bju press®

ELEMENTARY SUBJECT OVERVIEW

Science

bju press®

Our Vision

To equip students to apply science to life by observing and analyzing scientific information and by evaluating scientific models from a biblical worldview

Our Goals for Students

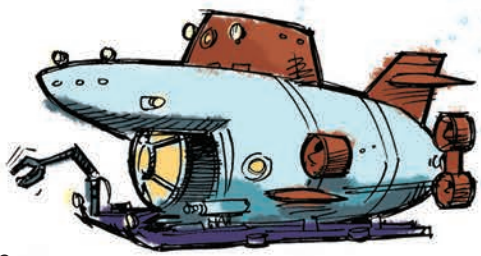
- To develop a foundational understanding of scientific knowledge and skills
- To engage students in scientific methods to solve real-world problems
- To use models to explain and describe observations and make predictions
- To enable students to interpret and apply scientific knowledge through the lens of biblical teaching

Contents

Program Approach

The BJU Press elementary science program begins the process of teaching students how to use scientific knowledge throughout their lives. Science is far more than a collection of facts. Students can use the knowledge and skills they learn in science classes to change our world and improve it for others. Our program begins by shaping a biblical worldview of science for students so that they can develop a good foundation for science learning, starting from Creation. They will get to engage in solving real-world problems so that they can see what they are capable of accomplishing as image-bearers of God. They will learn how to follow scientific methods, use models, and interpret and apply scientific knowledge through the lens of biblical teaching. Because of the worldview claims that fill modern science, Christian students must learn how to evaluate the information they encounter. We are dedicated to making science useful to students so that they can apply it to their lives for the glory of God.

Foundational Understanding of Science



To succeed in science learning, students need educational materials that go beyond a collection of science facts. They need to form a correct starting point for those facts, and they need to achieve science literacy. The BJU Press elementary science materials will introduce them to four key biblical worldview themes that will help them shape their understanding of science. First, based on the authority of Scripture, our science program establishes for students a young-earth model that views the earth and the universe as being about 6,000 or 7,000 years old (Gen. 1:1; Heb. 11:3). And the events of the Flood have significantly changed the surface of the planet. Second, students can find order in nature because it was designed by a Creator. Third, humanity was created in the image of God, which helps students understand how we are above animals and responsible for the care of God's creation (Gen. 1:26–28). Finally, students will understand that the end goal of science is to glorify God and to use science wisely for Him.

The elementary science materials also will help students build skills in reading informational science texts, will introduce them to using science tools, and will teach them how to read and interpret tables, charts, and graphs. The student edition will also give students a balanced introduction to science topics on a level that they can understand and assimilate, including

introductions to STEM careers. It encourages students to read for information, a skill critical for learning. Activities allow students to put science skills into practice and to demonstrate their knowledge and understanding of scientific concepts.

Engaging Students in the Work of Science

Success in science learning also demands hands-on activities that get the students thinking about the world around them. Both the student editions and activities include guided discovery activities, inquiry- and project-based investigations, and STEM activities. These will call the students' attention to real-world problems that can be solved by using science skills. Many of these activities encourage students to collaborate with each other, helping them to learn 21st century skills that scientists need to be effective, such as cooperation, time management, and problem-solving.

