Attainment's

EXPLORE BIOLOGY

INSTRUCTOR'S GUIDE

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Attainment Foreword

Christopher J. Rivera, PhD

English learners (ELs), students with disabilities, and ELs with disabilities, or extensive support needs, face many challenges in American educational systems. Not only are they navigating these systems with unique learning needs; but some are doing so while acquiring a second language, others are adjusting to new cultural norms, and some experience challenges with communication including the aforementioned. To assist in the increased academic and functional performance of these groups, researchers have illustrated and advocated for the continued use of instructional approaches that combine wide-range research-based strategies and frameworks as a way to further individualize instruction depending on student needs (e.g., Cook & Rao, 2018; Lopes-Murphy, 2012; Rivera et al., 2019; Roa et al., 2017). One of these approaches is the Universal Design for Learning (UDL; CAST, 2018). UDL places emphasis on three prominent guidelines for increasing academic performance. First, the framework suggests that students should be provided with multiple means of *Engagement*. This can be achieved by developing lessons that provide varied options that will captivate student interest, increase collaboration amongst students, and promote self-reflection. Secondly, UDL seeks to ensure that lessons are taught in a way that promote multiple means of *Representation*. In other words, students are given options in how they view information that is presented and are supported in ways to help promote understanding across languages. Finally, the UDL framework seeks to give students multiple means of *Action and Expression*. This final component encourages educators to seek different ways in which students can demonstrate their knowledge through, for instance, varied expressive and communicative intents.

For ELs, UDL is an additional layered framework that can be beneficial in the acquisition of academic language. Lopes-Murphy (2012) argued that ELs need scaffolded language supports that help connect prior knowledge with new information. In addition, students need opportunities to engage in academic language with other learners across multiple settings. Students with the most diverse learning needs need diverse solutions. This is where the addition of UDL is beneficial. Not only does it provide instructional flexibility, but it challenges educators to think carefully about how to increase accessibility to content while also focusing on language development. While UDL is important, Rivera et al. (2016) adds that ELs with extensive support needs should be given multiple opportunities to actively participate in lessons taught and should be granted the same access to the general curriculum as their peers, despite complex language or communication needs. The same can be said of monolingual students with extensive support needs.

While research in using UDL for students with disabilities has been established (e.g., Cook & Rao, 2018; Rao et al., 2017), its application is still emerging regarding ELs with extensive support needs (Rivera et al., 2019), and examples of applying existing strategies and instructional frameworks are still somewhat elusive in mainstream contexts. This is why Attainment Company's **integration of the UDL framework with language-building objectives** is so timely. Attainment has carefully revisited their curricula and have applied UDL guidelines with special emphasis on language acquisition to aid educators in supporting both student academic and language achievement. Directions and suggestions for connecting prior knowledge, scaffolding language supports, modeling, providing visual aids, and clear steps for embedding UDL have been enhanced in their new curricula. Even more exciting are the clear protocols for assisting educators in teaching and the plethora of resources provided for students. Through this curriculum series, Attainment ensures both equity and accessibility for diverse groups of students, including those with the most extensive support needs.

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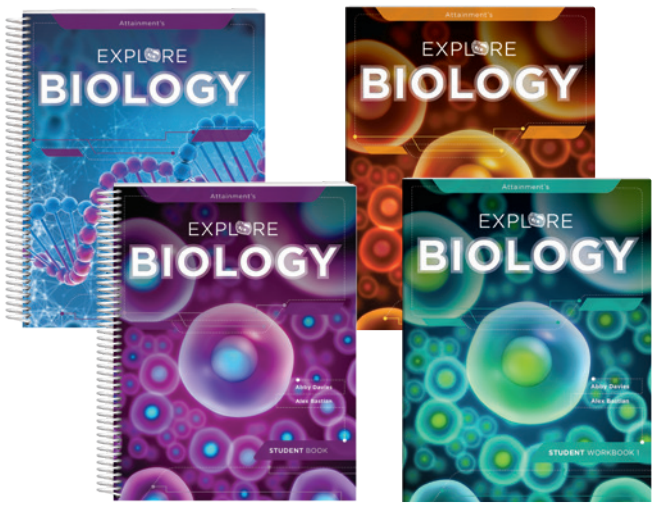
Components List



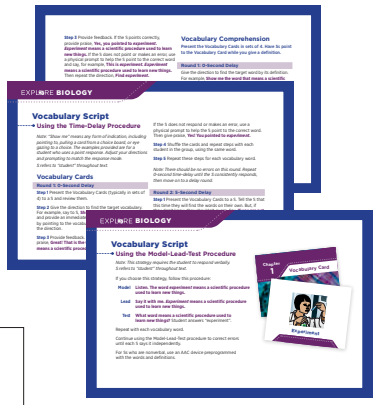
BOOKS

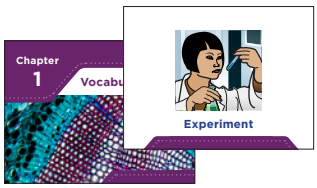
The **Explore Biology Instructor's Guide** contains comprehensive introductory, vocabulary, and Big Idea lessons to be used in conjunction with all 12 chapters of the Student Book. Using evidence-based practices, the Instructor's Guide provides instructors with effective teaching strategies for all students. It also features content-based activities that instructors can implement to increase student understanding and foster engagement, and tips for how to best use the provided **Animal Cell Model.**

The **Explore Biology Student Book** features 6 units and 12 chapters. Each chapter begins with the Big Picture statement, outlining the most important theme of the chapter, and the 5 Big Ideas. The Big Picture contains a QR code, which will lead students to an original video based on the five Big Ideas. Each Big Idea includes two content-based vocabulary words and four images. The fourth image corresponds to the "Did You Know?" section, which gives students the opportunity to learn an interesting fact related to the Big Idea content. A "Discovery" page to foster discussion or provide an activity is included after the Big Ideas. The chapter ends with a 10-question quiz.

