

**Unit 1** *continued***Nature of Science**

29. What can you conclude if you perform one test and the results support the hypothesis with which you started?
- A The hypothesis is correct.
  - B The data were recorded incorrectly.
  - C More experiments are needed to confirm the result.
  - D The hypothesis has become a theory.
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Use the information below to answer questions 30 through 32.

Scientific investigations are a continual process. When the results of an experiment are reported, they are reviewed and compared to existing theories. Even after results are reviewed and accepted by the scientific community for publication, the investigation of the topic may not be finished. New evidence may become available. The scientist may change the hypothesis based on the new evidence. In other cases, the scientist may have more questions that arise from the original evidence.

New information constantly challenges theories that exist. In the process, scientific knowledge grows. Each advance leads to new questions, new experiments, and sometimes, new theories. For example, in the midtwentieth century, scientists discovered that magnetic rocks on the sea floor are oriented in alternating directions. This discovery showed that Earth's magnetic poles are not fixed. The north and south poles reverse periodically. This discovery, once it was confirmed, caused scientists to revise several theories. The fact that the magnetic fields can reverse raised new questions about the nature of Earth's core. These questions led to new scientific investigations and new theories about Earth's composition and history. When the alternating stripes of magnetic rock were found, new research was designed to explain the stripes. This research helped confirm that the continents move as the sea floor spreads. The new theory of plate tectonics was developed, based partly on this evidence.

Each new discovery leads to new questions. Possible answers to these questions—hypotheses—are studied. These experiments, in turn, lead to new discoveries and new questions.

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30. After an investigation, what do scientists do with their results?
- A Hide them from other scientists.
  - B Share them only with their family.
  - C Put them away for several years to see if they hold up.
  - D Communicate their results to other scientists.
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31. In what way is a successful experiment never the final step in a scientific investigation?
- A The results may later be proven wrong.
  - B Scientist have to keep investigating so that they have work to do.
  - C The data from an experiment lead to new questions and further investigation.
  - D The experiment is not complete until a new theory is proposed.
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- 32. How did the confirmation of magnetic striping on the sea floor lead to new discoveries in plate tectonics?**
- A The new information helped answer questions about the movement of continents.
  - B The results proved that Earth's magnetic field is strong enough to affect rocks.
  - C The reversal of the magnetic poles is the force that drives plate tectonics.
  - D The discovery helped scientists get new funding to do research in plate tectonics.
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- 33. Lisa made a hypothesis that gravity causes all things to fall to the ground. Her sister pointed out that helium balloons move away from the ground. Lisa should**
- A throw out her hypothesis and do a different research project.
  - B try to find out why helium balloons are different from most objects.
  - C ignore her sister and keep testing her own hypothesis.
  - D assume that gravity does not affect helium balloons.
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- 34. Mark is investigating the properties of rocks. His hypothesis is that all rocks are very hard. What observation might cause him to revise his hypothesis?**
- A A piece of quartzite is clear and colorless.
  - B A piece of granite did not break when he struck it with a hammer.
  - C Mark can crumble a piece of shale in his hand.
  - D A piece of pumice floats on water.
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- 35. Which term below best describes a hypothesis?**
- A the result of an experiment
  - B a well-tested explanation for why something happens
  - C a random guess about what causes something
  - D a possible explanation of an observation or result
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## CHAPTER

## 2

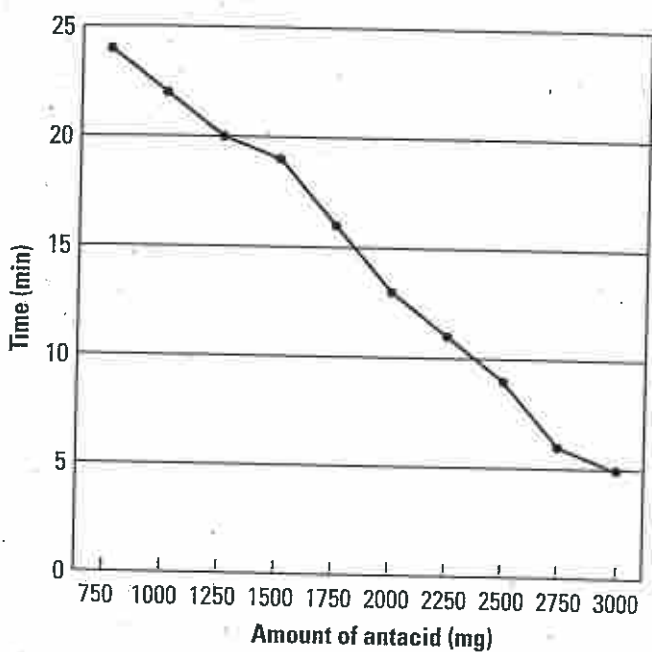
## INDEPENDENT AND DEPENDENT VARIABLES

**Data Analysis Practice**

During experiments scientists manipulate or change an independent variable to observe or measure its effects on a dependent variable.

Chemists working for a pharmaceutical company carry out an experiment in which they measure the amount of time it takes for different amounts of an antacid to neutralize 1 mL of hydrochloric acid (HCl). The results of their experiment are shown in the graph below.

**GRAPH 1: ANTACID AMOUNTS AND NEUTRALIZATION TIMES**



- 1. Identify** What are the independent and dependent variables in this experiment?

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- 2. Analyze** What is the relationship between the amount of antacid and the length of time to neutralize the acid?

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