

The Nature of Science

Key Question: What is the nature of science?

BEFORE YOU READ

Skim Section 1.1 (pages 4 to 15). On the lines below, predict what you will learn by reading this section.

HINTS FOR SKIMMING

- When you skim, you read quickly to get the main ideas and a few of the details.
- Quickly read over the headings to get a general sense of what the section is about.
- Read the first and last sentence of each paragraph.
- Take a quick glance at illustrations and captions for clues to meaning.
- Remember, you do not have to read every word.

WHILE YOU READ

Pause and think as you read. After you read the text under each heading and subheading, pause and write brief notes or make sketches in column 2 to record main ideas and details that you want to remember.

Heading or subheading	Ideas to remember
<p>What Is Science?</p>	
<p>The Characteristics of Science</p> <p>Science starts from observations that lead to questions.</p>	

Name: _____

Date: _____

1.1

The Nature of Science (continued)

Heading or subheading	Ideas to remember
The Characteristics of Science	
Scientific knowledge comes from observation.	
Scientific knowledge is tentative but reliable.	
Misunderstandings about Science	
Misunderstanding 1: All scientists follow the "scientific method."	
Misunderstanding 2: Science always involves experimentation.	
Misunderstanding 3: Scientific investigations provide proof.	
Misunderstanding 4: Science is not very successful.	

The Nature of Scientific Inquiry

Key Question: What is the nature of scientific inquiry?

BEFORE YOU READ

- The boldface terms are words you will be using frequently in science this year. In the space provided, explain the meaning of each boldfaced word. Add sketches to help you remember the definitions.

variable:	independent variable:	positive correlation:
controlled experiment:	dependent variable:	negative correlation:
correlational study:	controlled variables:	qualitative observations:
observational study:	control:	quantitative observations:

The Nature of Scientific Inquiry (continued)

- Preview the tables and figures in Section 1.2. On the lines below, predict what you will learn by reading this section.

WHILE YOU READ

As you read, use the space below to make jot notes and/or sketches of the main ideas in the section.

TIPS ON MAKING NOTES

- Use headings and subheadings as a guide to organize your own notes.
- Use point form. Don't copy word for word. Choose only key words.
- Make sketches to help you recall important ideas.
- Write down any questions you have to ask the teacher or to research yourself.
- Review your notes when you are done.

AFTER YOU READ

- Compare your notes with those of another student. Identify what is the same and what is different.
- Discuss with a partner how what you learned by reading the section relates to your prediction.

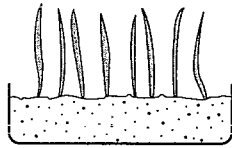
Examining an Experiment

Have you ever noticed how a plant bends toward the light? Plants twist and bend in order to get toward the light. The attraction of plants toward light is referred to as phototropism.

In this example, Lee and Jill conducted experiments to learn more about the way corn plants grow. You will observe their experiments and interpret the data they collected.

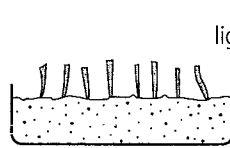
Experiment #1

Group A

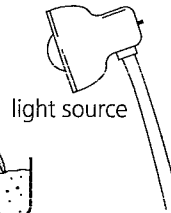


Normal plants with tips on the shoots.

Group B



Plants with tips cut from the shoots.



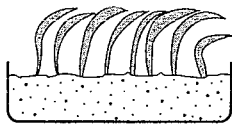
- (a) Identify the control and the experimental groups.

- (b) What are the independent and dependent variables?

After a period of time, Lee and Jill observed the following.

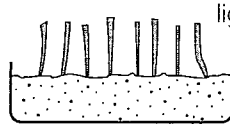
Experiment #1

Group A

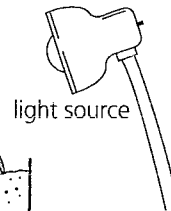


Normal plants with tips on the shoots.

Group B



Plants with tips cut from the shoots.



- (c) Record your observations.

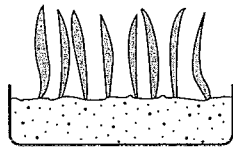
Lee and Jill examined the results. Lee concluded that the cutting of a plant prevented it from responding to the light. He suggested that the injured plant must be using all of its energy to repair itself. Lee explained, "That is why the plants in group B failed to grow and to bend toward the light."

Examining an Experiment (continued)

Jill suggested that they do another experiment to test Lee's hypothesis. In the second experiment, Jill and Lee decided to cover the tips of the shoots with aluminum foil.

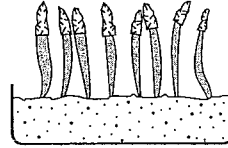
Experiment #2

Group A

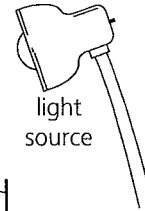


Normal plants with tips on the stems.

Group B



Plants with foil on the tips of the stems.



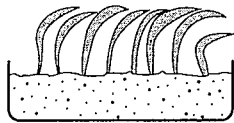
light source

(d) What were Lee and Jill testing in the second experiment?

The following observations were made a few days later.

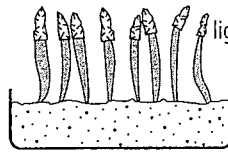
Experiment #2

Group A

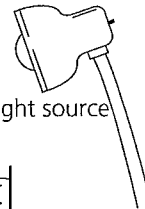


Normal plants with tips on the stems.

Group B



Plants with foil on the tips of the stems.



light source

(e) Record your observations.

(f) On the basis of the second experiment, Lee decided to change his first hypothesis. Why did he believe that his first hypothesis was no longer correct?

(g) What conclusion would you make, based on the results of the second experiment?