The Consumable Student Workbooks correspond to the Student Book and reduce prep time. The workbooks condense the student activities from the Student Book into a consumable option.

- ◯ Instructor's Guide
- ◯ Student Book
- ◯ 2 Consumable Student Workbooks
- ◯ Vocabulary Cards
- ◯ Big Idea Cards
- ◯ Time-Delay Procedure Card
- ◯ Model-Lead-Test Procedure Card
- ◯ Animal Cell Model
- ◯ Reference Guide
- ◯ HUB files include graphic organizers, digital worksheets, and UDL charts.





CARDS

The provided **Big Idea Cards** may be used by themselves or in conjunction with the **Explore Biology Student Book.** Each Big Idea Card includes the same information provided in each Big Idea section of the Student Book. Each Big Idea Card also details how to use the provided **Animal Cell Model** to best support student understanding.

Vocabulary Cards are provided for all chapter vocabulary. These cards can be used when using the Time-Delay strategy, Model-Lead-Test, as well as review activities.

A **Time-Delay Procedure Card** and **Model-Lead-Test Procedure Card** are provided for you as a reference to use when teaching vocabulary terms.

MODEL

The provided **Animal Cell Model** is best used to support student understanding and foster discussion. This hands-on tool can provide students with a concrete understanding of how models are used in the study of biology. Look inside the model to see important organelles to discuss the functions of different components of a cell or compare and contrast it with a plant cell. Suggestions for how to best use the **Animal Cell Model** are included in many lesson plans.

Attainment HUB

Various digital files can be downloaded from Attainment's HUB for convenient printing or for projecting onto whiteboards. First, go to the Attainment HUB at hub.attainmentcompany.com. Follow the instructions given on the inside cover of the Instructor's Guide to redeem your HUB code and access all digital, reproducible content. Digital resources for Explore Biology include:

- Chapter Overview
- Graphic Organizers
- Frayer Model
- Diagrams
- T-Chart
- KWL Chart
- Vocabulary Worksheet
- Word Search
- Discovery Worksheet
- Quiz
- Big Idea Worksheet
- Image Library
- Term Tests
- Answer Keys
- UDL Charts

USING EXPLORE BIOLOGY

Prior to beginning instruction, it will be important to read the content of the lesson, and the entire chapter. When reading, consider if any of the following modifications will be needed to support student understanding.

1 VOCABULARY

You may find it necessary to substitute or add phrases that might clarify vocabulary words. For example, in the passage for Big Idea 4, you may include the phrase *work in the field* for the vocabulary word *fieldwork*. Since *fieldwork* is used often, it is better to support understanding rather than substituting a different word. Examples where you might exercise some word choice will be vocabulary that might not be content-specific. For example, in the passage for Big Idea 2 the word *performed* is used. You might choose to substitute *done* for *performed.*

Some words cannot be changed without losing the meaning of a sentence; these words will need to be pre-taught. For example, the passage for Big Idea 2 uses the term *conclusion.* If students do not know what *conclusion* means, they will not understand important ideas.

2 GRAPHIC ORGANIZERS

The use of graphic organizers has been shown to be an effective strategy that can be used across content areas for all students. There are many types of graphic organizers, but they all allow students to categorize information, making it less overwhelming and easier to manage. Some lessons require that students complete a KWL chart—a graphic organizer for which students fill in columns for ***What Do I Know?, What Do I Want to Know?,*** and ***What Did I Learn?*** When the opportunity presents itself, try to incorporate other graphic organizers into instruction.

Some suggested graphic organizers include the following: a T-chart teaches examples and non-examples of living things; a Venn diagram shows characteristics of prokaryotic cells and eukaryotic cells; a Concept Map shows facts about ecosystems; a timeline shows life on Earth; a Cause-and-Effect organizer illustrates the concept of climate change; a Frayer Model organizer teaches vocabulary words or concepts. The ideas and uses are limitless!

The lesson content is short but can be dense. During the lesson, give students an opportunity to stop and reflect on the information being presented. Allow them to complete or add to a graphic organizer. Some organizers will lend themselves to being completed in stages, while others will be more effective if completed at one time.

3 VISUAL MODEL

In general education, this course is typically taught by a credentialed science teacher who may often have a classroom with visual supports to help make these abstract concepts more concrete. An **Animal Cell Model** has been provided with this curriculum and will help support student understanding. In preparation for instruction, consider gathering additional visual models such as a microscope. Each lesson contains specific suggestions.

4 CONCEPTS

The content of **Explore Biology** assumes some background knowledge on the part of the students. Examples can be seen right from the first Big Idea with the concepts of scientists, life, and the environment. If students do not understand these concepts, you will need to start by designing a lesson to introduce students to them. This will be true throughout this curriculum. Pay special attention to the Big Ideas as these represent fundamental understandings. The content of **Explore Biology** also assumes background knowledge on the part of instructors. As special educators, most of us do not have a science background. Prior to beginning instruction, make sure that you have a solid understanding of the content. You should be able to provide examples, simplify content, and/or explain the content to a greater extent than the provided text.