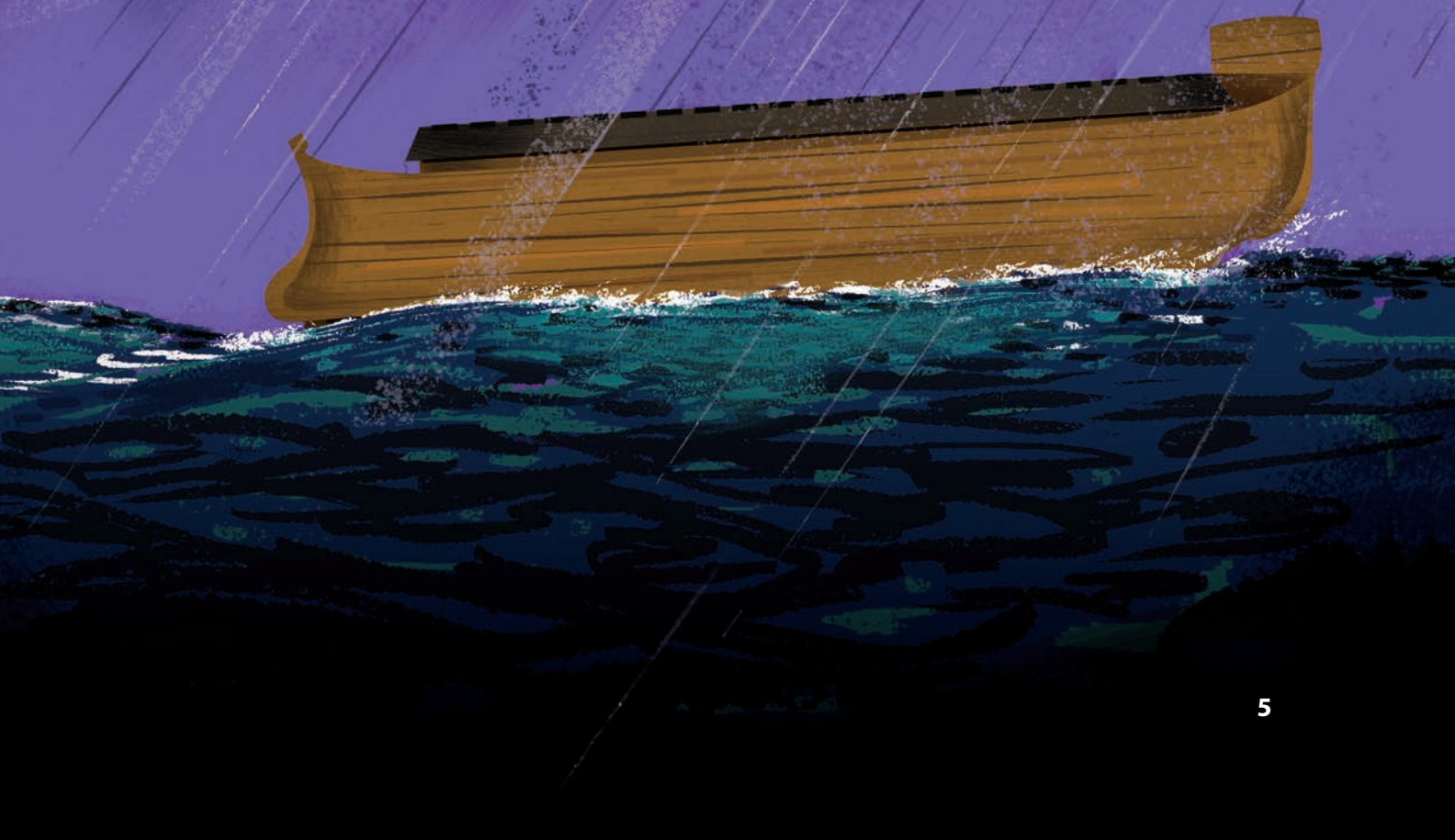
Using Models

Many of the activities require students to construct and use models of real-world principles. Model use is an important aspect of science learning because scientists can't always observe an object or principle

directly and must use a model to replicate what happens in real life. Interacting with these models helps students to explain and describe their observations as well as make predictions about those principles. However, using a model also reveals an important aspect of science learning: science has limits. A model cannot be exact, and only so much can be learned from one. Similarly, scientists are limited by the use of models and by their own understanding of real-world principles. Only the Bible has the authority to influence how we make decisions in science.

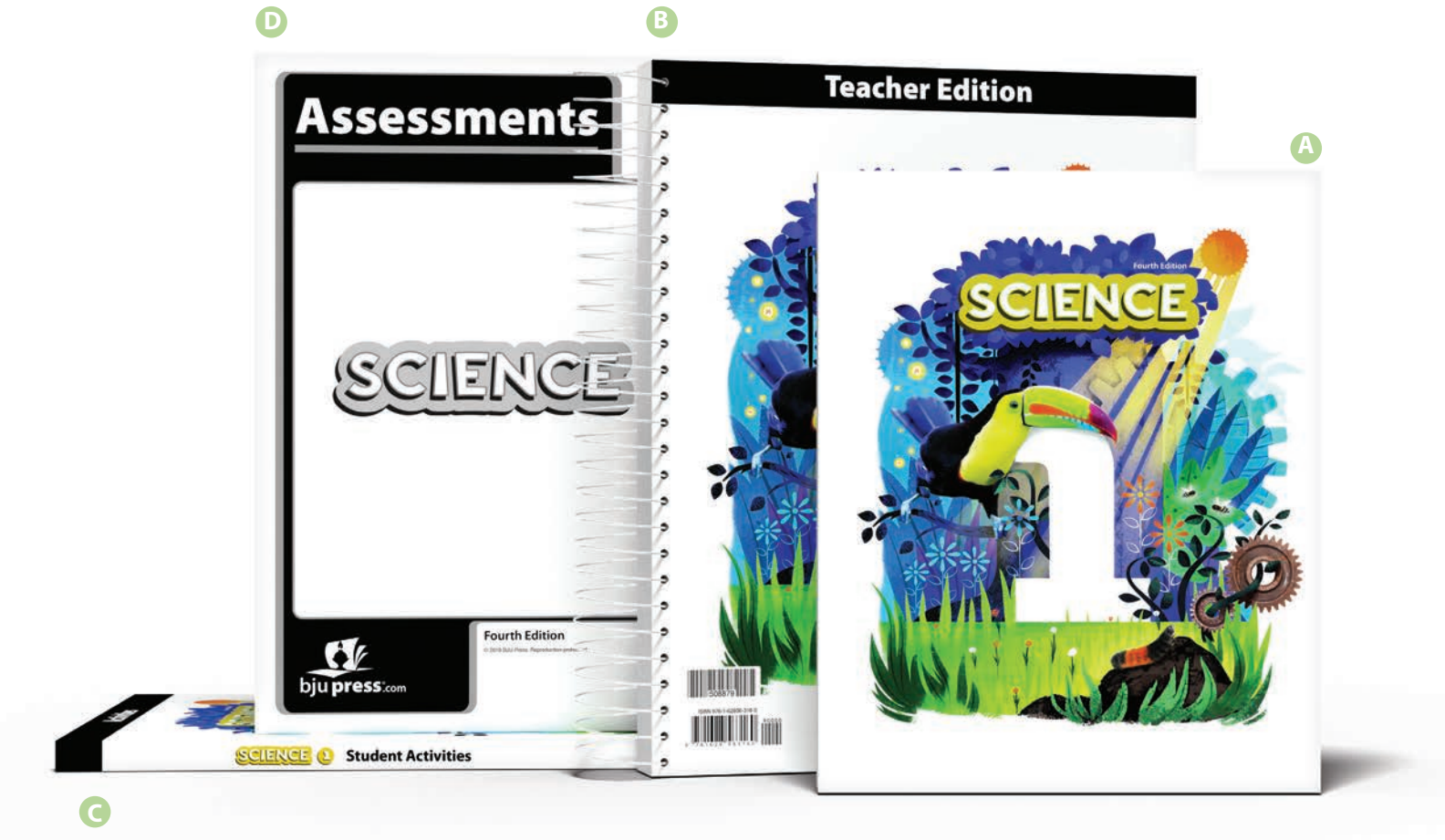
Using Biblical Teaching to Interpret and Apply Knowledge

