

Science 6

Teacher's
Edition

Fourth Edition

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SCIENCE 6 Teacher's Edition

Fourth Edition

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Teacher’s Toolkit CD

Activity Manual Answer Key	
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Games	
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Materials List	
National Science Education Content Standards	
Quizzes and Answer Key	
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Science Fair Information	

Goals for SCIENCE 6

Develop a knowledge of God

- Inculcate the understanding that God is the Creator and Sustainer of the universe (Col. 1:16–17)
- Identify the orderliness and precision of God's creation (Eccles. 3:1–8)
- Inspire curiosity, wonder, and appreciation of God's creation (Ps. 19:1)

Encourage Christian growth

- Promote disciplined and orderly approaches to problem solving (1 Thess. 5:21)
- Teach cooperative skills through group activities
- Challenge students to be good stewards of God's creation (Gen. 2:15)

Promote scientific literacy

- Establish foundational science facts and skills for further science instruction
- Balance presentation of facts with active participation
- Teach processes involved in a scientific method
- Show the integration of science into the student's everyday life
- Affect a positive attitude toward science through active participation and relevant discussions



Christian Worldview for SCIENCE 6

Science is one of the most hotly contested areas of human culture. Many scientists today do not believe in God and try to explain everything from a naturalistic point of view. The Bible presents us with a view of the world we live in and the tools we should use to study it. This biblical view is called a Christian worldview. There are only two worldviews—one based on God's Word and one based on man's own word and philosophies.

What is a Christian worldview in Science?

A Christian worldview is based on the authority of the Bible. God made humans in His own image. We are to declare His glory by being like Him. Tragically, the disobedience of the first man and woman brought death into the world. But God did not abandon His image bearers. Even while God was pronouncing a curse upon His perfect creation, He promised to redeem the world to Himself, by sending His own Son into the world to accomplish salvation (Gen. 3:15). The story of the human race is the story of God's redemptive acts to restore His kingdom and rescue His people. God reveals Himself in the Bible and through nature. As we study science and learn how God's world works, we also learn more about the God who created it all.

Your *worldview* refers, simply, to your way of viewing the world. It is the set of assumptions and beliefs used to interpret everything that happens. Everybody has a way of looking at the world. Your way is evident when you answer questions like: Where did we come from? Are humans more important than animals? What happens to us when we die? What is true? The study of science raises many of these questions and so becomes a powerful way of learning and applying a Christian worldview. A Christian worldview as it appears in the field of science has several key ideas.

God is the Creator of all things

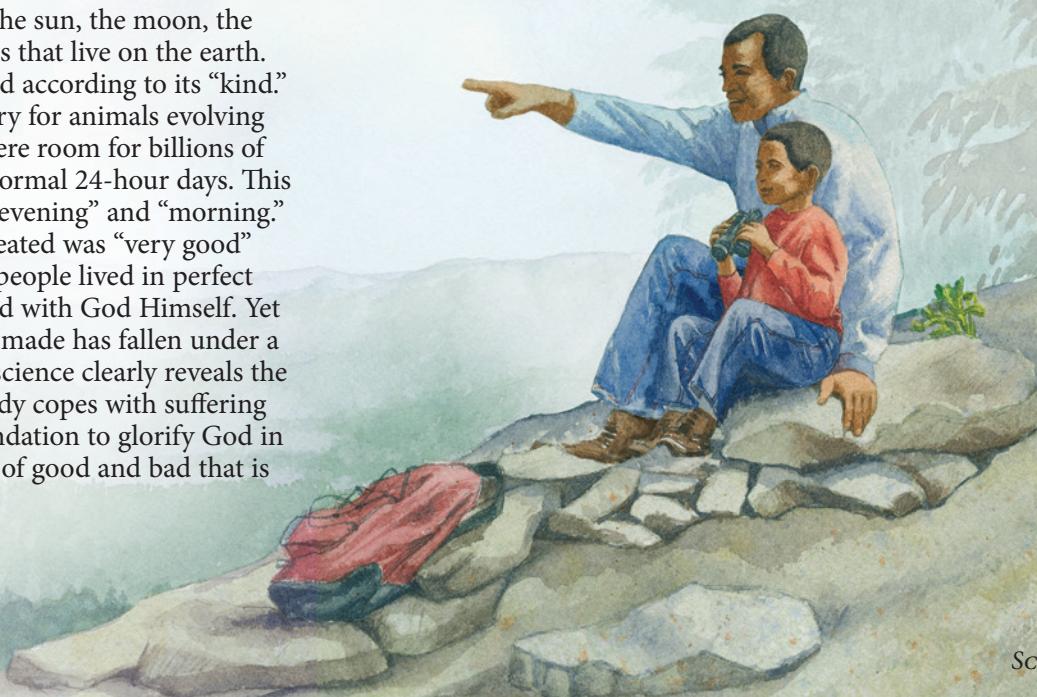
The fact that God is Creator stands in direct contradiction to the evolutionary theory about the earth. Genesis 1 describes the creation of the stars, the sun, the moon, the earth, and all the plants and animals that live on the earth. Each plant and animal is categorized according to its "kind." There is no room in the biblical story for animals evolving into higher life forms. Neither is there room for billions of years. The "days" in Genesis 1 are normal 24-hour days. This is emphasized by the repetition of "evening" and "morning." God declared that everything he created was "very good" (Gen. 1:31). There was no sin, and people lived in perfect harmony with the created world and with God Himself. Yet because of Adam's sin, all that God made has fallen under a curse (Gen. 3). Today the study of science clearly reveals the effects of sin. Much of scientific study copes with suffering and death. A Christian has the foundation to glorify God in science as he recognizes the source of good and bad that is seen around him.

People are important to God

A naturalistic perspective on science views humans as a part of the evolutionary process and ultimately no more important than the animals on the earth. A Christian worldview identifies mankind as a separate act of creation, made in the "image of God" (Gen. 1:26). This means that people are very important. They are not just another species of animal but are image bearers of God. Because people are God's special creation, He instituted the death penalty for anyone who murdered another human (Gen. 9:6). Jesus also said that the second most important commandment was to love your neighbor as yourself (Matt. 22:39). It was God's own love for His image bearers that led Christ to pay such an awful price to redeem mankind from sin (2 Cor. 5:21). Because of all this, Christians have a powerful motivation to study science. When a Christian helps poor children get clean drinking water or develops a new medication for a harmful disease, he glorifies God by reflecting the value that God places on people.

God placed people on the earth to rule in His place

From the beginning, God gave people a way to bring glory to Him. He gave people authority over the created world. This means that we have authority over living things, such as fish, birds, and cattle (Gen. 1:26). God's plan includes that people are to have families, spread out, and live in every part of the earth. People are to bring the vast resources and potential of the earth under their careful stewardship (Gen. 1:28). Just as Adam was told to dress and keep the garden (Gen. 2:15), so all of mankind is to be a steward over the earth. Much of our work in science today fulfills this mission given to us by God. Science is used every day to build and design things that help people to steward, or manage, the potential that the earth has. When Christians participate in this work, they are obeying the Lord and bringing glory to Him.

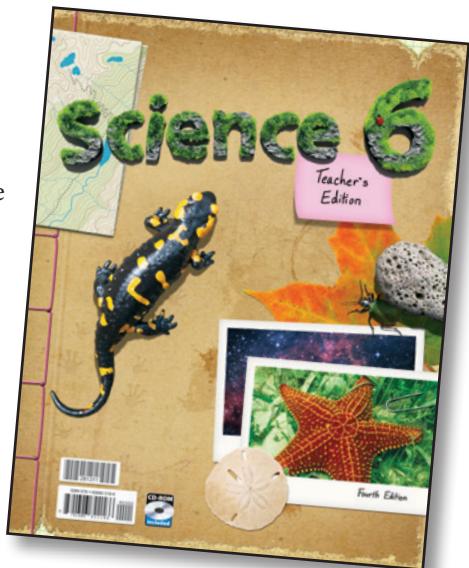


Instructional Materials



Student Text

The *SCIENCE 6 Student Text* provides grade appropriate information through text, diagrams, graphs, charts, and annotated photographs and illustrations. The Student Text also includes special interest boxes and Quick Check questions as well as instructions for experiments, activities, and projects. The last page of each chapter provides lists of vocabulary and key ideas as well as an application question. A glossary and index are included at the end of the book.



Teacher's Edition

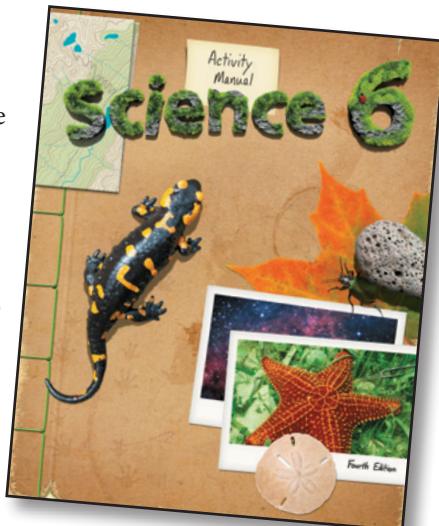
The *SCIENCE 6 Teacher's Edition* contains 180 lessons. These lessons are grouped into six units, with each unit having two or three interrelated chapters and a technology lesson that corresponds with the topics discussed in that unit. Most lessons include additional background information, Bible application, cross-curricular links, and scientific activities.

The Teacher's Edition also includes useful information about science process skills, the management of activities, and grading. A materials list and the alignment of *SCIENCE 6* with national standards are located in the back of the Teacher's Edition.

Activity Manual

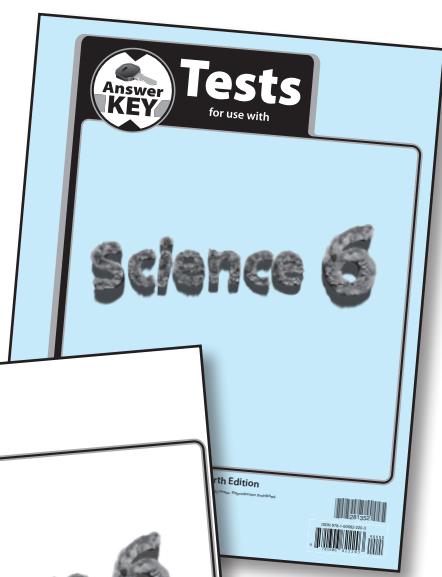
The *SCIENCE 6 Activity Manual* provides a variety of pages to aid the student's understanding. Study Guide pages provide a systematic review of concepts. Pages for recording information for Activity and Exploration lessons reinforce scientific methods. Preview, Reinforcement, Bible Connection, Technology, and Expansion pages are also included.

Answers are located in the Activity Manual Answer Key on the Teacher's Toolkit CD. The CD is part of the Teacher's Edition.



Tests

SCIENCE 6 Tests includes fifteen chapter tests. Tests include objective items, the use and labeling of charts and diagrams, and essay questions. An answer key for the tests is available separately.



Teacher's Toolkit CD

The *SCIENCE 6 Teacher's Toolkit CD* is located inside the back cover of the Teacher's Edition. It includes the Activity Manual Answer Key, rubrics for assessing Activity and Exploration lessons, quizzes, instructional aids, diagrams, and useful information about science fairs, all in a printer-friendly format that may also be adapted for electronic use.

Text Lesson Features

Use the **materials list** to determine the materials needed to teach the lesson.

Begin the lesson with an **introductory discussion or activity**.