5 UNIVERSAL DESIGN FOR LEARNING

Universal Design for Learning (UDL) is a framework to support and improve teaching and learning for all learners based on scientific findings (CAST; *https://www.cast.org/impact/universal-design-for-learning-udl*). This framework involves providing multiple means of *Representation, Expression,* and *Engagement*. *Representation* focuses on how information is presented. *Expression* focuses on varying ways that students can demonstrate understanding, and *Engagement* focuses on keeping students motivated and interested in learning. A general UDL chart is provided here with some general suggestions for multiple means of *Representation, Expression,* and *Engagement* that are not content-specific and, therefore, are applicable across lessons. When appropriate, additional content-specific suggestions will be provided at the lesson level.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	**Expression** *Strategic, goal-directed learners*	**Engagement** *Purposeful, motivated learners*
• Project content to a Promethean board. • Provide large photos representing concepts and vocabulary. • Provide physical objects or special representations for concepts and vocabulary. • Connect concepts and vocabulary to the learner's experiences and background knowledge. • Add simulations, graphics, videos, and activities to concepts and vocabulary. • Use strategically placed symbol supports with concepts and vocabulary, for example. • Provide options for organizing information. • Repeat lessons, providing opportunities for review and practice. • Enlarged text. • Enlarged images. • Access to reference materials.	• Provide accessible assistive technology for the student. • Allow for the use of physical manipulatives and actions to demonstrate understanding. • Provide pre-programmed AAC devices. • Allow students to respond from a variety of options. • Add physical modifications to the Student Book to support students' ability to turn pages and locate chapters. • Physical modes of responding may include pointing to, pulling off, or eye gazing to a selected choice. • Allow for flexibility in assignment forms, such as traditional writing, an oral presentation, a skit, or an infographic. • Allow for the use of a variety of tools when completing assignments or projects (e.g., grammar tools, sentence starters, word banks, or word predictors).	• Assure students have background knowledge. • Increase physical engagement by asking students to follow along as you read the text. • Give students opportunities to participate in reading the text. • Break up lessons into small increments. • Differentiate the complexity of the text. • Use the Student Book as is when appropriate. • Lessen the complexity of words and phrases by substituting fewer complex words or adding explanations or details to more complex words or phrases. • Communicate the lesson objectives in a meaningful manner. • Offer explicit opportunities to generalize learning into new situations (e.g., a real-world connection). • Whenever possible, give students choices regarding what activity to complete and how the activity is completed.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

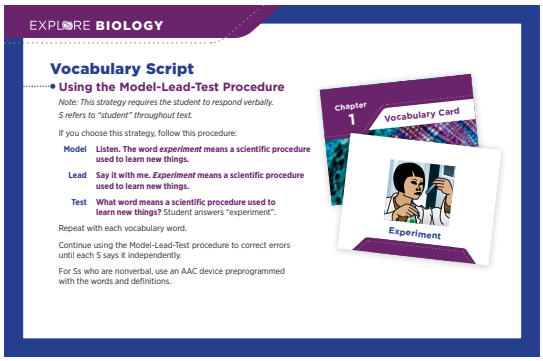
EMBEDDING EVIDENCE-BASED TEACHING PROCEDURES

While Explore Biology is not a scripted curriculum, evidence-based instructional strategies are scripted in Chapter 1 and suggested in remaining chapters. The consistent use of evidence-based practices can lead to improved student performance.

MODEL-LEAD-TEST PROCEDURE (MLT)

Evidence-based teaching procedures can effectively be utilized when completing the steps of each lesson. One procedure that can be embedded is the direct instruction method of MLT (Archer & Hughes, 2011; Bursuck & Damer, 2011). In MLT, you first model the target behavior ("Watch me"), then you lead the students to practice together with you in unison ("Do it with me"). After you have modeled the target behavior and led students through the process, the last step (test) requires the students to practice the target behavior independently ("Your turn").

The MLT is one procedure that is used for teaching vocabulary. For your convenience, a **Model-Lead-Test Procedure Card** is provided. While not scripted into the lessons, Model-Lead-Test is also appropriate for the first lesson in each chapter, which introduces the Big Ideas for the chapter. Keep in mind that MLT is a procedure that requires a verbal response from the student.


EXPLORE BIOLOGY

Vocabulary Script

Using the Model-Lead-Test Procedure

Note: This strategy requires the student to respond verbally.
S refers to "student" throughout text.

If you choose this strategy, follow this procedure:

Model **Listen. The word *experiment* means a scientific procedure used to learn new things.**

Lead **Say it with me. *Experiment* means a scientific procedure used to learn new things.**

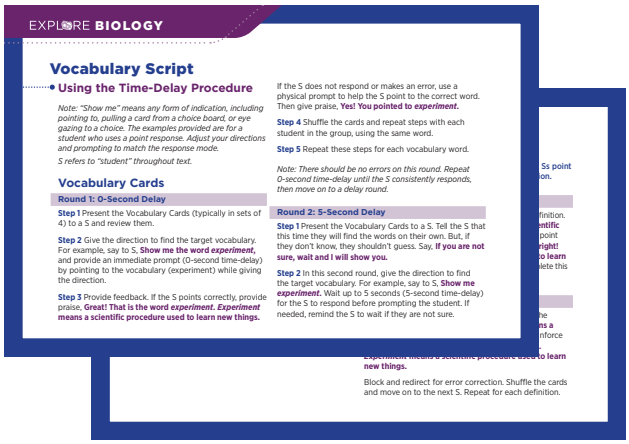
Test **What word means a scientific procedure used to learn new things?** Student answers "experiment".

Repeat with each vocabulary word.

Continue using the Model-Lead-Test procedure to correct errors until each S says it independently.

For Ss who are nonverbal, use an AAC device preprogrammed with the words and definitions.

Model-Lead-Test Procedure Card


EXPLORE BIOLOGY

Vocabulary Script

Using the Time-Delay Procedure

Note: "Show me" means any form of indication, including pointing to, pulling a card from a choice board, or eye gazing to a choice. The examples provided are for a student who uses a point response. Adjust your directions and prompting to match the response mode.
S refers to "student" throughout text.