Scientific knowledge is useless in a vacuum because students need to be able to understand and use the knowledge they gain. The world-view lessons in the student editions will help the students to interpret nature (including fossils, life, stars, earth, and the solar system) through the lens of the Bible's story. Nature appears designed because it is. The activities support those lessons and give students an opportunity to apply what they have learned, using and developing their creativity and problem-solving skills. Ultimately, the BJU Press elementary science materials teach students to view the natural world as belonging to God. We can glorify God because of His creation. Scientific knowledge enables students to both care for God's world effectively and to help others.



The Materials

Below are the standard BJU Press science materials provided for each elementary grade. Some grades may include additional pieces. For a comprehensive list, contact your Precept sales representative at preceptmarketing.com/locator.



A. Student Edition (eTextbooks available)

Each student edition provides grade-appropriate information through text, diagrams, graphs, charts, and annotated photographs and illustrations. Each book also includes Quick Check questions, a glossary, and an index. The Quick Check questions use high-level questioning to promote understanding and critical-thinking skills. The student edition also contains an introduction to each investigation, exploration, and STEM activity.

B. Teacher Edition

Each teacher edition includes guided instruction for every lesson as well as useful information about science inquiry or process skills, the management of activities, and grading. Most of the lessons also include additional background information, cross-curricular links, and science activities. The teacher editions, combined with the student editions, also include frequent and varied opportunities for pre-assessment and skill measurement. Additionally, the teacher editions include guidance for anticipating and overcoming common student misconceptions in science as well as opportunities for differentiated instruction, ensuring that all students have opportunities to grow their science skills.

C. Activities

The activities provides a variety of pages to aid the students' understanding. Activities differ among grades and include investigation, exploration, STEM, study guide, preview, reinforcement, enrichment, Bible Connection, technology, and expansion pages. A digital activities answer key with overprint answers is available on the teacher's toolkit CD, when available, or on Teacher Tools Online.

D. Assessments

Each assessment packet contains one age-appropriate test per chapter, covering the most important concepts taught in the lessons. Although tests are important, BJU Press does not recommend that they be used as the sole means of determining a student's grade. The assessment packet also contains a tailored rubric for each investigation, exploration, and STEM activity.

▶ *See pages 14–15 for technology solutions.*

Student Edition

Direction of Motion

A force can change the direction of an object's motion.

straight line

back and forth

round and round

up and down

zigzag

Annotated diagrams aid student understanding

What causes an object's motion?

Quick Check questions assess reading comprehension

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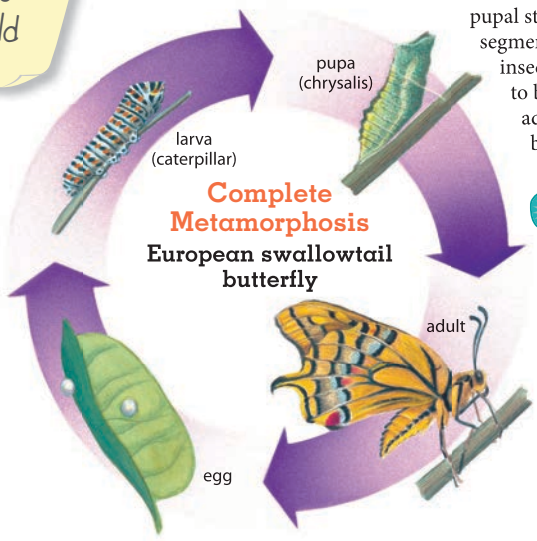
Vocabulary terms in bold

Complete metamorphosis has four stages. The egg hatches into what is called the *larva*. The larva does not look like the adult insect; in fact, you would not think it was even related to the adult. Caterpillars and grubs are larvae of different-looking adult insects. The larva eats as much as possible in order to be ready for the next stage of its growth—the *pupa*. During the pupal stage the insect is in transition. It may be covered with a chrysalis or cocoon. The insect does not eat while it is in the pupal stage. It grows wings and body segments during this time. Finally, the insect emerges from its covering to begin its adult stage. When an adult female lays eggs, the cycle begins all over again.