Guide student reading with questions to give a **purpose for reading**.

Discussion
What important property do indicator substances have? They change color when in contact with an acid or a base solution.

Explain how litmus paper works. Red litmus paper turns blue in a basic solution. Blue litmus paper turns red in an acidic solution.

Where does the substance used in litmus paper come from? lichens

Indicator paper is also used to determine whether a solution is an acid or a base. What else can it show? the pH value of a solution

What are some other natural substances that are indicators? Possible answers: beets, pears, red cabbage

Discuss Creation Corner.

What is a unique feature of some hydrangeas? The color of their blossoms depends on the pH of the soil.

How is the hydrangea like litmus paper? An acidic soil will produce pink flowers just as litmus paper turns red in an acid. A basic soil will turn the blossoms blue just as litmus paper turns blue in a base.

Why do you think some bushes might have both pink and blue blossoms? Answers will vary, but suggest that the soil may be different where different parts of the root system are. As different parts of the root system supply different parts of the bush, the colors may vary.

God's design includes many things that are for man's enjoyment.

Apply biblical truth and principles with discussions marked with a Bible icon.

Lesson 89
Student Text pages 178–81
Activity Manual pages 113–14

- Objectives**
- Compare and contrast characteristics of acids and bases
 - Describe the purpose of an indicator
 - Identify products that are acids, bases, or salts
 - Summarize how a salt forms

Materials

box of baking soda

container

water

Vocabulary

acid	neutral
base	indicator
alkali	salt
pH scale	

Introduction

Display the box of baking soda. Have you ever used baking soda for a purpose other than baking? **Answers will vary.**

Read the variety of uses listed on the box of baking soda or those listed in Teacher Helps. Discuss the variety of uses and why the student thinks baking soda works these ways.

Allow a student to examine some dry baking soda. What are some characteristics, or properties, of baking soda? Possible answers: white, powdery, smooth, odorless

Allow another student to add a little water to the baking soda and feel it.

How would you describe the baking soda paste? Possible answers: slippery, slimy

The compound we call baking soda is classified as a base. Today we will look at acids and bases to see how these chemicals are useful in our daily lives.

Teach for Understanding

Purpose for reading

How are acids and bases different?

How are salts formed?

Discussion

What is an acid? a compound that forms hydrogen ions when dissolved in water

What determines the strength of an acid? the number of hydrogen ions it forms

CREATION CORNER

Flowering bushes usually produce flowers of the same color year after year. But the blossoms on some hydrangeas will be different depending on the soil pH. Acidic soil produces pink blossoms, while basic soil produces blue blossoms. You can even change the color of the flowers in the middle of a blooming season by adding acid or base substances to change the pH of the soil. What an amazing plant God has created for our enjoyment!



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Chapter 7 • Lesson 89

Indicators
Acids and bases are usually found in water solutions. Certain substances called **indicators** change color when exposed to acid or base solutions.

Litmus paper is a paper that has been treated with an indicator substance made from lichens. If you dip blue litmus paper into an acid solution, the paper turns red. If you dip red litmus paper into a base solution, the paper

turns blue.

Many other natural substances, such as beets, pears, and red cabbage, can also indicate by changing their color whether a solution is an acid or a base.

Their color changes can even indicate the pH range of the substance.

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SCIENCE BACKGROUND

Antacids

Whether antacids are liquids to drink, tablets to chew, or tablets to be dissolved in water, all antacids are bases. Often they contain a type of flavoring such as mint or fruit to cover the bitter taste of the base.

Two common bases found in antacids are sodium bicarbonate (NaHCO_3) and magnesium hydroxide (Mg(OH)_2). Baking soda, a product with many household uses, is sodium bicarbonate. Magnesium hydroxide is sold as Milk of Magnesia. When combined with the hydrochloric acid in your stomach, either of these bases reacts chemically, producing water and a harmless salt.

*** DIRECT AN ACTIVITY ***

Using litmus paper

Materials: 10 mL of ammonia in a glass container, 10 mL of vinegar in a glass container, red and blue litmus paper, medicine dropper, goggles

Label the two containers.

Which of these is an acid and which is a base? (The student may look at the pH scale.) Ammonia is a base and vinegar is an acid.

What is one way we can be sure which is an acid and which is a base? Test with litmus paper.

Direct the student to use red and blue litmus paper to test the ammonia. Then use fresh red and blue litmus paper to test the vinegar.

SCIENCE 6 TE

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Acids and Bases

Properties

Acids and bases are compounds with properties that make them useful to people in a variety of ways. Acids form hydrogen ions (H^+) when they are dissolved in water. The strength of an acid depends on the number of hydrogen ions it forms. Acids have a sour taste. Some weak acids, such as lemon juice and vinegar, can make us pucker when we taste them.

Many stronger acids are dangerous to taste and can burn your skin. Strong acids, such as sulfuric acid, are corrosive. Corrosive acids can even dissolve metals. Strangely enough, your stomach produces one of the strongest acids, *hydrochloric* (hye kluh RIK) acid, to help digest food. However, God has

designed our stomach with a special coating. This coating protects the stomach from its corrosive acid.

Bases form hydroxide (hy DRAHK side) ions (OH^-) when they are dissolved in water. Similar to acids, the strength of a base depends on the number of hydroxide ions it forms. Bases taste bitter and feel slippery. You have probably experienced this property when you have tried to pick up a piece of soap.

Like acids, some bases are weak

and some are strong. Baking soda and

antacid tablets are two common weak

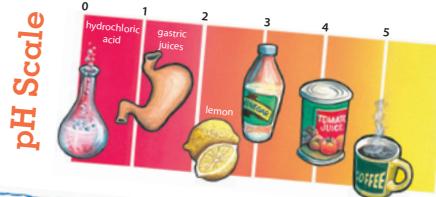
bases. Just as strong acids can be dan-

gerous, so can strong bases. The base

sodium hydroxide is used to make lye

and drain cleaners. Bases that dissolve

in water are referred to as **alkalis** (AL kuh LIES).



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Baking soda uses
Baking soda may be used for peroxide, turn red litmus paper blue, neutralize acids, produce hydroxide ions when dissolved in water, donate electrons, conduct electricity, and have a pH range of 7.1–14.

Bases feel soapy
Bases react with and dissolve natural fatty acids and oils found on skin. This reaction results in the slippery soapsuds felt as the friction is reduced. Bases are used to make soap. The high base content of early homemade soaps often irritated the skin. Most modern soaps have a pH value between 9.5 and 10.0.

Definition of an acid

Most definitions of acids are actually lists of properties. The properties of acids include the following: taste sour, cause blue litmus paper to turn red, neutralize bases, react with metals, produce hydrogen ions when dissolved in water, accept electrons, conduct electricity, and have a pH range of 0–6.9.

Definition of a base

Most definitions of bases are actually lists of properties. The properties of bases

SCIENCE 6 TE

Enrich the student's knowledge by incorporating **cross-curricular links, activities, and demonstrations**.

Locate the necessary **materials** needed for enrichment with the activity description.

Clarify and enhance the lesson with information from **Science Background** and **Science Misconceptions**.

pH Scale

Scientists use a special scale to determine the concentration, or amount, of an acid or a base in a solution. The term *pH* comes from French words meaning "the power of hydrogen." The pH scale is numbered from 0 to 14. Acids measure from 0 to 6.9 on the scale, with 0 being highly acidic and 6 being slightly acidic. Bases measure from 7.1 to 14 on the scale, with 14 being highly basic and 8 being slightly basic. Solutions with a pH of 7.0 are **neutral**, meaning they are neither basic nor acidic. Pure water has a pH of 7.0.

Soil pH affects how well plants absorb nutrients from the soil. Most plants grow best if the soil pH is around 6.0–7.0. People can buy pH test kits at most lawn and garden stores. Once a gardener knows the pH of his soil, he can raise or lower the pH by adding substances to the soil. To

testing the pH of pool water

increase the pH, most gardeners add a base called lime to the soil. To lower the soil pH, many gardeners add peat moss or compost. These items usually have some type of acid in them.

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Discussion

How do acids taste? **Answers:** sour
What are some common weak acids? **Possible answers:** lemon juice and vinegar
What is an example of a corrosive acid that can be found in your body? **Possible answers:** hydrochloric acid found in the stomach

What is a base? A compound that forms hydroxide ions when dissolved in water
What determines the strength of a base? the number of hydroxide ions it forms
What are some characteristics of bases? They taste bitter and feel slippery.
What are some common weak bases? **Possible answers:** baking soda and antacids
💡 How do you dilute an acid or a base? add more water to the solution
Describe an alkali. It is a base that dissolves in water.

What is the name of the scale that is used to show the strength of an acid or a base in a solution? **pH scale**
How is the pH scale numbered? 0–14
Why is pure water considered a neutral compound? It has a pH of 7, which is neither an acid nor a base.
What numbers on the scale indicate that a compound is an acid? 0–6.9
Do lower or higher numbers indicate a strong acid? lower numbers
What numbers on the scale indicate that a compound is a base? 7.1–14
Do lower or higher numbers indicate a strong base? higher numbers

Evaluate the understanding of science concepts through discussion.

Bases

The term *alkali* refers to a soluble base or a solution of a base. Items that have a pH value above 7 are considered to be basic, or alkaline. The adjective *alkaline* is often used as a synonym for *base*, especially for soluble bases. Bases with a higher pH are considered to have a higher alkalinity.

Promote higher-level thinking skills with questions marked with a light bulb icon. Answers to these questions are not taken directly from the pages being discussed.

Atoms and Molecules

Include discussion of graphic information.

Chapter 7 • Lesson 89

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Continued from page 198.
What are the results of the tests? The ammonia turns the red litmus paper blue, and the blue litmus paper stays blue; vinegar turns the blue litmus paper red, and the red litmus paper stays red.
Fill a medicine dropper with ammonia and add five drops to the vinegar. Have another student stir the mixture and check it with blue litmus paper.
Continue adding ammonia one drop at a time and checking with litmus paper until the litmus paper no longer reacts.
What change did you observe in the litmus paper? At first the blue litmus paper turned red, but after adding ammonia the paper stayed blue.
Is this liquid still an acid? **No** What is it? It is neutral.

salt crystals

QUICK CHECK

1. What are the properties of bases?
2. What are the properties of acids?
3. What are some everyday products that contain acids or bases?
4. How is a salt formed?

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Continued from page 198.

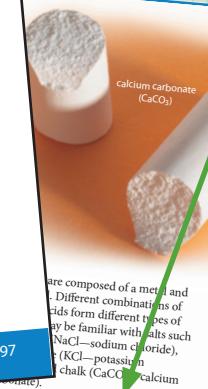
How many drops of ammonia were needed before the solution became neutral? **Answers will vary.**
What formed when you neutralized the acid and base? **water and a salt**
How do we know the solution is neutral? **Litmus paper does not change color when a solution is neutral.**

Atoms and Molecules

Assess the student's work and knowledge by using a rubric, quiz, or test.

Reinforce, review, and enrich student learning with pages from the **Activity Manual**.

Review each text lesson with a **Quick Check**.



Discussion

💡 Explain what it means to neutralize an acid or a base. **Possible answer:** When an acid and a base come in contact with each other, the reaction causes the pH to become closer to 7, or neutral.
💡 Explain how an antacid can help your stomach feel better. An upset stomach can be caused by too much gastric acid. The antacid contains a base. When the acid and base are combined, they neutralize each other.