Vocabulary Cards

Round 1: 0-Second Delay

Step 1 Present the Vocabulary Cards (typically in sets of 4) to a S and review them.

Step 2 Give the direction to find the target vocabulary. For example, say to S, **Show me the word *experiment*,** and provide an immediate prompt (0-second time-delay) by pointing to the vocabulary (experiment) while giving the direction.

Step 3 Provide feedback. If the S points correctly, provide praise, **Great! That is the word *experiment*. *Experiment* means a scientific procedure used to learn new things.**

If the S does not respond or makes an error, use a physical prompt to help the S point to the correct word. Then give praise, **Yes! You pointed to *experiment*.**

Step 4 Shuffle the cards and repeat steps with each student in the group, using the same word.

Step 5 Repeat these steps for each vocabulary word.

Note: There should be no errors on this round. Repeat 0-second time-delay until the S consistently responds, then move on to a delay round.

Round 2: 5-Second Delay

Step 1 Present the Vocabulary Cards to a S. Tell the S that this time they will find the words on their own. But, if they don't know, they shouldn't guess. Say, **If you are not sure, wait and I will show you.**

Step 2 In this second round, give the direction to find the target vocabulary. For example, say to S, **Show me *experiment*.** Wait up to 5 seconds (5-second time-delay) for the S to respond before prompting the student. If needed, remind the S to wait if they are not sure.

Block and redirect for error correction. Shuffle the cards and move on to the next S. Repeat for each definition.

Time-Delay Procedure Card

TIME-DELAY PROCEDURE

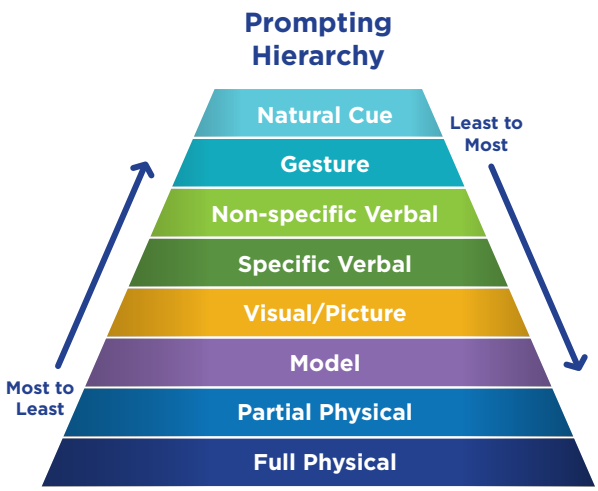
Time-Delay is also a suggested evidence-based practice for teaching the science vocabulary in **Explore Biology**. An example of the Time-Delay procedure is as follows: the teacher lays out four vocabulary cards. She gives the instructions, "Point to *organism*," and immediately points to the vocabulary card for *organism* so the student knows where to point. When the student consistently responds at 0-time delay (Round 1), the teacher gives the direction to the student, but delays prompting for a specified number of seconds (e.g., 4–5 seconds) to provide the student the opportunity to respond independently (Round 2). Several questions should be considered for each student when using this procedure:

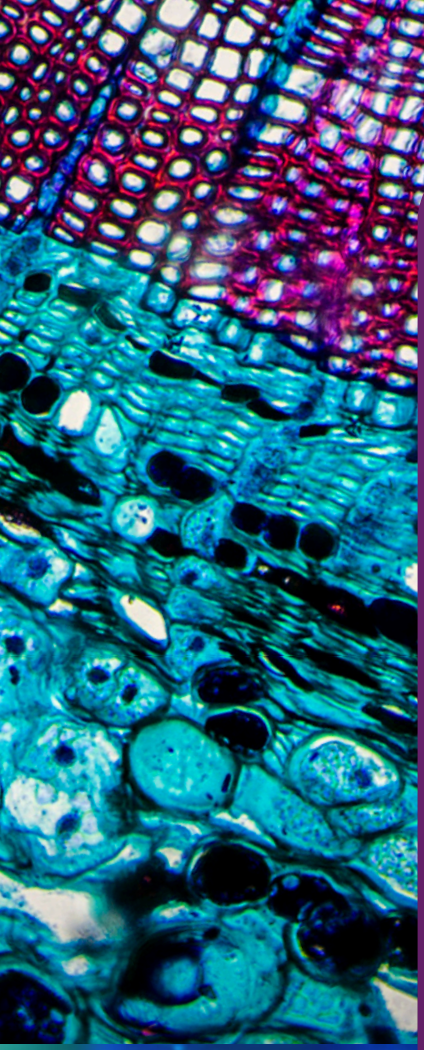
- What type of response does the student use: Point to the answer (receptive)? Say the answer (expressive)? Pull the answer from a choice board? Eye gaze to an answer?
- Will the student respond receptively only or receptively and expressively (e.g., point to the answer only; point to the answer and say it; use an AAC device to respond)?
- How many warm-up trials will you give at 0-second time delay?
- How long will you wait before prompting in Round 2 (e.g., 5 seconds)?
- What kind of feedback will you provide? If a student struggles with Round 2, return to Round 1 for a few trials and then return to Round 2. For students who are consistently responding in Round 2, you can skip Round 1.