Complete Metamorphosis
European swallowtail butterfly

QUICK CHECK

1. Describe two characteristics of arthropods.
2. Why is a spider not an insect?
3. Describe the stages of incomplete and complete metamorphosis.

SCIENCE & THE BIBLE

The Bible mentions several instances in which God used arthropods. God sent locusts and flies to plague Pharaoh when the children of Israel were in ypt. John the Baptist ate locusts and oney during his wandering in the ilderness.

God also uses arthropods to teach us lessons. Proverbs 30:25–27 mentions that the ants are little and not strong, yet they are hard workers that prepare their food in the summer. These verses also mention the locusts, who have no king, but still go forth in bands or organized groups. All of God's animals behave in a manner that glorifies Him. How much more should we who bear His image also live in a way that glorifies Him?

Science and the Bible

s as they glide. Their soft, flat toes that act ps to help the frogs anches. One kind of tree flying frog, has flaps of sides of its body. These nd the frog's webbed s flying frog to glide for to 15 m (50 ft).

frog

TASTIC FACTS

ever heard of a p of a tree? Bromeliads, a plant family that includes pineapples, often grow on the branches of trees in rain forests. Their long, stiff leaves collect water. Some bromeliads can hold as much as 7 L (2 gal) of water! The small ponds that form in the leaves are homes kinds and ans.

roots. Because the roots are so near the surface of the soil, the trees need extra support to keep from falling over. Some tall trees have roots that grow out of the sides of their trunks. These aboveground roots give the trees extra support.

Many rain forest animals live in the treetops and rarely to ground. Some of these ar their tails to swing throu Other animals glide or j branch to branch. Some have large, webbed feet

Interest boxes provide additional info

Teacher Edition

Unit 2: Let's Learn About Living Things

Chapter 3: Plants

Lesson	Teacher Edition	Student Edition	Activities	Objectives
17	50–59	44–53	39–42	• Identify the characteristics of living and nonliving things • Classify items as living or nonliving • Identify the needs of plants • Identify ways people use plants • Explain from Genesis 3:17–18 how the Fall affected plants BWS
18	60–65	54–59	43–48	• Identify each part of a plant and its function • Relate plant survival and growth to God's creational design BWS
19	66	60	49–50	**Investigation: Plant Needs** • Predict the effects on the growth and survival of a plant when its needs are not met • Observe and describe parts of a plant • Draw a conclusion about plant needs (about the growth and survival of plants) based on observations
20	67–69	61–63		
21	70	64		
22	71	65		
23	72	44–65		
24	73			

Lesson Plan Overview included in each teacher edition

Light 10

During World War I there was an army dedicated to saving lives instead of taking them. This army of doctors and nurses cared for soldiers who had been wounded in battle. But how could they look inside a soldier to see what was wrong? Marie Curie, a Polish chemist and physicist, knew that the x-ray, a recent development in technology, would be helpful in solving this problem. She studied how to work on cars. Then she gathered together twenty vans with the equipment for taking x-rays. She and her daughter drove to the front lines to help the doctors care for wounded soldiers. Her x-ray trucks were called "Little Curies." By the end of the war, she had set up 200 x-ray stations in military hospitals. She also directed the training of many people in the use of x-rays. Of Marie Curie's work, soldiers healed faster and lives were saved.

useful?

237

Teacher helps and background information

Lesson Plan Overv

Student Text page 237
Activity Manual page 159

139

Objectives
- Recognize that God provides for the needs of people

Materials
- child's cardboard or wooden puzzle with 10 or fewer pieces
- blindfold

Teacher's Toolkit CD
- Visual 10.1: *Little Curies*

Introduction
- Choose a student to put the puzzle together. Blindfold the student. Allow him to put the puzzle together again.
  How was it different putting the puzzle together this time? Possible answer: harder putting it together because you could not see the pieces
  The human body is more complex than the puzzle. Are we able to see inside the human body? no Why would it be important to see inside the human body? Possible answers: to be able to see what is wrong; to be able to repair damage to an organ

Preparation for Reading
- Instruct the students to read silently page 237 to find out a way to look inside the human body.