What substances form as a result of the reaction between an acid and a base? **water and a salt**
Describe a salt, an ionic compound formed from a reaction between an acid and a base that contains positive ions from the acid and negative ions from the acid

What are most salts composed of? **a metal and a nonmetal**

Are all salts the same? **No**

What makes salts different from one another? **different combinations of bases and acids which form different types of salt**

Name some common salts. **Possible answers:** sodium chloride—table salt; potassium chloride—salt substitute; calcium carbonate—chalk

Answers

1. Bases form hydroxide ions in water, taste bitter, and feel slippery.
2. Acids form hydrogen ions in water and taste sour.
3. Possible answers: Acids include lemons, vinegar, tomato juice, and coffee. Bases include baking soda, toothpaste, antacid, and ammonia.
4. Salts form as a result of the neutralizing of an acid and a base by a chemical reaction.

Activity Manual
Review, page 113

This page reviews Lesson 89.

Expansion, page 114

This page looks at the life of Robert Boyle, who was both a scientist and a Christian.

Assessment

Quiz 7-C

The quiz may be given any time after completion of this lesson.

Activity Lesson Features

Incorporate some science process skills into each activity.

Identify a problem. Most activities state a problem that needs a solution.

Record specific materials and measurements used for each activity on the Activity Manual pages.

Use the materials list in the Student Text to identify the basic resources needed for each activity.

Which Antacid Is Best?

Lesson 91

**Student Text pages 184–85
Activity Manual pages 117–18**

Objectives

- Hypothesize about the effectiveness of several antacids
- Make and use a model of “upset stomach” acid
- Infer information from the model

Materials

- See Student Text page

Introduction

When you have an upset stomach, what kind of medicine do you take? *Answers will vary.*

Do you prefer one type of medicine over another? Why? *Answers will vary.*

Do you know whether your preferred medicine works better than other medicines? How do you know? *Answers will vary.*

Today you will have the opportunity to test which antacids work best for neutralizing an acid.

Teach for Understanding

Purpose for reading

The student should learn the following:

Procedure

Preparing the materials, mixing the ingredients, and testing the antacids.

Direct the student to make his upset stomach mixture. If needed, demonstrate how to use the indicator paper to record the pH level of the upset stomach mixture.

ACTIVITY

Materials

goggles
metric measuring cups
metric measuring spoons
80 mL water
40 mL vinegar
200 mL or larger container
pH indicator paper
6 clear plastic cups
6 spoons or stirring sticks
5 mL baking soda
80 mL milk

Antacids used

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SCIENCE BACKGROUND

Modeling stomach acid

A normal stomach is actually acidic with a pH level of 1.6–2.4. The general principles used in this activity are valid; however, the pH numbers used do not approach the true physiologic pH values in the stomach. An upset stomach may be caused by too much acid in the stomach rather than a lower pH level of acid in the stomach. Not all antacids work the same way. Since this activity does not involve a real stomach, an antacid that acts as a buffer will show better results in this activity than an antacid that is an acid reducer. Antacids that reduce the amount of acid in the stomach will appear to be less effective, although they may actually be more effective in a stomach with more acid.

Teacher Helps

Variety of antacids

Choose antacids that are made of different ingredients. Two antacids with the same ingredients will likely have a similar pH reading.

Indicator papers

The pH indicator paper is different from litmus paper.

Using red cabbage juice

Red cabbage juice may be used in place of the pH paper, but this will give a less accurate reading. The colors of the cabbage juice and their coordinating pH levels are as follows:

pH 2–red	pH 4–purple	pH 8–blue	pH 12–greenish yellow
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**Chapter 7, Lesson 91, pages 184–85
Activity**

Process Skills

- Hypothesizing
- Experimenting
- Observing
- Inferring
- Recording data

Which Antacid Is Best?

The stomach uses acid to digest food, but the stomach should not be too acidic or too basic. Many antacids can help an upset stomach caused by the presence of too much acid. Some antacids are sold as medications. Other antacids may be food or cooking ingredients found around your house. In this activity you will test the effectiveness of several different antacids on experimental “upset stomachs.”

Problem

Which antacid works best to neutralize an acid?

Procedure

- Write a hypothesis in your Activity Manual explaining which antacid you think will work best to neutralize an acid.
- Combine 80 mL of water and 40 mL of vinegar in the container to make an *upset stomach mixture*.
- Place a pH indicator strip into the *upset stomach mixture* for 30 seconds. Immediately compare the color of the strip to the pH chart. Record the pH level in your Activity Manual.
- Pour 20 mL of the *upset stomach mixture* into each plastic cup. These are your “upset stomachs.” Label them 1–6.
- Place one dose of each antacid into cups 1–4 and mix well. (Tablets should first be crushed.)

Materials

goggles
metric measuring cups
metric measuring spoons
80 mL water
40 mL vinegar
200 mL or larger container
pH indicator paper (range of 1–14)
6 clear plastic cups
6 spoons or stirring sticks
5 mL baking soda
80 mL milk
One dose each of four different commercial antacids (or their generic equivalents) such as:
Alka-Seltzer
Maalox
Pepto Bismol
Rolaids
Tums
Milk of Magnesia
Activity Manual

Make teaching easier by using the management ideas and other information included in Teacher Helps.

The student formulates a hypothesis that states what he is trying to prove in the activity.

The student records observations and measurements in the Procedure section. Data is sometimes recorded using graphs and charts.

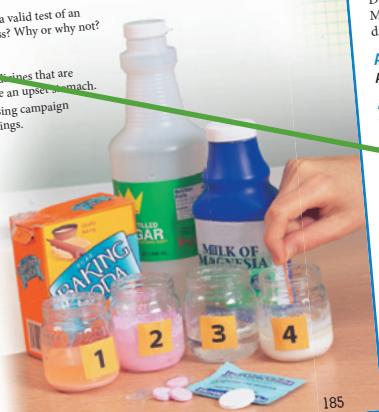
- Check the effectiveness of each antacid by placing a fresh piece of pH indicator paper into each solution for 30 seconds. Immediately compare the color of the strip to the pH chart. Record the pH level in your Activity Manual.
- Compare the pH level with the original pH of the "upset stomach."
- Test the effectiveness of baking soda and milk as antacids. Add 5 mL of baking soda to cup 5. Add 80 mL of milk to cup 6. Mix and check with pH paper. Record your results.

Conclusions

- Which antacid would you want to use if you had an upset stomach?
- Do you think this is a valid test of an antacid's effectiveness? Why or why not?

Follow-up

- Try some other medicines that are advertised to relieve an upset stomach.
- Prepare an advertising campaign based on your findings.



Conclusions

Provide time for the student to evaluate his hypothesis and answer the questions.

Which antacid worked best to neutralize the acid?
Answers will vary.

How is this model like or unlike a human stomach?
Elicit the idea that a human stomach would not have exactly the same pH levels as the upset stomach mixture model and that upset stomachs can be caused by things other than acid.

Use the Conclusions questions to analyze the results of the activity and discuss what the student has learned.

Discuss student answers to question 4 in the Activity Manual. You may choose to share the information discussed in the Science Background.

Activity Manual

Activity, pages 117–18

Assessment

Rubrics

Select the prepared rubric, or design a rubric to include your chosen criteria.

Extend the activity by using suggestions in the Follow-up section.



Creating an advertisement

Instruct the student to make an advertisement for the product he found to work best for neutralizing an acid. The student can choose to write a radio advertisement, a TV commercial, an advertisement for a newspaper, or a billboard advertisement. The advertisements can be presented to the rest of the class.

Atoms and Molecules

SCIENCE PROCESS SKILLS

Hypothesizing

Remind the student that a hypothesis is a testable statement that tells what he thinks will happen. Although at this level it is not necessary for all conditions to be defined in a hypothesis, a student's hypothesis should be as specific as possible.

Allow several students to read their hypotheses. Discuss whether the hypotheses are testable and suggest improvements as needed.

The hypothesis for this activity should be straightforward. For example, "Maalox will neutralize the acid the best."

Emphasize a specific process skill in each activity.

Conclusions

- Which antacid worked best to neutralize the acid?

- Did your results support your hypothesis? Explain.
- How is this model like or unlike a human stomach?
- Do you think this is a valid test of the effectiveness of an antacid? Why or why not?

The student records in his Activity Manual his responses to the questions to support his conclusions.

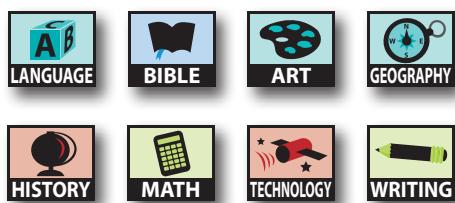
Teaching a Text Lesson

Overview

The introduction of each lesson provides a short activity or relevant questions to focus the student on the day's lesson. Most lessons cover four pages of the Student Text. The Purpose for Reading questions should be presented before the student begins to read the text. The student should then read the material silently on his own. Assign the student to read the text as part of the lesson or prior to the lesson at home or in class. Oral reading of the text should be reserved for short passages only as they relate to the discussion.

The lesson plan provides questions to help you identify the student's level of comprehension of the material he has read. This discussion provides an auditory reinforcement of key ideas. The higher-level thinking questions (marked with the light bulb icon) help the student apply the information that he has read by relating it to previous knowledge and everyday situations.

Enrichment information and activities in the shaded portions of the pages provide additional material for you to use with the lesson based on the class dynamics and available time. An enrichment activity may reinforce a concept taught in the lesson or extend a concept. Enrichment information and activities may also be used to apply the science concepts to other subjects. The following cross-curricular links are included.



Reading for Information

The teaching instructions focus on reading for information, which is an essential skill for reading success. It is also a skill emphasized in the Common Core State Standards. The following elements can assist the student in developing and refining his informational reading skills.

- The Purpose for Reading questions in the Teacher's Edition give you opportunity to direct the student's focus as he reads the material.
- The Quick Check at the end of each lesson in the Student Text helps the student evaluate how well he has comprehended what he read.
- The strategies for instruction incorporated in the *SCIENCE 6* program allow you to guide the student in interpreting graphic information. Graphic information, such as charts, graphs, maps, photos, illustrations, and diagrams, are forms of communication that enhance the student's reading and understanding.
- The PQ3R method is presented in Lesson 27. This is one method that may be used throughout the year to aid the student in gathering information from the text.

SCIENCE 6 also incorporates several strategies drawn from standards from the ELA Common Core State Standards (CCSS) as they apply to science. These standards are meant to help the student meet the specific challenges of reading, writing, speaking, listening, and language in the science fields.

Vocabulary and Materials

The terms that the student needs to know are found in the vocabulary section at the beginning of each lesson. These terms are also bold in the Student Text.

The materials needed to teach *SCIENCE 6* can be found in the following sections of the Teacher's Edition:

- Instructional Materials, on page vii, identify the essential items available for purchase to teach *SCIENCE 6*.
- The Materials section, found at the beginning of each lesson, lists the materials needed to teach that particular lesson.
- The Materials List, located in the Appendix and also on the Teacher's Toolkit CD, lists all the materials by chapter needed to teach the entire program.

School supplies found in a student's desk (glue stick, scissors, pencil, paper, Bible, etc.) are not typically listed in the materials list of each lesson. Pages that can be found on the Teacher's Toolkit CD are noted with the CD icon (CD).

Discussion

Each lesson includes a discussion section with questions to help you evaluate the understanding of concepts. The questions listed are not exhaustive but are the springboard to help you begin the discussion. Various icons are used to help you identify the type of question or section in a lesson.