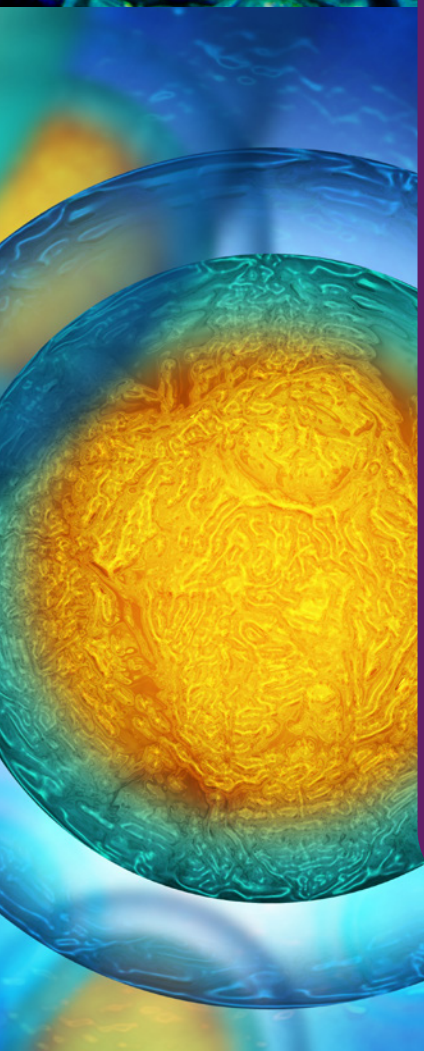
For your convenience, a **Time-Delay Procedure Card** is provided. **Vocabulary Cards** are provided with your kit for use during instruction.

LEAST INTRUSIVE PROMPT HIERARCHY

In least Intrusive prompting (LIP), teachers will utilize a least intrusive prompting hierarchy (as needed) to prompt the student through to the correct response. First, the teacher provides the student with an opportunity to respond independently. If the student does not make a correct response or does not respond within a set period of time (e.g., 5 seconds), the teacher provides the first prompt in a predetermined hierarchy (e.g., a verbal cue). The teacher proceeds through a prompting hierarchy until the student elicits a correct response (Collins, 2007). As shown to the right, this system places prompts given to students in a hierarchy from the least intrusive to most intrusive. The exact prompting hierarchy can vary by content, and student. For example, a verbal prompt, followed by a model prompt may work well for some science tasks. For other types of activities, it may be better to begin with a visual or gestural prompt. The key is to implement the prompting hierarchy consistently across lessons and across students. Familiarize yourself with the prompting levels shown here; always moving from least to most. Typically 2-4 prompting levels are employed during instruction. Scripted examples are provided in Chapter 1 and, occasionally, throughout the Instructor's Guide. These examples will serve as a model that can be applied to remaining lessons.







