these statements about cells are called the **cell theory**.

Connect to Investigation 1-A on pages 22–23

**cell theory** the theory in biology that explains the structure and source of all living things

**Table 1.1 The Cell Theory**

Statement	Example
All living things are made up of one or more cells.	
All new cells come from pre-existing cells.	
The cell is the basic unit of life.	<p data-bbox="519 1365 779 1470">This unicellular amoeba is surrounding an algal cell to get food and energy.</p> 

## Before you leave this page . . .

1. Identify the statements that make up the cell theory. Give an example that supports each statement.
2. What processes of scientific inquiry do you think scientists used to establish the cell theory?