- **Teacher's Toolkit CD**—Indicates pages on the CD.
- **Bible Connection**—Indicates a discussion of Bible truths and principles
- **Higher-level thinking**—Indicates that the answer to the question is not taken directly from the pages being discussed. Supply any prompts or background needed to guide the student to the answer.
- **Graphic information**—Indicates a discussion about a piece of art, a photo, a chart, a graph, or a diagram.
- **Activity**—Indicates when an activity or demonstration should be done during the teaching of the lesson.
- **Complete the Page**—Indicates where you may want to have the student complete his Activity Manual page during the teaching of the lesson.

Bible Integration

SCIENCE 6 incorporates a Christian worldview by showing God's nature and man's responsibility as revealed through creation. Biblical truth is woven throughout the Student Text. In addition, both the Creation Corner interest boxes and the Science and the Bible interest boxes help the student develop a Christian worldview.

Bible integration is included as part of the text discussion in the Teacher's Edition. Many lessons provide additional Bible links for further discussion. Bible Action Truths [BATs] provide Christians with specific goals for their actions and attitudes. A list of BATs, as well as Bible Promises, is on pages A2–A4 of the appendix. Both sections provide additional Scripture resources for you. Take advantage of teachable moments to apply biblical truth whenever the occasion arises.

Several chapters include a Bible Connection page or have an Expansion page with a biblical theme. Although each page is usually placed near the lesson to which it most closely corresponds, it may be used at any time during the teaching of the chapter.

Review and Test Lessons

A review lesson is planned for each chapter. Use of the suggested game or an alternate game from the Game Bank on the Teacher's Toolkit CD enables the teacher to reinforce concepts in a fun way.

The review lesson also gives the teacher an opportunity to check to see that each student has accurately completed the study guides for the chapter. The material for each chapter test is taken from the Activity Manual review pages for that chapter. A student who knows the material (not just the answers) covered on the review pages will be adequately prepared to take the test.

The test day has been given its own lesson number. There is no material assigned to be taught in this lesson. (**Note:** The tests must be purchased separately.)

Science Notebook

It is highly recommended that the student keep a loose-leaf notebook for science. The Activity Manual pages are three-hole punched to accommodate this suggestion. A notebook will allow the student to keep study guides, activity records, and other useful information organized. A section of the notebook should serve as a science journal for recording notes, observations, and thoughts about concepts and activities.

Johannes Kepler: Scientist of the Faith

Name _____

"Great is our Lord, and great is His excellence and there is not a count of His wisdom. Praise Him, Sun, Moon, and Planets . . . and you also, my soul, praise the Lord your Creator as long as I shall live." This was Kepler's conclusion to *The Harmony of the World*, his most famous book.

Johannes Kepler (1571–1630) was born into a very poor German family. He studied theology, philosophy, mathematics, and astronomy, doing extremely well in mathematics. Although he planned to become a minister, Kepler yielded to God's calling to become a mathematician and astronomer instead. Kepler became a Christian at a young age. His goal in life was to glorify God. One way that he wanted to do this was by showing the intricacies of the universe. Kepler is known as a founder of modern astronomy. He studied Mars's movements and discovered the three laws of planetary motion in our solar system. Astronomers thought that everything revolved around the earth in circular paths. He proved the planets moved in elliptical orbits, or paths, around the sun. This discovery established predictability and order in the solar system. Kepler rejoiced that his discoveries made people marvel at God's power. Throughout his life Kepler faced hardships, trials, sickness, persecution, and death in his family, but he remained faithful to God. He did not desire any honor for himself but sought to elevate the name of God the Father.

Answer the questions.

- What Christlike qualities are revealed through Kepler's life? *Answers will vary but may include the following: Kepler was determined to seek God and glorify Him. He was thankful that his discoveries made people marvel at God's power. As a mathematician and astronomer, Kepler desired to give God all honor and glory rather than seeking his own fame. He was a humble man.*
- Read 1 Corinthians 10:31. How should a Christian do everything in his life? *to the glory of God*
- How can a scientist bring glory to God in the things he does each day? *Answers will vary but could include showing others the amazing ways God's creation works or using scientific knowledge to do good works that glorify God (Matt. 5:16).*

174 Chapter 11, Lesson 128
Bible Connection

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Science 6 Activity Manual

Teaching Activity and Exploration Lessons

It is important to emphasize the value of the Activity and Exploration lessons in *SCIENCE 6*. In order for the student to truly know science, he must be able to use it. Knowing how to apply science is the basic premise behind the term *scientific literacy*.

The Activity and Exploration lessons allow the student to demonstrate his understanding of science concepts. However, these activities also allow the student to apply knowledge from other subject areas, such as measurement skills from math, and writing and communication skills from English.

Many activities in *SCIENCE 6* are open-ended experiments. These require the student to incorporate many science process skills. Because the goal of these activities is to teach a mental process as opposed to specific procedures, the activities may not follow an exact format. An activity may have more than one correct result.

Explorations are project-oriented activities. They often require the student to work outside of class and usually require more creativity than the activities that involve basic experiments. While doing explorations, the student will develop and use skills such as conducting research, writing, and making oral presentations.

Most of the Activity and Exploration lessons can be completed by students working in groups. Using science groups helps students learn cooperation and management skills. Brainstorming ideas among group members is usually a good problem-solving technique.

Groups for Activities

Place students in groups of three or four to allow for maximum participation.

A science group should be a mixture of students from all achievement levels.

You may find that students who are not good “book learners” are much better at doing hands-on activities.

At the beginning of the year, you may choose to assign tasks to each member of the groups to ensure active participation by all. Later the students within each group can decide the tasks of each member.

Groups for Explorations

Using groups for explorations may require extra input from you. Because the Exploration lessons are less structured, students may have a difficult time assigning themselves appropriate tasks. However, since these lessons often require a high level of creativity, students may be less intimidated in a group setting.

Management Tips

Being prepared is the key to a successful activity. Materials lists are given in the Student Text and in the Activity Manual. The Teacher’s Edition also includes a comprehensive materials list on pages A7–A16. A printable copy of this list is included on the Teacher’s Toolkit CD. You will need to determine specific quantities based on the number of science groups you have in your class. You may need an additional quantity of some materials in order for the student to follow up the activity with new variables.

Have newspaper or plastic to cover work surfaces and buckets or containers in which to dispose of waste material. Paper towels and damp rags are helpful also.



Science Process Skills

Science is not just a collection of facts. It is also a demonstration of processes that show understanding of how science works. Each Activity lesson in *SCIENCE 6* allows the student to practice multiple science process skills. Additionally, one particular process skill is highlighted for discussion in each Activity lesson.

Although process skills are emphasized in the Activity lessons, they are also used in class discussions, demonstrations, and Exploration lessons. The following is a list of process skills that are used throughout *SCIENCE 6*.

Hypothesizing	formulating a statement that can be tested by experimentation
Predicting	forecasting an expected result based on prior experience or knowledge
Measuring	using standard devices and techniques to quantify information
Experimenting	setting up an investigation to test a hypothesis
Making models	creating a physical or mental representation to explain or clarify ideas, objects, or events
Observing	using the senses to gather information regarding objects and events
Inferring	suggesting explanations based on previous knowledge or observation
Classifying	grouping or ordering objects based on similarities or differences
Identifying and controlling variables	recognizing the changing and unchanging factors in an investigation and adjusting one factor to obtain data
Collecting and recording data	gathering information about objects and events in an organized and systematic manner
Communicating	using written, oral, or graphic means to transmit information to others
Defining operationally	explaining an object or event properly but in terms of the student's observation and experience

Assessment and Grading

SCIENCE 6 provides a variety of tools that teachers may use for assessment and grading. Frequent assessment enables you to adjust your instructional plan to better meet the needs of each student. The chart identifies suggested percentages you may use for calculating the student's total grade.

Tests and Quizzes	Written Work	Activities & Explorations	Participation
50%	25%	25%	
33%	33%	33%	
50%	20%	20%	10%
40%	25%	25%	10%

Tests and Quizzes

SCIENCE 6 Tests can serve as the objective part of the evaluation of a student's progress. The most effective tests are an outgrowth of the teaching process. Accordingly, these tests should not replace your individual assessment of a student's understanding and application. The tests can be adapted to meet the teaching emphasis and direction as well as the student's maturation level. You may find it necessary to eliminate some items, provide additional test items, or do both. Students will find the mastery-level information for the SCIENCE 6 Tests on the Study Guide and Thinking It Through pages in the Activity Manual and the Diving Deep pages in the Student Text. An Answer Key is available separately.

Two or three optional quizzes are provided for each chapter on the Teacher's Toolkit CD. The quizzes correlate with the Study Guide pages in the Activity Manual. You may choose one of a variety of ways to grade the quizzes. You could use point values or percentages for individual scores. The scores could then be compiled and averaged treating them as one test grade, or quiz scores could be assigned a designated percentage of the total grade. Quiz scores could also be included within the category of Written Work.

Written Work

Written work may include daily assignments, Quick Check answers, Activity Manual pages, essay and application questions, and journal entries. Scores may be given based on the completion of some assignments and the accuracy of content on others.

Activities and Explorations

A rubric is a useful tool for assessing work that is not objective, such as the Activity and Exploration lessons. Specific rubrics for each Activity and Exploration, as well as instructions for their use, are located on the Teacher's Toolkit CD. In a group activity it is often beneficial to give not only the group as a whole a grade but also to give each student an individual grade. You may choose to give the rubric to the student or to the group for self-assessment as the activity or project is completed. Your scores and comments on a rubric allow the student to see why he received a particular grade and show him areas in which he can improve.

Participation

You may choose to evaluate the student's participation during lesson discussions. This subjective assessment should be tracked. You could use a checklist, rubric, point values, or letter grade.

Which Antacid Is Best?

Name: *Tara Robinson*

Category	Possible points	Points earned
Instructions Student followed instructions	4	4
Materials Student handled materials properly	5	5
Measurements Student took accurate and appropriate measurements	5	5
Recorded Information Student recorded necessary information	5	3
Process Skill—Hypothesizing Student wrote an appropriate hypothesis for the problem	5	4
Content Student showed understanding of content	4	4
Completed Task Student completed task in a timely manner	3	3
Independent/Group Work Student worked independently when required or made a worthwhile contribution to a group	3	2
Comments:	Total	Grade
	34	30
		88%

Tara, you showed good organizational skills. Remember to list all of the materials that you used in the experiment.

You participated a lot, but did not allow others equal opportunity. Try to work on sharing materials next time.

SCIENCE 6

Rubrics

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Scheduling

SCIENCE 6 provides material for a year-long program. Test and review days are included, and some activities have been allotted two lesson days for completion. The instruction of all textual information, activities, and explorations will adequately fill a full year science program.

A program that includes less than a full year of science instruction must adjust the use of the materials to best fit both the individual and the school's needs. The following are additional ways to adjust the program to fit an alternate schedule.

- The material covered in Chapter 13, *Heredity and Genetics*, may not appear on the achievement tests. You may choose to skip this chapter.
- The last two chapters, dealing with the human body and health topics, could be omitted. This material is not currently on standardized tests.
- You may choose to combine lessons. For example, you may choose to combine two text lessons to one lesson or three text lessons to two lessons.
- Each chapter has at least one Exploration and two Activity lessons. If needed, you may introduce the Exploration and assign it to be completed for homework. Many of the Exploration projects may be completed outside of class.
- Since many of the Explorations require the use of research and study skills, they can be incorporated into another subject area, such as Language Arts.
- Explorations and enrichment activities from many lessons can be adjusted for use in learning centers.