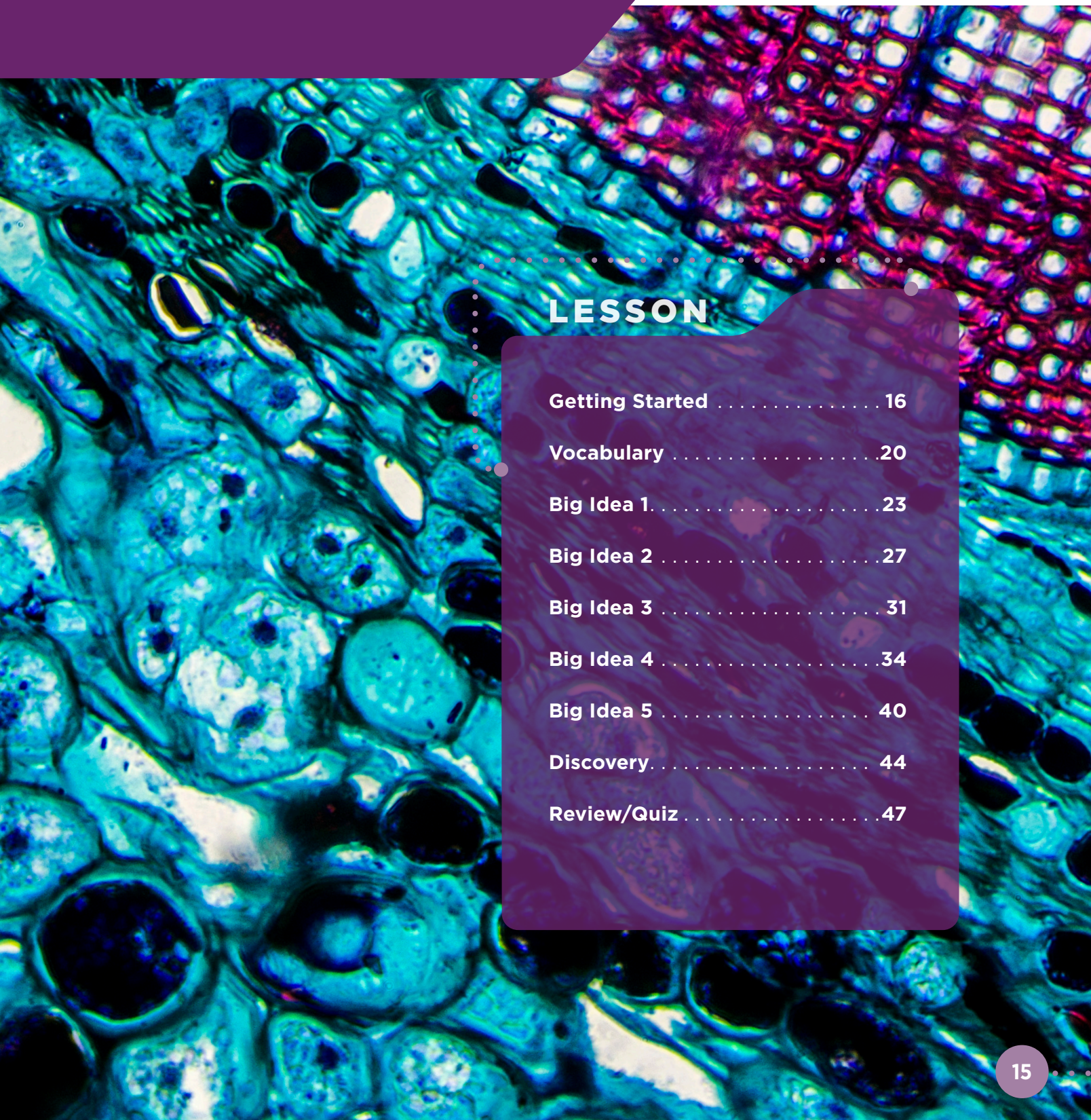
Unit **1**

Intro to Biology

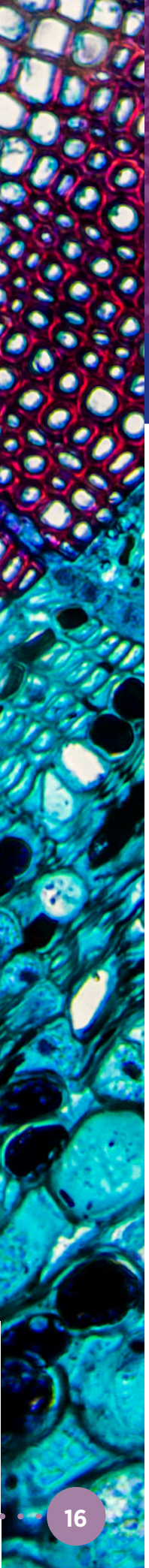
Note: *Chapter 1 is more explicit and provides more scripting than other chapters. Since the lesson formats within each chapter (Introduction, Vocabulary, Big Idea lessons, Discovery, and Quiz) are consistent, the lessons in Chapter 1 serve as a model. Refer back to these lessons as needed when moving through the curriculum.*

What is Biology?

Chapter 1



LESSON



CHAPTER 1

GETTING STARTED

Getting Started

Student Workbook pages 2-3

Introduction of Big Ideas

LEARNING OBJECTIVE:

Demonstrate an understanding of at least three Big Ideas.

MATERIALS:

tools or equipment used in biology (microscope, laboratory equipment, animations, models), **Animal Cell Model, Big Idea Cards**

Optional: printed Big Ideas page from **Student Book, Big Idea Worksheet, Courseware Software**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic knowledge of science and scientific fields, living things vs. nonliving things, change vs. staying the same

PREREQUISITE VOCABULARY:

study, field, changing

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

LANGUAGE BUILDER!

Use picture supports and point out important verbs, nouns, and adjectives within Big Ideas.

Biology is the study of life.

Biologists learn new things through research.

Tools are used to study biology.

Research can be done in the laboratory or in the field.

Biology is always changing.

Consider pre-teaching the vocabulary words *research* and *laboratory* from the Big Ideas.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Point out everyday examples of living things (plant, animal, human). • Show examples of tools and equipment used in biology, e.g., microscope.	• Preprogram AAC devices with words like *research* and *laboratory* to demonstrate understanding. • Plan for response options related to the KWL topic.	• Encourage each student to contribute at least one question to the KWL chart. • Practice measuring using the metric system.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

OVERVIEW

INTRODUCTION *Follow along*

Today we will begin the biology course. Listen. Biology is the scientific study of living things.

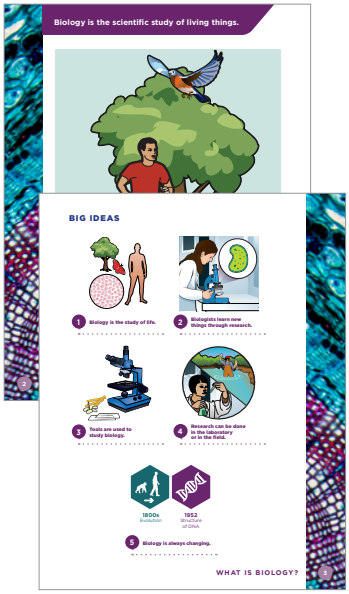
What is biology? Confirm correct responses. Model correct answer if needed.

Your biology book is broken down into units of study. Each unit will have two chapters. Unit 1 is called "Intro to Biology".

As we make our way through this course, each chapter will follow the same order. We will begin with a lesson that focuses on the Big Ideas for the chapter. These are the main ideas and the most important information to learn. Then we will have a vocabulary lesson, where you will learn words that are important in the chapter, and what those words mean. After the vocabulary lesson, we will learn more about each Big Idea for the chapter. Each Big Idea also has a "Did You Know?" section that tells an interesting fact related to the Big Idea. At the end of each Big Idea lesson, we will practice answering questions from the end of chapter quiz. There will be five Big Idea lessons. The sixth lesson in every chapter will be a Discovery lesson. The Discovery lessons give us a chance to learn interesting facts about a specific topic of biology and do an activity. Finally, the last lesson in every chapter will be a quiz. But remember, we will practice the quiz questions along the way.

We may repeat lessons, especially the vocabulary and Big Idea lessons.

Find Chapter 1 in your book. The title of Chapter 1 is "What is Biology?" Describe the image on page 1. Let students know that this is a magnified image of cells. **Biology studies living things. Biologists use tools to study living things, such as microscopes. This image shows a magnified image of cells, using a microscope. We will discuss more about living things and tools used in biology in this chapter.**



ACTIVATE PRIOR KNOWLEDGE *KWL chart*

Let's begin by talking about what we already know. We will use a graphic organizer called a KWL chart.

Assess students' basic knowledge of biology and living things by asking questions. As students offer what they know, add a few facts to the "What you Know" or "K" column of the KWL chart. If students are not able to demonstrate the needed prerequisite knowledge, provide some or all of the facts suggested below. Review the facts listed before moving on.

What do you want to know about biology or living things? Record responses under the "Want to Know" or "W" column. Be sure that at least one question will be answered in the chapter content.