Teach for Understanding
What were Marie Curie's trucks called? Little Curies
- Display the *Little Curies* visual. Explain that this is one example of the trucks with x-ray equipment.
  What language is on the side of the truck? French
  What do you think the words say? radiology service
  Why do you think there is a red cross on the truck? to let everyone know that this vehicle was in the service of caring for the wounded and not part of the war itself
  What differences and similarities do you see compared to today's vehicles? Possible differences: open spokes on the tires; open sides on the van; elongated engine area Possible similarities: four tires; running board for ease in entering; drive on the same side of the road as Americans
  How were nurses and doctors able to see inside the human body? by using x-ray technology
  How did Marie Curie help save lives? She researched human anatomy, studied how to use the x-ray machines, and put together vans with needed equipment.
  What does God want people to use this technology for? to serve and care for others and glorify God

Activity Manual
Preview, page 159
The Looking Ahead page is intended to assess the student's prior knowledge before beginning the chapter.

Background

Chapter Preview
Preview and prereading activities may include using a K-W-L chart, a probe, or an anticipation guide.

Chapter Photo
The photo on page 237 shows a lighthouse in the twilight on Sylt. It is the largest island in North Frisia, which is in northern Germany.

Weblinks
The BJU Press website offers additional information and links you may find helpful throughout the unit.
bjupress.com/resources/science

Chemist and Physicist Marie Sklodowska Curie
Marie Curie (1867–1934) was a French physicist and the first female professor of physics at Sorbonne. In 1898 Marie Curie and her husband discovered the element polonium. She was the first woman to win a Nobel Prize. In 1903 she shared the prize with two others (one was her husband) for her work on spontaneous radiation. In 1911 she won the Nobel Prize in Chemistry for her discovery of and investigations into the chemistry of radium and polonium. She died from a blood disease that is often caused by exposure to large amounts of radioactive materials.

Chapter 10: Light

Lesson 139 • 271

- Science 5 Teacher Edition

Lesson
76

Student Edition page 208
Activities pages 207–9

Objectives

- Observe clues like a scientist
- Infer facts about an animal from its footprint clues
- Draw conclusions from data collected
- Relate conclusions from the collected data to what science can and cannot do BWS

Materials

- See *Activities* page 207.
- images for display of a goose, rabbit, and dog

Teacher Resources

- Visuals 11.2–11.6: *Following Clues*

Directions for making the trails and the animal tracks appear on Visual 11.2. Position the trails of animal tracks before class.

Introduction

How does a detective solve a mystery? by following clues

What kind of clues might a detective look for to solve a crime such as a break-in? Possible answers: fingerprints, scraps of paper or fabric, things left behind, what kinds of things were taken, when the break-in happened

Today you will study some clues like a scientist.

Preparation for Reading

- Direct the students to remove pages 207–9 from their *Activities* books. Direct them to read page 208 and *Activities* pages 207–9 silently before beginning.

Teach for Understanding

How do scientists find out about things that lived long ago? They study clues.

- Direct attention to the **Inquiry Skills**.

What inquiry skills will you be using in this Exploration? Observe, Measure, Infer

- Review the inquiry skills of *observe*, *measure*, and *infer*. Refer to Chapter 1, if needed.

What are you going to observe? animal tracks

What are you going to use to measure? a ruler or meter stick

t mean to *infer*? to use what you know to gs happen

before or after you observe? after

ion to the **Purpose**.

purpose of this Exploration? to study clues st

out the animal tracks. Explain that these tracks are clues about different animals.

- Direct the students to choose a trail.
- Distribute the **Materials**.

Teach for understanding

EXPLORATION

Following Clues

Name _____

Inquiry Skills
- Observe
- Measure
- Infer

Materials
- ☐ animal tracks
- ☐ ruler or meter stick
- ☐ colored pencils or crayons

Purpose

I want to study clues like a scientist.

Procedure

☐ 1. Look at the trails of animal tracks. Tracks are the footprints left behind by an animal.

☐ 2. Choose a trail of tracks to follow. Circle the animal tracks you will follow.

☐ 3. Imagine you are a scientist who discovered the trail. Look for clues about the animal's size, speed, and actions as you follow and study the animal's tracks.

☐ 4. Measure the length of one set of footprints using a ruler or meter stick.

Length of footprints: _____ cm

☐ 5. Measure the distance between two sets of animal footprints, or tracks, using a ruler or meter stick.