Lesson Plan Overviews

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 1: Earthquakes and Volcanoes					
1	3–5	1–3	1	Unit and Chapter Opener <ul style="list-style-type: none"> Recognize the interrelationship of science concepts Explain that ideas about science change, but God never changes Preview the unit and chapter content <i>Creation under the curse of sin</i> <i>God's omniscience</i> <i>Interrelationship of the parts of creation</i> <i>God's use of creation for His glory</i> <i>Mankind's finite knowledge</i>	
2	6–9	4–7	2–3	Earthquakes <ul style="list-style-type: none"> Identify some of the results of the constant changes on the earth's surface Explain the theory of plate tectonics Infer that plate boundaries are unstable areas of the earth's surface Interpret diagrams of the parts of the earth and the different kinds of faults Relate the movement of plates to faults and earthquakes <i>The Flood as God's judgment on sin</i> <i>God's omnipotence</i> <i>God's use of creation for His purposes</i>	Using models Inferring
3	10–13	8–11	3–6	Earthquake Waves <ul style="list-style-type: none"> Compare and contrast body waves and surface waves Explain differences between the Mercalli scale and the Richter scale Describe disasters related to earthquakes <i>Christ as solid foundation for life</i> <i>Mankind's God-given dominion</i> <i>Mankind's demonstration of God's love</i>	Measuring and using numbers Using models Communicating
4	14–15		7–8	Activity: Practice using a scientific method <ul style="list-style-type: none"> Practice a scientific method 	Hypothesizing Recording data Identifying variables
5–6	16–17	12–13	9–10	Activity: Construction Site <ul style="list-style-type: none"> Model the effects of an earthquake on a building Design and construct a structure that can withstand a simulated earthquake Record and analyze information to form conclusions Identify variables <i>Christians as dependable workers</i> <i>Christians as faithful workers</i>	Predicting Experimenting Observing Making and using models Recording data Identifying and controlling variables
7	18–21	14–17	11–12	Volcanoes <ul style="list-style-type: none"> Explain the causes of a volcanic eruption Identify the parts of a volcano Describe three ways volcanoes are classified 	Classifying
8–9	22–23	18–19	13–14	Activity: Create an Eruption <ul style="list-style-type: none"> Design a model volcano based on one of the three kinds of volcanoes Construct a model volcano Communicate the type of volcano made and the process used to make the volcano Compare the model volcano to an actual volcano 	Predicting Making and using models Measuring Observing Communicating
10	24–26	20–22	15–16	Effects of Volcanoes; Other Thermal Eruptions <ul style="list-style-type: none"> Identify possible dangers of volcanoes List some of the meteorological effects of a volcanic eruption Name some of the products of volcanoes Describe other kinds of thermal eruptions <i>God as Master of creation</i> <i>God's use of forces for Earth's benefit</i>	Using a model Inferring
11–12	27	23	17–18	Exploration: I.N.V.E.N.T <ul style="list-style-type: none"> Identify the dangers and difficulties associated with exploring volcanoes Design a piece of equipment that would help in volcano research 	Communicating
13	28–29			Graphic Organizers <ul style="list-style-type: none"> Use graphic organizers to identify related concepts Recognize that graphic organizers have different purposes 	
14	30	24	19–20	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 1 Apply knowledge to everyday situations 	
15	30			Chapter 1 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 1 	

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 2: Weathering and Erosion					
16	31	25	21	Chapter Opener <ul style="list-style-type: none"> Recognize that scientific inferences are not always accurate Preview the chapter content 	
17	32–35	26–29	22	Rock Cycle and Mechanical Weathering <ul style="list-style-type: none"> Identify the three types of rocks and explain how they are formed Differentiate between mechanical and chemical weathering Define and give examples of mechanical weathering <i>The Flood's effect on the earth</i>	Making and using models Inferring
18	36–39	30–33	22–24	Chemical Weathering and Caves <ul style="list-style-type: none"> Define and give examples of chemical weathering Describe how acid rain forms Summarize how chemical weathering forms limestone caves <i>Man as steward of God's creation</i> <i>God's perfect design</i> <i>God's use of forces for Earth's benefit</i>	Making and using models
19	40–41		25–26	Activity: Measurement <ul style="list-style-type: none"> Measure length to the nearest millimeter Measure mass to the nearest gram Measure volume to the nearest milliliter <i>Man's demonstration of God's love</i> <i>Christians as faithful workers</i>	Measuring
20	42–44	34–36	27–28	Soil <ul style="list-style-type: none"> Compare the different kinds of soil and their relative sizes Describe the factors that determine the composition of soil Describe the five soil horizons Interpret a texture triangle diagram <i>God's provision for mankind</i>	Inferring Classifying Interpreting data
21	45	37	29–30	Exploration: Soil Detective <ul style="list-style-type: none"> Interpret the procedure of a flow chart Analyze a soil sample 	Observing Interpreting data
22–23	46–47	38–39	31–32	Activity: Retaining the Right Amount <ul style="list-style-type: none"> Record observations Analyze experiment results Predict the amount of particles needed for a specific soil sample 	Hypothesizing Predicting Measuring Experimenting Observing Identifying variables Recording data
24	48–51	40–43		Erosion <ul style="list-style-type: none"> Differentiate between erosion and weathering Identify kinds of mass wasting Describe how sediment is carried and deposited by a stream <i>God as Master of creation</i> <i>God's use of forces for Earth's benefit</i> <i>Man's use of wisdom to serve his fellow man</i> <i>Spirit-filled Christians</i>	Using models
25	52–53	44–45	33–34	Activity: Stream Erosion <ul style="list-style-type: none"> Record and analyze data Measure volume, angles, and mass accurately Experiment to discover how the steepness of a slope affects erosion 	Hypothesizing Measuring Experimenting Observing Identifying variables Recording data
26	54–57	46–49	35–36	Wave, Wind, and Ice Erosion <ul style="list-style-type: none"> Demonstrate an understanding of the real-life problems of sand erosion and deposition Summarize how water, wind, and ice cause erosion Compare the effects of ice erosion with other kinds of erosion Describe how rocks are eroded by glaciers <i>Man's as steward of God's creation</i> <i>Mankind's use of God's resources</i> <i>Man's responsibility for his actions</i>	Using models Inferring
27	58–59		37–38	PQ3R <ul style="list-style-type: none"> Use the PQ3R method to read informational text 	
28	60	50	39–40	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 2 Apply knowledge to everyday situations 	
29	60			Chapter 2 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 2 	

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 3: Natural Resources					
30	61	51	41	Chapter Opener <ul style="list-style-type: none"> Explain how God's wisdom and mercy are demonstrated in natural disasters Preview the chapter content <i>God's use of forces for Earth's benefit</i>	
31	62–65	52–55	42	Nonrenewable Energy Resources <ul style="list-style-type: none"> Differentiate between renewable and nonrenewable resources Explain how fossil fuels formed Identify the sources and uses of petroleum, natural gas, and coal Describe the benefits and problems related to the use of nuclear energy <i>God's provision for mankind</i> <i>Mankind's use of God's resources</i> <i>The Flood's effect on the earth</i>	Inferring
32	66–67	56–57	43–44	Activity: Clean Up the Spill <ul style="list-style-type: none"> Explain the different methods of cleaning up an oil spill Predict the best method for removing the oil Use a model to demonstrate the different methods of cleanup Compare the methods used in this activity with the methods used in a real oil spill <i>Man's responsibility for his actions</i> <i>Man's demonstration of God's love</i>	Hypothesizing Predicting Making a model Observing Inferring
33	68–71	58–61	45–46	Renewable Energy <ul style="list-style-type: none"> Describe some renewable energy resources Compare and contrast renewable sources of energy 	Using a model
34	72–75	62–65	47–48	Minerals and Soil <ul style="list-style-type: none"> Name and identify the uses of several metals Recognize soil as a natural resource Identify several ways to conserve soil Defend the idea that people can change nature to meet their needs <i>God's Word as the only true source of guidance</i> <i>God's plan for worship</i> <i>God's refining in Christians' lives</i> <i>Mankind's use of God's resources</i> <i>Mankind's God-given dominion</i>	Inferring
35	76–77	66–67	49–50	Activity: Erosion Prevention <ul style="list-style-type: none"> Make models of soil without erosion prevention and soil with erosion prevention Infer how certain materials prevent soil erosion 	Observing Making a model Recording data Inferring
36–37	78–83	68–73	51–52	Water Resources; Preserving Our Resources <ul style="list-style-type: none"> Identify water as a natural resource Explain how the ocean is the source of most fresh water Identify locations of fresh water Describe the different kinds of ice Explain what it means to reuse, reduce, or recycle something <i>God's design for Earth's resources</i> <i>God's provision for mankind</i> <i>Man as a steward of God's creation</i>	
38	84–85		53–54	Exploration: Water Conservation <ul style="list-style-type: none"> Compare the differences between water accessibility in Bible times and water accessibility now Identify several ways to conserve water Recognize Christ as the Living Water <i>God's gift of eternal life</i> <i>Salvation through Christ</i>	Measuring and using numbers Observing Inferring Collecting and recording data
39	86–87	74–75	55	Technology: Autonomous Underwater Vehicles <ul style="list-style-type: none"> Identify examples of technology Explain what an autonomous underwater vehicle is Identify uses for AUVs Describe how the Seaglider functions <i>Man's use of wisdom to serve his fellow man</i> <i>Mankind's God-given dominion</i> <i>Mankind's God-given curiosity</i>	
40	88	76	56	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 3 Apply knowledge to everyday situations 	
41	88			Chapter 3 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 3 	

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 4: Cells and Classification					
42	91–93	77–79	57	Unit and Chapter Opener <ul style="list-style-type: none"> Recognize the interrelationship of science concepts Recognize that God supplies the needs of every organism Preview the unit and chapter content <i>God's perfect creation</i> <i>God's perfect design</i>	Classification
43	94–98	80–84		Cells and Organisms <ul style="list-style-type: none"> Distinguish between living things and nonliving things Identify five characteristics of living things Identify men associated with the development of the microscope Describe the cell theory <i>Creation under the curse of sin</i> <i>Death and decay as a result of sin</i> <i>Consequences of sin</i> <i>God's perfect creation</i> <i>God's plan for salvation</i> <i>Mankind's finite knowledge</i> <i>New life in Christ</i>	Observing Using models Inferring Classifying
44	99–100		58	Using a Microscope <ul style="list-style-type: none"> Identify the parts of a microscope Explain how to use a microscope 	Observing
45	101–3	85–87	59–62	Cells <ul style="list-style-type: none"> Identify a cell as a living unit Discuss the relationship of cells, tissues, organs, and systems Identify cell structures Compare and contrast plant and animal cells 	Inferring
46–47	104	88		Activity: Cell Model <ul style="list-style-type: none"> Demonstrate knowledge of cell structure Construct a 3-D model of a cell Prepare a written report 	Making and using a model Communicating
48–49	105	89	63	Exploration: An Organized Cell <ul style="list-style-type: none"> Correlate the function of cell structure to another organization Write and present a skit to compare a cell to an organization 	Making and using a model Communicating
50	106–7	90–91		Reproduction of Cells <ul style="list-style-type: none"> Describe the process of cell division—both mitosis and meiosis Recognize when mitosis occurs and when meiosis occurs <i>God's plan for heredity</i>	
51	108	92	64	Activity: Classifying <ul style="list-style-type: none"> Distinguish groups according to chosen criteria Complete a classification chart 	Observing Classifying Communicating
52	109–13	93–97	65	Living Kingdoms <ul style="list-style-type: none"> Name the six kingdoms Identify characteristics of each kingdom Explain how man is similar to and yet different from other living organisms <i>Effects of a little sin</i> <i>God's perfect design</i> <i>God's provision for His creation</i> <i>Mankind as God's special creation</i>	Making and using models Inferring Classifying
53	114–15	98–99	66–68	Naming Organisms <ul style="list-style-type: none"> Recognize that Carolus Linnaeus was responsible for the method of classification that we use List the levels of the classification system from largest to smallest Compare the common names and scientific names of organisms Write a scientific name properly <i>God's orderly design</i> <i>God's variety in creation</i> <i>God's omniscience</i> <i>Man as steward of God's creation</i>	
54	116	100	69–70	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 4 Apply knowledge to everyday situations 	
55	116			Chapter 4 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 4 	