One way that we can answer these questions is to read about the topic. As we read this chapter, we can check back to see if any of our questions have been answered. If they have been answered, we will list the answers in the last column on the graphic organizer—the "L" column. "L" stands for What we Learned.

This activity is meant to assess knowledge of basic facts such as:

- Humans, animals, plants, and bacteria are living things.
- Living things have characteristics in common.
- Biologists use research to learn about living things.
- Science changes as more research is performed.

EXPLORE

THE BIG PICTURE *Participate in discussion*

Turn to page 2 in your book. Point to text as you read the Big Picture. **Biology is the scientific study of living things. That's what we will do in this course. We will study living things. What is one example of a living thing?** If needed, remind students of both big and small living things (human, animals, plants, bacteria).

Point out the Big Picture on page 2. **This image shows different examples of living things, like a man, a tree, a gorilla, a bird, and a rat. Can you think of something these living things have in common?** Confirm correct responses. Model a correct response if needed.

BIG IDEAS *Follow along*

Listen while I read each Big Idea. Remember, this is the most important information for Chapter 1. As you read, point to each Big Idea so that students can see. Remember to refer to the UDL chart for suggestions to increase learning potential. This will be especially important since the overview lesson comes before the vocabulary lesson.

You may choose to ask students to point to each Big Idea in their books as you read it, or you may allow them to focus on oral comprehension.

Read each Big Idea. Elaborate as needed, providing examples or visuals.

Good listening.

CHECK FOR UNDERSTANDING *Answer questions*

Now I will go back through the Big Ideas again. This time, I will ask a question after each one. Read each Big Idea once or even twice more. After each Big Idea, ask the corresponding question below.

1. What is the study of life?

2. What do biologists do?

3. What are used to study biology?

4. Where can research be done?

5. What is biology always doing?

If needed, use LIP until the student reaches the correct answer. 1. Verbal. Reread the Big Idea. Re-ask. 2. Model. Model providing the correct answer, either verbally or by pointing to the correct response option. Re-ask. 3. Physical Guidance. If using response options, guide the student to the correct response.

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

DEEPER UNDERSTANDING *Watch video and answer question*

Let's watch a video about the five Big Ideas. This video will help show us what we are about to learn.

Use the QR code to access the video clip for Chapter 1. Ask students one or two questions about the video or ask one thing that was learned. Reinforce and confirm correct responses.

If needed, use LIP. A suggested hierarchy would be 1. Verbal. Listen to video again. Re-ask. 2. Model. Model providing the correct answer, either verbally or by pointing to the correct response option. Re-ask. 3. Physical guidance. If using response options, guide the student to the correct response.

CLOSING

Great job answering questions about the Big Ideas. We will learn more about each Big Idea in upcoming lessons.

EXAMINE IT! *Integrate the Animal Cell Model into your lesson.*

- Use the provided Animal Cell Model to show how models are used as a tool in biology.

CHAPTER 1

VOCABULARY

Vocabulary

Student Workbook pages 4-5

Vocabulary

LEARNING OBJECTIVE:

Gain exposure to new scientific vocabulary.

MATERIALS:

Animal Cell Model, Vocabulary Cards, Model-Lead-Test Procedure Card, Time-Delay Procedure Card, Vocabulary Worksheet

Optional: photos and/or objects to represent vocabulary, **Word Search Activity**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic knowledge of scientific research, tools, and equipment

PREREQUISITE VOCABULARY:

procedure, process, representation, environment, magnify, product

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
Varying ways to represent vocabulary: • As presented in **Student Book** • Supported by objects, graphics, photographs, models, or videos	• Allow students to create alternate versions of the definitions using synonyms for the words and/or symbols e.g., *microscope*-makes things bigger. • Rather than the definition, allow students to provide an example that demonstrates they understand the meaning of a word e.g., *innovation*.	• Choosing the strategy best suited for your students will increase engagement. • Using the appropriate form of vocabulary (see Representation) will lead to increased engagement. • Vary what you consider to be acceptable performance for this lesson. Not all students will learn and maintain ten vocabulary words.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

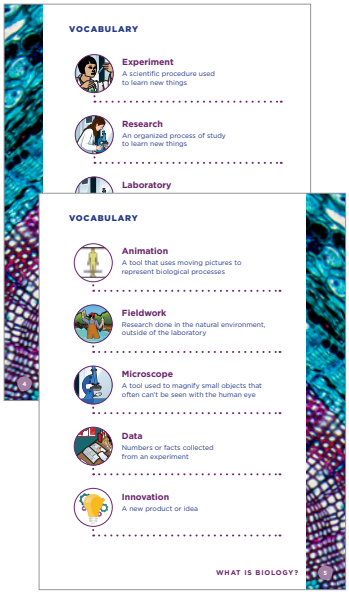
Examine It! **Language Builder!** **Challenge!**

VOCABULARY

INTRODUCTION *Follow along*

Ask students to turn to page 4 in their book. **Today our lesson starts on page 4, Chapter 1, which will be a vocabulary lesson.**

There are ten vocabulary words per chapter. Decide if you will teach all ten words in one lesson or teach sets of words per lesson. Repeat these lessons if needed.



CHOOSE YOUR STRATEGY *Learn vocabulary*

Model-Lead-Test

Note: *This strategy requires the student to respond verbally.*

If you choose this strategy, use the provided **Model-Lead-Test Procedure Card** or follow this procedure:

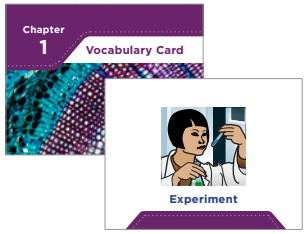
> **Model: Listen. The word *experiment* means a scientific procedure used to learn new things.**
>
> **Lead: Say it with me. *Experiment* means a scientific procedure used to learn new things.**
>
> **Test: What word means a scientific procedure used to learn new things?** Student answers "experiment".