Distance between prints: _____ cm

Reduced student text for reference

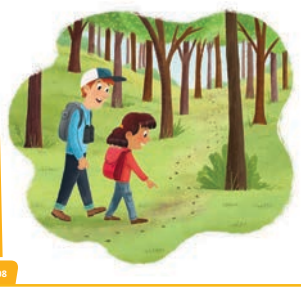
EXPLORATION

Following Clues

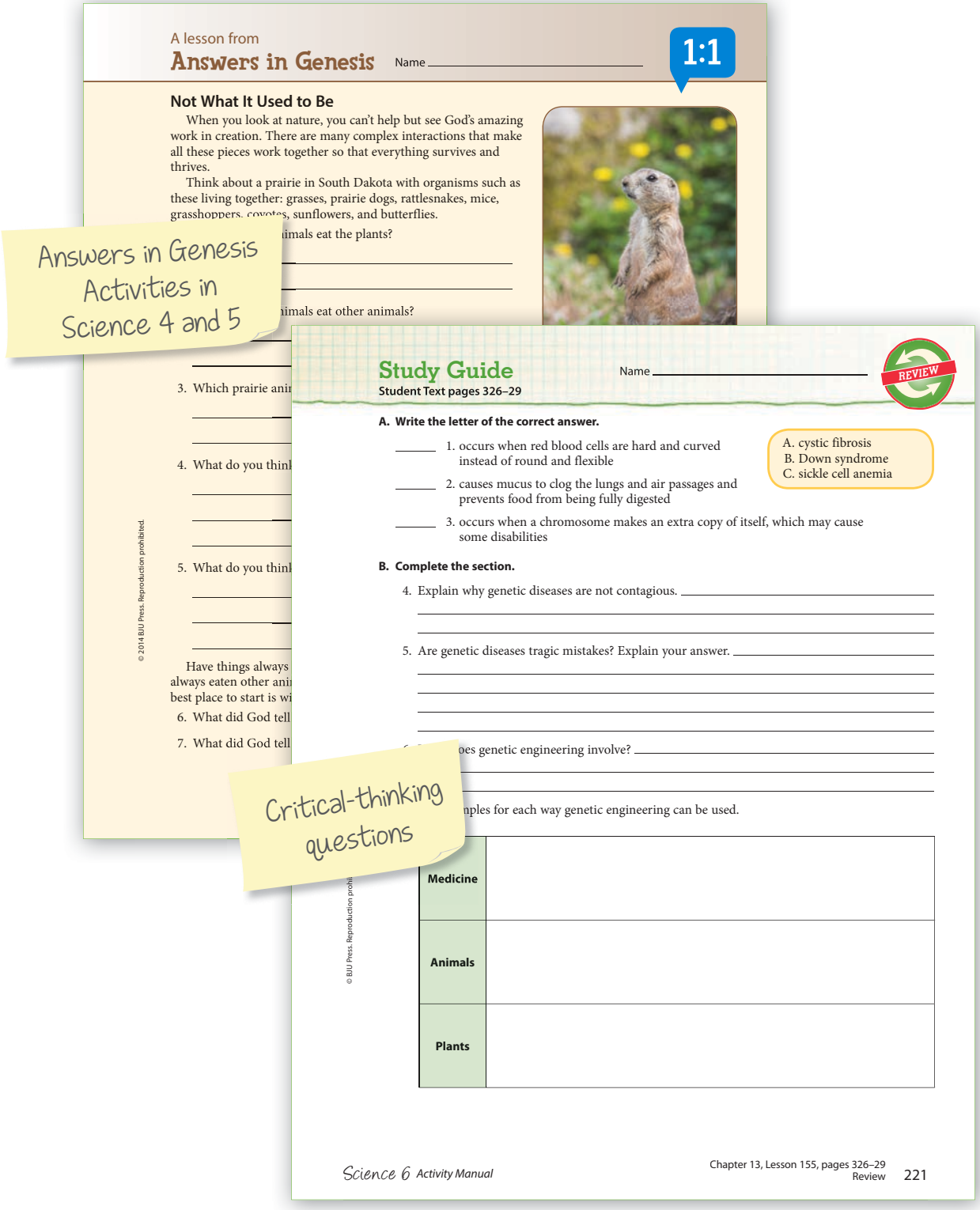
Inquiry Skills
- Observe
- Measure
- Infer

Scientists study clues to find out about the earth. They study clues to find out about the things that lived long ago. You can study clues like a scientist.

In this Exploration, you will look for clues. You will observe and follow a trail of animal tracks. You will infer about the animal that made the tracks. You will compare your findings with those of others.



Student Activities



A lesson from
Answers in Genesis Name _____ 1:1

Not What It Used to Be

When you look at nature, you can't help but see God's amazing work in creation. There are many complex interactions that make all these pieces work together so that everything survives and thrives.

Think about a prairie in South Dakota with organisms such as these living together: grasses, prairie dogs, rattlesnakes, mice, grasshoppers, coyotes, sunflowers, and butterflies.

...imals eat the plants?

...imals eat other animals?

3. Which prairie ani...

4. What do you think...

5. What do you think...

Have things always ... always eaten other ani... best place to start is wi...