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 5: Animal Classification					
56	117	101	71	Chapter Opener <ul style="list-style-type: none"> Recognize that studying animals helps us see God's care for His creation Preview the chapter content <i>God's care for His creation</i> <i>Mankind's God-given dominion</i> <i>Man's responsibility for his actions</i> <i>Mankind's imitation of God's creation</i>	
57	118–21	102–5	72	Sponges, Stinging Animals, and Mollusks <ul style="list-style-type: none"> Recognize invertebrates and vertebrates as a broad way to distinguish animals Recognize that unique animal characteristics allow classification Describe the unique characteristics of the phyla that include sponges, jellyfish, and mollusks <i>God's perfect design</i> <i>God's provision for His creation</i> <i>God's provision for man</i>	Observing Classifying Inferring
58	122–23	106–7	73	Technology: Fiber Optic Sponges <ul style="list-style-type: none"> Compare the spicules of a Rossella sponge with optic fibers Identify ways that studying a Rossella sponge may improve fiber-optic technology Recognize man's duplication of God's creation <i>Mankind's imitation of God's creation</i> <i>God's perfect design</i>	Making and using models Inferring
59	124	108	74	Exploration: Snail Terrarium <ul style="list-style-type: none"> Construct a terrarium Observe land snails Record observations 	Observing Recording data
60	125–27	109–11	72, 75	Echinoderms, Flatworms, Roundworms, Segmented Worms <ul style="list-style-type: none"> Identify characteristics of echinoderms Compare characteristics of flatworms, roundworms, and segmented worms Compare a free-living worm with a parasite Explain why worms can be both helpful and harmful to man 	Observing
61	128–31	112–15	76–78	Arthropods <ul style="list-style-type: none"> Identify crustaceans, arachnids, centipedes, millipedes, and insects as arthropods Describe basic characteristics of each kind of arthropod <i>God's use of creation for His glory</i> <i>Creation models biblical truth</i>	Observing Inferring
62	132–33	116–17	79–80	Activity: Mealworm Movement <ul style="list-style-type: none"> Observe the larval stage of complete metamorphosis Observe the pupal stage of complete metamorphosis Collect and record observation data 	Experimenting Observing Identifying and controlling variables Recording data
63	134–37	118–21	81	Fish and Amphibians <ul style="list-style-type: none"> Identify fish as cold-blooded animals that breathe through gills Identify amphibians as cold-blooded animals that live part of their lives in water and part on land Describe the life cycle of most amphibians <i>God's provision for His creation</i> <i>God's perfect design</i>	Inferring Classifying
64	138–41	122–25	82	Reptiles and Birds <ul style="list-style-type: none"> Identify two characteristics of reptiles Identify two characteristics of birds Compare similarities and differences of birds and reptiles <i>God's power over sin</i> <i>God's perfect design</i> <i>God's provision for His creation</i> <i>Creation models biblical truth</i>	Measuring and using numbers Classifying
65–66	142–47	126–31	82–84	Mammals and Humans <ul style="list-style-type: none"> Identify four characteristics of mammals Explain how marsupials and monotremes are different from other mammals Recognize how humans are different from mammals <i>Mankind created in God's image</i> <i>Mankind as God's special creation</i>	Classifying Making and using models

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
67	148–49	132–33	85–86	Activity: Blubber Mitts <ul style="list-style-type: none"> Formulate a hypothesis Model the insulating properties of animal blubber Experiment to test each model as an insulator Record temperatures and observations 	Predicting Experimenting Measuring Inferring Observing Collecting and recording data
68–69	150–51	134–35	87	Exploration: Animal Robotics <ul style="list-style-type: none"> Associate animal parts with mechanical tools Research to design a robotic animal Create a drawing and description of a robotic animal <i>Mankind's God-given dominion</i> <i>Mankind's God-given curiosity</i> <i>Mankind's imitation of God's creation</i> <i>Mankind's responsibility to glorify God</i>	Inferring
70	152	136	88	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 5 Apply knowledge to everyday situations 	
71	152			Chapter 5 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 5 	

Chapter 6: Plant Classification

72	153	137	89	Chapter Opener <ul style="list-style-type: none"> Recognize that man's knowledge must continually be re-evaluated Preview the chapter content <i>Mankind's finite knowledge</i> <i>God's orderly design</i> <i>God as Master of creation</i>	
73	154–57	138–41	90–91	Nonvascular Plants; Seedless Vascular Plants <ul style="list-style-type: none"> Describe differences between vascular and nonvascular plants Classify vascular plants as seed-bearing plants or seedless plants Identify kinds of seedless vascular plants Identify the parts of a fern Differentiate facts and opinions <i>God's love of beauty</i> <i>God's variety in creation</i>	Observing Inferring
74	158–61	142–45	92–93	Gymnosperms <ul style="list-style-type: none"> Classify seed-producing plants as gymnosperms and angiosperms Identify four kinds of gymnosperms Identify two kinds of conifers Describe ways that man uses conifers <i>Christians' dependence on God's Word</i> <i>Giving God the best</i>	Measuring and using numbers Using models Observing Inferring Classifying
75	162–65	146–49	94	Angiosperms <ul style="list-style-type: none"> Identify characteristics and examples of angiosperms Compare and contrast annual, biennial, and perennial plants Name some ways that angiosperms are used Compare monocotyledons and dicotyledons <i>Mankind's God-given dominion</i> <i>Man's use of wisdom to serve his fellow man</i>	Observing Inferring Classifying
76	166	150	95–96	Activity: Classification Check <ul style="list-style-type: none"> Create a visual illustrating how plants are classified 	Observing Classifying Communicating
77	167	151		Exploration: Plant Products <ul style="list-style-type: none"> Research products made from a given plant Prepare a display to demonstrate research results Present a display 	Communicating
78	168–71	152–55	97–98	Plant Parts <ul style="list-style-type: none"> Identify the two kinds of vascular tissue and their functions Summarize three main functions of a plant stem Compare and contrast herbaceous and woody stems Summarize three main functions of root systems Compare and contrast taproots, fibrous roots, and aerial roots <i>The Bible as final authority</i> <i>Faith in the Word of God</i> <i>God's perfect design</i> <i>God's provision for His creation</i>	Using models Inferring

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
79	172–73	156–57	99–100	Activity: How Big Is My Tree? <ul style="list-style-type: none"> Measure the circumference, height, and crown of a tree and calculate the tree's point value Create a graph to show relationships Interpret graphs Compare data 	Measuring Observing Inferring Communicating Collecting, recording, and interpreting data
80	174	158	101–2	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 6 Apply knowledge to everyday situations 	
81	174			Chapter 6 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 6 	

Chapter 7: Atoms and Molecules

82	177–79	159–61	103	Unit and Chapter Opener <ul style="list-style-type: none"> Recognize the interrelationship of science concepts Recognize that man's inferences are sometimes inaccurate Preview the unit and chapter content <i>God as Master of creation</i> <i>God's creation of invisible forces</i> <i>God's holding all creation together</i> <i>God's omniscience</i> <i>Mankind's finite knowledge</i>	
83	180–83	162–65	104	Atoms <ul style="list-style-type: none"> Describe and label the size, charge, and location of each part of an atom Recognize that an element is made of only one kind of atom Differentiate between atomic mass and atomic number <i>God as Master of creation</i> <i>Mankind's finite knowledge</i> <i>Faith in the Word of God</i>	Making and using models
84	184–87	166–69	105–6	Elements <ul style="list-style-type: none"> Recognize that the periodic table is a classification system Describe the process Mendeleev used for arranging the elements Identify the types of information provided for each element on the periodic table Identify the terms <i>period</i> and <i>group</i> as they relate to the periodic table Differentiate among categories on the periodic table <i>God's orderly design</i>	Classifying Inferring Making models
85	188	170	107–8	Exploration: Wanted: U or Your Element <ul style="list-style-type: none"> Write about an element based on research Construct a visual aid 	Communicating
86	189–91	171–73	109	Compounds, Chemical Formulas, Chemical Reactions <ul style="list-style-type: none"> Explain that a chemical change occurs when atoms of different elements combine Demonstrate how to read and write a chemical formula Differentiate between synthesis and decomposition reactions 	Observing Predicting Inferring
87	192–93	174–75	109–10	Atomic Bonds <ul style="list-style-type: none"> Compare and contrast ionic bonding Describe what causes an ion 	Making and using models Inferring
88	194–95	176–77	111–12	Activity: Hot or Cold <ul style="list-style-type: none"> Evaluate whether a chemical reaction has occurred Collect data to identify a reaction as endothermic or exothermic 	Predicting Observing Measuring Experimenting Collecting and recording data
89	196–99	178–81	113–14	Acids and Bases <ul style="list-style-type: none"> Compare and contrast characteristics of acids and bases Describe the purpose of an indicator Identify products that are acids, bases, or salts Summarize how a salt forms <i>God's creation for man's enjoyment</i>	Observing Inferring Experimenting
90	200–201	182–83	115–16	Activity: pH Indicator <ul style="list-style-type: none"> Identify a solution as an acid or a base by using a pH indicator solution Observe the effects of an acid or a base on an indicator Estimate the strength of an acid or base solution by interpreting a table 	Predicting Measuring Observing Recording data

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
91	202–3	184–85	117–18	Activity: Which Antacid Is Best? <ul style="list-style-type: none"> • Hypothesize about the effectiveness of several antacids • Make and use a model of “upset stomach” acid • Infer information from the model 	Hypothesizing Experimenting Observing Inferring Recording data
92	204	186	119–20	Chapter Review <ul style="list-style-type: none"> • Recall concepts and terms from Chapter 7 • Apply knowledge to everyday situations 	
93	204			Chapter 7 Test <ul style="list-style-type: none"> • Demonstrate knowledge of concepts taught in Chapter 7 	

Chapter 8: Electricity and Magnetism

94	205	187	121	Chapter Opener <ul style="list-style-type: none"> • Recognize God’s use of man’s curiosity • Preview the chapter content <i>Mankind’s finite knowledge</i> <i>Mankind’s God-given curiosity</i>	
95	206–9	188–91	122	Static Electricity; Current Electricity <ul style="list-style-type: none"> • Explain what causes static electricity • Identify the two things needed for an electric current to flow • Describe the characteristics of conductors, resistors, and insulators <i>Man as steward of God’s creation</i> <i>Mankind’s God-given dominion</i>	Experimenting Inferring
96	210–11	192–93	123–24	Activity: An “Unbreakable” Circuit <ul style="list-style-type: none"> • Design and build an “unbreakable” circuit • Experiment to test hypotheses 	Hypothesizing Predicting Experimenting Inferring Identifying and controlling variables
97	212–15	194–97	125–28	Circuits; Measuring Electricity; Batteries <ul style="list-style-type: none"> • Differentiate between parallel circuits and series circuits • Distinguish among the three basic units of electrical measurement: volt, ampere, and watt • Explain how a battery works <i>God’s perfect design</i> <i>God’s provision for His creation</i>	Measuring and using numbers Experimenting Making and using models
98	216–18	198–200	129	Magnetism <ul style="list-style-type: none"> • Describe what happens to magnets at their poles • Explain the relationship between magnetism and electricity • Identify and describe the parts of a generator • Explain how a generator works 	Observing
99	219	201	130	Exploration: Famous Inventors <ul style="list-style-type: none"> • Research an inventor • Present a speech honoring an inventor 	Communicating
100	220–21	202–3	131–32	Activity: Build an Electromagnet <ul style="list-style-type: none"> • Identify ways to increase a wire’s magnetism • Predict ways to strengthen an electromagnet • Experiment to test predictions 	Hypothesizing Predicting Experimenting Observing Inferring Identifying and controlling variables Recording data
101	222–23	204–5	133	Technology: Magnetic Levitation <ul style="list-style-type: none"> • Explain how electromagnets are used in maglev trains • Identify some ways a maglev train may benefit the environment and transportation 	Making and using models
102	224–27	206–9	134	Electronics <ul style="list-style-type: none"> • Explain the difference between electricity and electronics • Identify the benefits of an integrated circuit • Identify some of the parts of a computer <i>God’s perfect creation</i>	Observing Experimenting Recording and interpreting data Communicating
103	228	210	135–36	Chapter Review <ul style="list-style-type: none"> • Recall concepts and terms from Chapter 8 • Apply knowledge to everyday situations 	
104	228			Chapter 8 Test <ul style="list-style-type: none"> • Demonstrate knowledge of concepts taught in Chapter 8 	

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 9: Motion and Machines					
105	229	211	137	Chapter Opener <ul style="list-style-type: none"> Recognize that God values creativity Preview the chapter content <i>Mankind's responsibility to glorify God</i>	
106	230–33	212–15	138	Motion <ul style="list-style-type: none"> Differentiate between speed and velocity Explain why a reference point is needed to observe motion Describe the relationship of mass and velocity to momentum <i>Christ as a Christian's reference point Bible as final authority</i>	Using numbers Inferring
107	234–37	216–19	139–40	Laws of Motion <ul style="list-style-type: none"> Identify Newton's three laws of motion Explain that both gravity and friction work against inertia <i>Mankind's finite knowledge God's omniscience</i>	Inferring Using numbers Using models Defining operationally
108	238–39	220–21	141–42	Activity: Mini Cars in Motion <ul style="list-style-type: none"> Plan a demonstration to illustrate the laws of motion Experiment to show each of the laws of motion with toy cars Identify the laws of motion in real-life situations <i>God's orderly design</i>	Experimenting Making and using models Observing Communicating
109	240	222	143–44	Exploration: Roller Coaster <ul style="list-style-type: none"> Design and make a model roller coaster Discover relationships between slope, speed, and momentum 	Making and using models Inferring
110	241–43	223–25	145–46	Work; Simple Machines: Levers <ul style="list-style-type: none"> Explain that work equals force times distance Describe a lever Identify several common levers Differentiate among the three classes of levers <i>God's design of man's body</i>	Using numbers Using models Inferring Classifying
111	244–47	226–29	147–51	Pulleys; Wheels and Axles; Inclined Planes; Wedges; Screws; Compound Machines <ul style="list-style-type: none"> Describe a pulley, wheel and axle, inclined plane, wedge, and screw Discern between a fixed pulley, a moveable pulley, and a block and tackle Explain what a compound machine is 	Making and using models Inferring Observing Classifying
112	248–49	230–31	152	Activity: How Much Force? <ul style="list-style-type: none"> Experiment to show that an inclined plane reduces the amount of force needed to do work Measure metrically in newtons and centimeters Define operationally the results of the activity 	Measuring Experimenting Observing Defining operationally Recording data
113	250	232	153–56	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 9 Apply knowledge to everyday situations 	
114	250			Chapter 9 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 9 	

Chapter 10: Stars

115	253–55	233–35	157	Unit and Chapter Opener <ul style="list-style-type: none"> Recognize the interrelationship of science concepts in the unit Recognize how God's glory is reflected in the vastness of the stars Preview the unit and chapter content <i>God as Master of creation God's creation reflects His glory God's omniscience God's omnipotence</i>	
116	256–59	236–39	158	Our Closest Star; Characteristics of Stars <ul style="list-style-type: none"> Explain how stars produce their own light Distinguish between apparent magnitude and absolute magnitude of stars Identify classifications of stars according to color Explain ways distance is measured in space Interpret diagrams <i>God as only Creator God's omniscience God's use of creation for His glory God's use of creation for His purposes</i>	Measuring and using numbers Making and using models Inferring Classifying

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
117	260–63	240–43	159–60	Kinds of Stars <ul style="list-style-type: none"> Differentiate between a pulsating variable star and an eclipsing variable star Describe the causes of novas and supernovas Describe how astronomers think neutron stars and black holes are formed 	Using models Inferring Observing
118	264–67	244–47	161	Observing the Heavens <ul style="list-style-type: none"> Identify various constellations Defend why a Christian should not be involved in astrology Describe the difference between a reflecting telescope and a refracting telescope Identify instruments used to study the stars <p><i>Faith in God's Word for guidance</i> <i>God's Word as the only true source of guidance</i> <i>God's omnipotence</i> <i>God's use of creation for His glory</i></p>	Classifying Observing Making and using models
119	268	248		Activity: Pinhole Constellations <ul style="list-style-type: none"> Make a model of a constellation Recognize and name several star groups and constellations 	Making and using models Observing
120	269	249		Exploration: A Different Look <ul style="list-style-type: none"> Make a model of a constellation Plot points on a graph Relate the model to the relative distances of stars 	Measuring Making and using models
121	270–75	250–55	162–64	Star Groups <ul style="list-style-type: none"> Identify how many stars are in a binary star group and in a multiple star group Differentiate between an open star cluster and a globular cluster Identify our galaxy as the Milky Way Recognize that our galaxy is part of a cluster of galaxies called the Local Group Describe asteroids, meteoroids, meteors, meteorites, and comets <p><i>God's omnipotence</i> <i>God as Master of creation</i> <i>God's use of creation for His glory</i> <i>God as only Creator</i></p>	Observing Inferring Using models
122	276–77		165–66	Exploration: Stargazing <ul style="list-style-type: none"> Interpret and use a star chart Identify objects in the night sky Record observations 	Observing Recording data
123	278–79	256–57	167–68	Activity: Crater Creations <ul style="list-style-type: none"> Test factors that affect the size and depth of craters Measure mass and length Use a chart to record information Make and test predictions 	Hypothesizing Measuring Observing Recording data Identifying and controlling variables Communicating
124	280	258	169–70	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 10 Apply knowledge to everyday situations 	
125	280			Chapter 10 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 10 	

Chapter 11: Solar System

126	281	259	171	Chapter Opener <ul style="list-style-type: none"> Recognize that God's creation is orderly Preview the chapter content <p><i>God's orderly design</i> <i>God's perfect design</i> <i>God's provision for His creation</i></p>	
127	282–85	260–63	172	Space Exploration <ul style="list-style-type: none"> Explain how a rocket uses thrust to launch Describe characteristics of space exploration tools such as rockets, space shuttles, satellites, and probes Distinguish between a space shuttle and a probe Identify ways that living in space is different from living on Earth <p><i>Man's brevity of life</i></p>	Inferring Communicating

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
128	286–87	264–65	173–74	Technology: Inflatable Spacecraft <ul style="list-style-type: none">Describe some types of inflatable spacecraftUnderstand the basics of inflatable technologyExplain the advantages of inflatable spacecraft <i>Mankind's responsibility to glorify God</i> <i>God's orderly creation</i>	Using numbers Inferring Making and using models
129	288–89	266–67	175–76	Activity: Rocket Race <ul style="list-style-type: none">Hypothesize how design affects the performance of a balloon rocketConstruct a balloon rocketDemonstrate an understanding of Newton's third law of motion	Hypothesizing Measuring Making and using models Experimenting Observing Inferring Recording data
130	290–93	268–71	177–78	The Sun and the Seasons <ul style="list-style-type: none">Identify the parts of the sunDescribe the characteristics of a solar stormDescribe relationships between the sun and the planetsSummarize why Earth experiences seasons <i>God's perfect design</i> <i>God's orderly design</i>	Inferring Measuring and using numbers Making and using models
131	294–97	272–75	179–80	The Planets <ul style="list-style-type: none">Describe similarities among the inner planetsExplain how people have gradually learned about the planetsIdentify characteristics of Mercury, Venus, and Mars <i>God's provision for mankind</i>	Inferring
132	298–301	276–79	179–82	Earth; the Moon; Project Apollo; Eclipses <ul style="list-style-type: none">Explain some ways God made Earth uniqueDescribe why the same side of the moon always faces EarthGive details about the <i>Apollo 11</i> missionDescribe the causes of solar and lunar eclipses <i>God's provision for mankind</i> <i>God's omnipotence</i> <i>God's loving care</i>	Making and using models Inferring Communicating
133	302–3	280–81	183–84	Activity: Spare Parts Solar Oven <ul style="list-style-type: none">Construct a solar oven that will melt a marshmallowInfer the relationship between materials used and results	Observing Inferring Identifying variables Recording data Communicating
134	304–7	282–85	179–80, 185	The Outer Planets <ul style="list-style-type: none">Identify characteristics of each of the outer planetsDefine <i>dwarf planet</i>Explain why Pluto is classified as a dwarf planetExplain how we know information about the outer planets and the Kuiper Belt <i>God's great glory</i> <i>God's omnipotence</i> <i>God's perfect design</i>	Inferring Making and using models Communicating
135	308–9		186	Exploration: Solar Walk <ul style="list-style-type: none">Construct a scale model of the solar systemGain a greater understanding of the vastness of our solar system <i>God's vast universe</i> <i>God's love for mankind</i> <i>God's omnipotence</i>	Measuring Making and using models
136	310–11		187–88	Exploration: Travel Brochure <ul style="list-style-type: none">Design a travel brochure for a planetCollect dataWrite from research	Collecting and recording data Communicating
137	312	286	189–90	Chapter Review <ul style="list-style-type: none">Recall concepts and terms from Chapter 11Apply knowledge to everyday situations	
138	312			Chapter 11 Test <ul style="list-style-type: none">Demonstrate knowledge of concepts taught in Chapter 11	