6. What did God tell...

7. What did God tell...

Answers in Genesis Activities in Science 4 and 5

Study Guide REVIEW
Student Text pages 326–29 Name _____

A. Write the letter of the correct answer.

A. cystic fibrosis
B. Down syndrome
C. sickle cell anemia

_____ 1. occurs when red blood cells are hard and curved instead of round and flexible

_____ 2. causes mucus to clog the lungs and air passages and prevents food from being fully digested

_____ 3. occurs when a chromosome makes an extra copy of itself, which may cause some disabilities

B. Complete the section.

4. Explain why genetic diseases are not contagious. _____

5. Are genetic diseases tragic mistakes? Explain your answer. _____

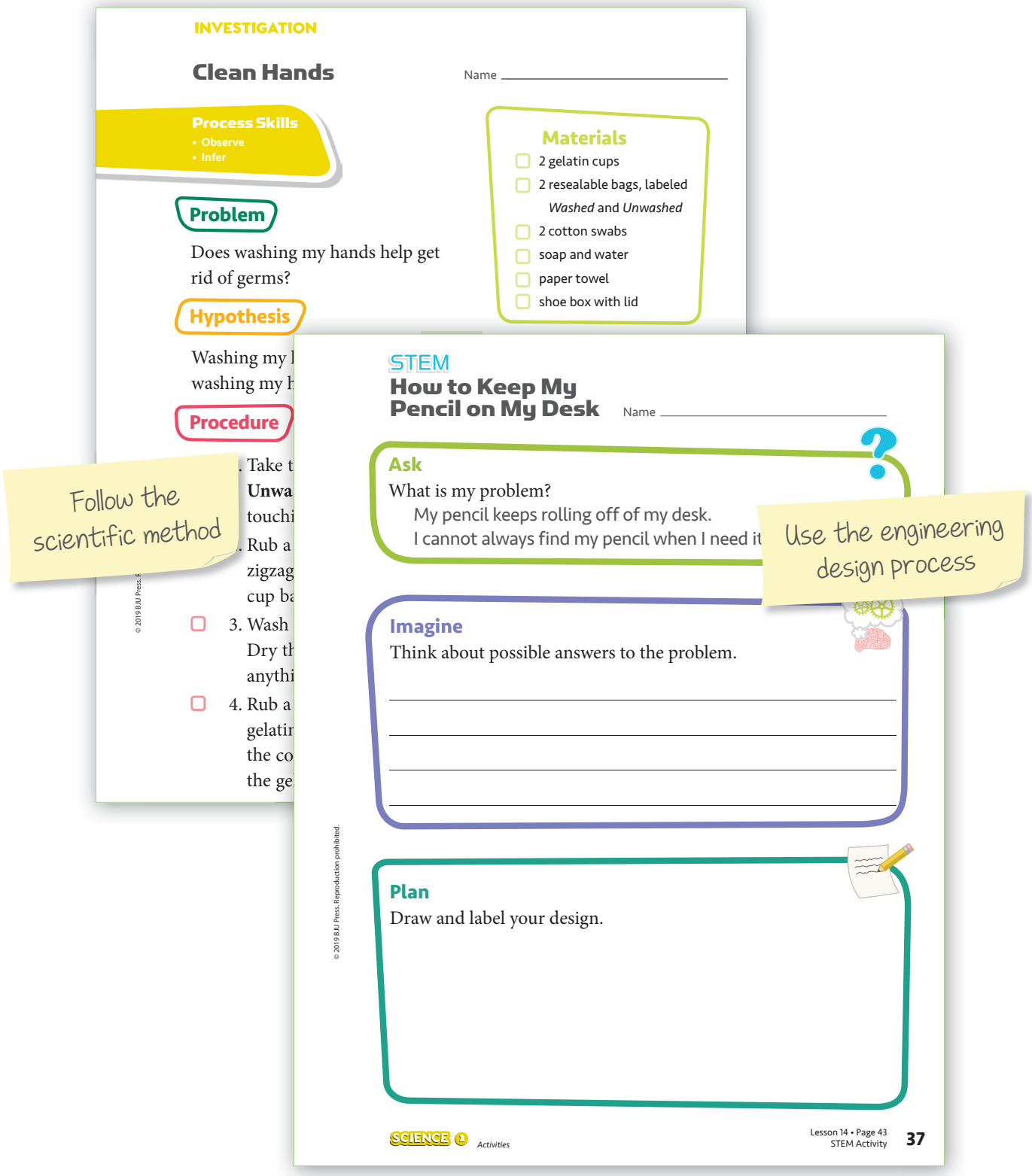
...oes genetic engineering involve? _____

...mples for each way genetic engineering can be used.

Medicine	
Animals	
Plants	

Critical-thinking questions

- Science 6 Activities


INVESTIGATION
Clean Hands
Name
Process Skills
• Observe
• Infer
Materials
2 gelatin cups
2 resealable bags, labeled Washed and Unwashed
2 cotton swabs
soap and water
paper towel
shoe box with lid
Problem
Does washing my hands help get rid of germs?
Hypothesis
Procedure
STEM
How to Keep My Pencil on My Desk
Name
Ask
What is my problem?
My pencil keeps rolling off of my desk.
I cannot always find my pencil when I need it
Imagine
Think about possible answers to the problem.
Plan
Draw and label your design.
Follow the scientific method
Use the engineering design process
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SCIENCE 1 Activities
Lesson 14 • Page 43
STEM Activity
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Teacher Tools Online®

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Encourage. Enable. Enhance.

Teacher Tools Online is the premier resource for teachers using BJU Press materials. It encourages teachers in their efforts to expand their lessons, enables them to reach struggling students in new ways, and enhances their teaching strategies for greater depth. Teacher Tools Online provides teacher resources at the touch of a button, freeing up valuable time for teachers. Teachers will find educational articles, editable lesson plan overviews, PowerPoint presentations, an electronic assessments generator, and much more in the Teacher Tools Online database!

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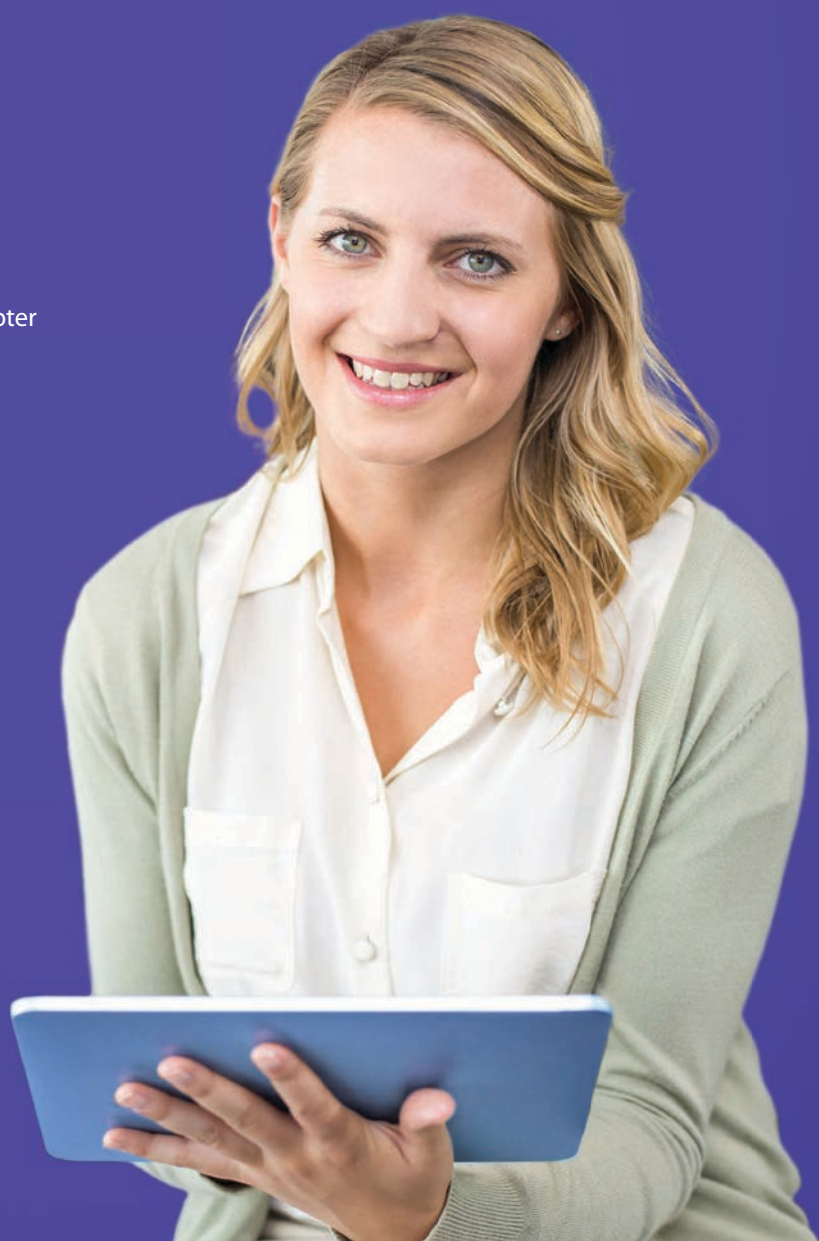
TeacherToolsOnline.com gives you quick access to resources that work directly with your BJU Press textbooks.



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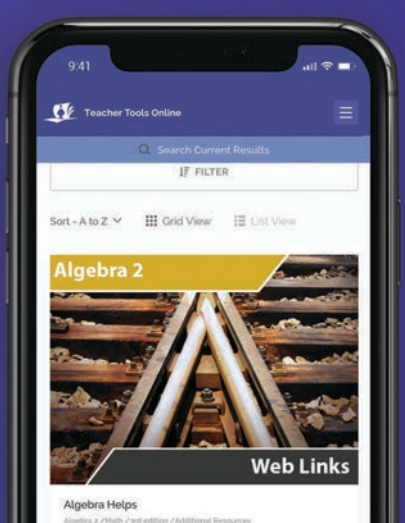

Available Resources

PowerPoint—Pre-designed, editable presentations give you a quick starting point every day.

Lesson Plan Overviews—Editable Word documents with an overview of each day's objectives, content, and materials needed to plan ahead.

Media—BJU Press videos, external web links, and artwork help you customize lessons for different learners. Artwork includes maps, charts, and other images that enhance lessons.

ExamView®—Test-building software with a database of questions that lets you quickly create your own assessments and prevent cheating.

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