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
Chapter 12: Plant and Animal Reproduction					
139	315–17	287–89	191	Unit and Chapter Opener <ul style="list-style-type: none"> Recognize the interrelationship of science concepts Recognize that man's inferences are sometimes faulty Preview the unit and chapter content <i>God's perfect design</i> <i>God's plan for heredity</i> <i>God's plan for salvation</i> <i>God's gift of eternal life</i>	
140	318–21	290–93	192	Plant Reproduction <ul style="list-style-type: none"> Identify each part of a flower and describe its function Differentiate between pollination and fertilization Explain how scientists classify fruits Describe the process of germination <i>God's love of beauty</i> <i>God's provision for His creation</i>	Classifying Inferring Observing
141	322–23	294–95	193–94	Activity: Flower Dissection <ul style="list-style-type: none"> Measure the parts of a flower Identify the parts of a flower <i>God's perfect design</i>	Measuring Observing Recording data Defining operationally
142	324–27	296–99	195–96	Seeds in Cones; Spores <ul style="list-style-type: none"> Explain how conifers reproduce Compare and contrast seeds and spores Identify some organisms that reproduce by spores <i>God's perfect design</i>	Inferring Observing
143	328–31	300–303	197	Animal Reproduction <ul style="list-style-type: none"> Recognize that animals begin as a single cell Compare and contrast placental and marsupial development Generalize characteristics of eggs and where they are laid Explain benefits of the laying of many eggs by some animals <i>Mankind as God's special creation</i> <i>Mankind created in God's image</i> <i>Man's use of wisdom to serve his fellow man</i> <i>Man as steward of God's creation</i> <i>God's provision for His creation</i>	Inferring Communicating
144	332–33		198	Exploration: What Value Does God Place on Life? <ul style="list-style-type: none"> Recognize the value that God places on life Summarize how God provides eternal life <i>God's value of life</i> <i>God's plan for salvation</i> <i>God's gift of eternal life</i> <i>God's plan and provision for mankind</i> <i>God's omniscience</i> <i>God's omnipotence</i>	Inferring
145	334–37	304–7	199–202	Asexual Reproduction <ul style="list-style-type: none"> Identify some methods of asexual reproduction Activity: It's a Race <ul style="list-style-type: none"> Set up an experiment to observe and compare the rate of growth of a seed and of a plant cutting 	Hypothesizing Measuring Observing Inferring Recording data Communicating
146	338	308	203–4	Chapter Review <ul style="list-style-type: none"> Recall concepts and terms from Chapter 12 Apply knowledge to everyday situations 	
147	338			Chapter 12 Test <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 12 	

Chapter 13: Heredity and Genetics

148	339	309	205	Chapter Opener <ul style="list-style-type: none"> Recognize that each human is uniquely planned and formed by God Preview the chapter content <i>God's plan for heredity</i> <i>God's knowledge of each individual</i> <i>God's perfect design</i>	
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Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
149	340–42	310–12	206–8	<p>Heredity</p> <ul style="list-style-type: none"> Describe the relationship among chromosomes, DNA, and genes Distinguish between learned and inherited traits <p>Activity: It's All in the Genes</p> <ul style="list-style-type: none"> Survey a sample group Graph survey results <p><i>God's knowledge of each individual Christians as a reflection of God</i></p>	Collecting data Interpreting data Communicating Inferring
150	343–44	313–14	209–12	<p>DNA: the Double Helix</p> <ul style="list-style-type: none"> Describe the structure of a DNA molecule Recognize James Watson and Francis Crick as those who identified DNA structure Identify uses of DNA testing Create a model of a DNA molecule 	Inferring Using models
151	345	315	213–14	<p>Exploration: DNA Extraction</p> <ul style="list-style-type: none"> Extract DNA from organic matter 	Observing
152	346–49	316–19	215	<p>Father of Genetics; Dominant and Recessive Genes</p> <ul style="list-style-type: none"> Describe Mendel's experimental procedures Explain Mendel's conclusions Interpret diagrams and charts Differentiate between dominant genes and recessive genes <p><i>Man's responsibility for his actions Honesty</i></p>	Inferring
153	350–53	320–23	216–18	<p>Punnett Squares; Pedigrees</p> <ul style="list-style-type: none"> Predict genetic probability using a Punnett square Interpret a pedigree chart Identify some traits as sex-linked <p><i>Identified in Christ</i></p>	Inferring Using models
154	354–55	324–25	219–20	<p>Activity: Paper Pet Genetics</p> <ul style="list-style-type: none"> Use Punnett squares to predict genotypes Construct paper pets based on predicted genotypes 	Making and using models Inferring Interpreting data Communicating
155	356–59	326–29	221	<p>Genetic Disorders and Diseases; Genetic Engineering</p> <ul style="list-style-type: none"> Identify and discuss some common genetic diseases and disorders Explain why genetic diseases are not easy to cure Name examples of genetic engineering <p><i>God as Master of creation God's knowledge of each individual God's perfect creation The Fall of mankind God's provision for man Mankind's God-given curiosity Mankind's use of God's resources</i></p>	Communicating Inferring
156	360–61	330–31	222	<p>Technology: A Useful Weed</p> <ul style="list-style-type: none"> Explain why thale cress is considered a model plant Describe how thale cress has been used in genetic engineering Recognize that scientists use the same basic methods that Mendel used 	Controlling variables Inferring
157	362	332	223–24	<p>Chapter Review</p> <ul style="list-style-type: none"> Recall concepts and terms from Chapter 13 Apply knowledge to everyday situations 	
158	362			<p>Chapter 13 Test</p> <ul style="list-style-type: none"> Demonstrate knowledge of concepts taught in Chapter 13 	

Chapter 14: Nervous System

159	365–67	333–35	225	<p>Unit and Chapter Opener</p> <ul style="list-style-type: none"> Recognize the interrelationship of science concepts Recognize that man's inferences are sometimes inaccurate Preview the unit and chapter content <p><i>God as Master of creation Mankind created in God's image God's use of creation for His glory God's design for man's body</i></p>	Inferring
160	368–71	336–39	226	<p>The Central Nervous System</p> <ul style="list-style-type: none"> Identify the two main parts of the nervous system Explain how the parts of the central nervous system work together Describe the four lobes of the cerebrum Differentiate among the functions of the three parts of the brain <p><i>God's design of man's body God's perfect design</i></p>	Inferring Making and using models Observing

Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
161	372–75	340–43	227–28	The Peripheral Nervous System <ul style="list-style-type: none">Identify the parts of a neuronExplain how neurons send messagesCompare the two parts of the peripheral nervous systemDescribe how a reflex occurs <i>God's perfect design</i>	Making and using models Inferring Observing
162	376–77	344–45	229–30	Activity: Reaction Time <ul style="list-style-type: none">Explore variables that affect reaction time <i>Christians as a reflection of God</i> <i>Man's responsibility for his actions</i>	Predicting Measuring Inferring Identifying and controlling variables Recording and interpreting data
163	378–81	346–49	231	The Five Senses <ul style="list-style-type: none">Recognize how the five senses interact with the nervous systemInterpret diagrams for informationIdentify the nerves associated with hearing, sight, and smellExplain how the different senses communicate with the brain <i>God's perfect design</i> <i>Faith in the Word of God</i>	Observing Inferring Making and using models Experimenting
164	382–83	350–51	232	Activity: Touch Tester <ul style="list-style-type: none">Predict and identify areas of the body that are the most sensitive to touch	Predicting Measuring Inferring Recording data
165	384–87	352–55	233–36	Memory and Sleep <ul style="list-style-type: none">Differentiate between short-term memory and long-term memoryIdentify two categories of long-term memoryDescribe some characteristics of REM sleep and explain why sleep is important to the body <i>God's command to remember</i> <i>God's design of man's body</i> <i>Mankind's responsibility to glorify God</i> <i>Mankind's finite knowledge</i> <i>Godly wisdom</i> <i>God's perfect design</i>	Inferring Classifying Observing
166	388–91	356–59	237–38	The Endocrine System; Disorders and Drugs <ul style="list-style-type: none">Compare characteristics of the nervous system and the endocrine systemIdentify the function of some glands in the endocrine systemIdentify some common nervous system disordersRecognize some of the problems resulting from drug abuse <i>God's design of man's body</i> <i>Consequences of sin</i> <i>Man's body as God's temple</i> <i>Mankind's responsibility to glorify God</i> <i>Spirit-filled Christians</i>	Inferring Observing
167	392–93			Exploration: Effects of Drug Abuse <ul style="list-style-type: none">Identify some common categories of drugsExplain how some types of drugs affect the nervous systemList some biblical reasons for not abusing drugs <i>Man's body as God's temple</i> <i>Mankind's sinful nature</i>	Inferring
168	394	360	239–40	Chapter Review <ul style="list-style-type: none">Recall concepts and terms from Chapter 14Apply knowledge to everyday situations	
169	394			Chapter 14 Test <ul style="list-style-type: none">Demonstrate knowledge of concepts taught in Chapter 14	

Chapter 15: Immune System

170	395	361	241	Chapter Opener <ul style="list-style-type: none">Recognize that man's inferences are sometimes inaccuratePreview the chapter content <i>God as the Great Physician</i> <i>God's omnipotence</i>	
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Lesson	TE pages	ST pages	AM pages	Objectives and Christian Worldview	Process Skills
171	396–99	362–65	242	<p>Diseases</p> <ul style="list-style-type: none"> • Recognize that disease is a consequence of Adam's sin • Explain how diseases are classified • Identify four common pathogens • List some diseases caused by each pathogen <p><i>Consequences of sin</i> <i>God's omnipotence</i> <i>God's protection of His people</i></p>	Inferring
172	400–403	366–69	243–44	<p>Pathogens and Noncommunicable Diseases</p> <ul style="list-style-type: none"> • Identify and explain several ways that pathogens are spread • Differentiate between communicable diseases and noncommunicable diseases • Explain some of the jobs of an epidemiologist <p><i>God as Master of creation</i> <i>God's omniscience</i> <i>God's knowledge of each individual</i></p>	Making and using models Inferring Observing Communicating
173	404–5	370–71		<p>Activity: Of Epidemic Proportions</p> <ul style="list-style-type: none"> • Recognize how quickly pathogens can spread • Infer the source of contamination 	Making and using models Observing Inferring Recording data Communicating
174	406–9	372–75	245	<p>The Immune System</p> <ul style="list-style-type: none"> • Identify several defensive barriers of the body • List two of the body's nonspecific defenses • Identify the body's specific defense against pathogens • Explain some functions of white blood cells during the immune response <p><i>God's plan for man's body</i> <i>Consequences of sin</i> <i>God's mercy</i> <i>God's perfect design</i></p>	Inferring
175	410–13	376–79	246–49	<p>Immunity; Antibodies and Antibiotics; Malfunctions of the Immune System</p> <ul style="list-style-type: none"> • Explain three ways that the body can obtain immunity • Compare and contrast antibiotics and antibodies • Identify problems that can occur when the immune system malfunctions <p><i>Man's sinful nature</i> <i>God's power over sin</i> <i>Faith in the Word of God</i> <i>God's omniscience</i> <i>God's omnipotence</i></p>	Inferring
176	414–15	380–81	250	<p>Technology: Robotic Surgery</p> <ul style="list-style-type: none"> • Compare robotic surgery with traditional surgery • Describe some advantages and disadvantages of long-distance robotic surgery <p><i>God's love for mankind</i> <i>Man's demonstration of God's love</i></p>	Inferring
177	416	382		<p>Activity: Defend and Capture</p> <ul style="list-style-type: none"> • Model the interactions between the immune system and pathogens 	Observing Communicating Defining operationally
178	417	383		<p>Exploration: Extra, Extra, Read All About It!</p> <ul style="list-style-type: none"> • Research and write an article about a medical discovery 	Communicating
179	418	384	251–52	<p>Chapter Review</p> <ul style="list-style-type: none"> • Recall concepts and terms from Chapter 15 • Apply knowledge to everyday situations 	
180	418			<p>Chapter 15 Test</p> <ul style="list-style-type: none"> • Demonstrate knowledge of concepts taught in Chapter 15 	

Lesson Plans