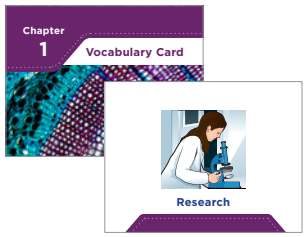
Repeat with each vocabulary word.

Time-Delay

Use Vocabulary Cards and the Time-Delay Procedure Card. Teach the words in sets of four (2 cards will repeat). It may not be realistic to teach multiple sets in one lesson.

When teaching vocabulary, use picture supports and point out important verbs, nouns, adverbs, and prepositions within the definitions. Give synonyms when possible. Use the vocabulary word in a sentence and repeat the sentence with the synonym.





WRITE ABOUT IT

WORKSHEET *Complete worksheet*

Use the editable Vocabulary Writing Page to create a Vocabulary Worksheet appropriate for each student. Provide students with the printed worksheet.

Now that we have gone over all of the vocabulary words for this chapter, you have a Vocabulary Worksheet to complete. Your worksheet has five words in the word bank. Five definitions are below. Complete the worksheet by writing the vocabulary word next to the correct definition.

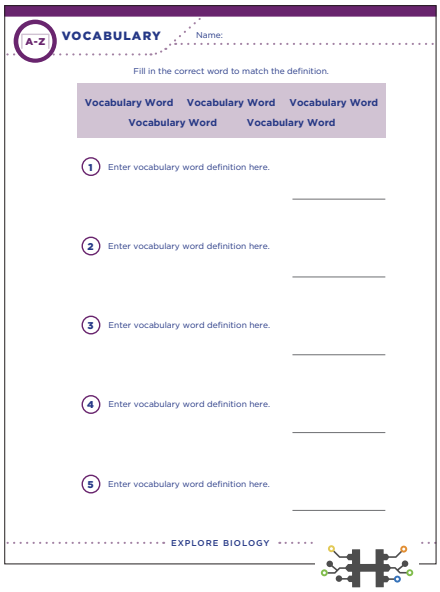
Students may:

- Complete the Vocabulary Worksheet independently and turn it in for teacher feedback.
- Complete the worksheet by pasting prewritten vocabulary words by the correct definition. If needed, words and definitions should be read aloud by a teacher or peer.
- Scribe to a teacher or peer to complete the worksheet.

CLOSING

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

Great job with the vocabulary words! We will review vocabulary words again as we read each Big Idea.


VOCABULARY

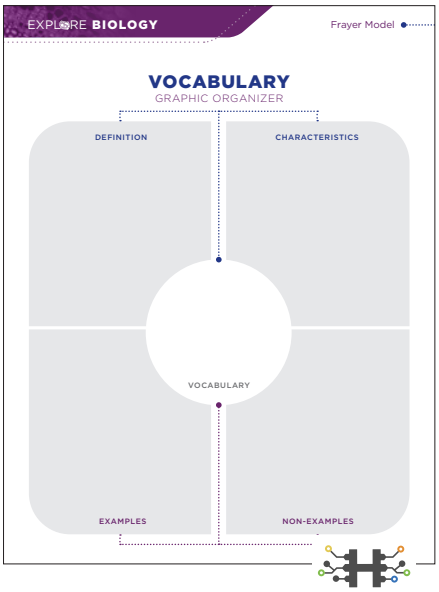
Name:

Fill in the correct word to match the definition.

Vocabulary Word Vocabulary Word Vocabulary Word Vocabulary Word Vocabulary Word

1. Enter vocabulary word definition here. _____
2. Enter vocabulary word definition here. _____
3. Enter vocabulary word definition here. _____
4. Enter vocabulary word definition here. _____
5. Enter vocabulary word definition here. _____

EXPLORE BIOLOGY


EXPLORE BIOLOGY

Frayer Model

VOCABULARY

GRAPHIC ORGANIZER

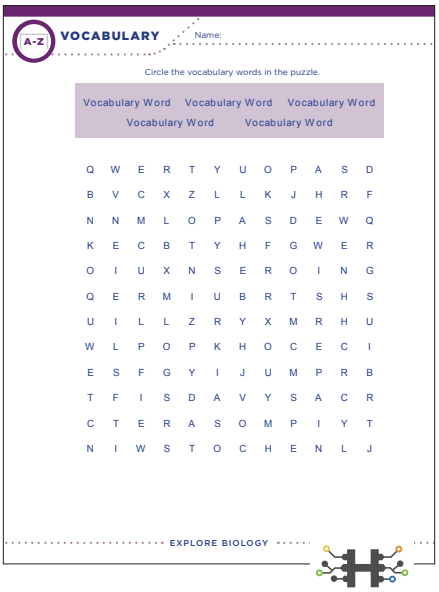
DEFINITION

CHARACTERISTICS

VOCABULARY

EXAMPLES

NON-EXAMPLES


VOCABULARY

Name:

Circle the vocabulary words in the puzzle.

Vocabulary Word Vocabulary Word Vocabulary Word Vocabulary Word Vocabulary Word

Q	W	E	R	T	Y	U	O	P	A	S	D
B	V	C	X	Z	L	L	K	J	H	R	F
N	N	M	L	O	P	A	S	D	E	W	Q
K	E	C	B	T	Y	H	F	G	W	E	R
O	I	U	X	N	S	E	R	O	I	N	G
Q	E	R	M	I	U	B	R	T	S	H	S
U	I	L	L	Z	R	Y	X	M	R	H	U
W	L	P	O	P	K	H	O	C	E	C	I
E	S	F	G	Y	I	J	U	M	P	R	B
T	F	I	S	D	A	V	Y	S	A	C	R
C	T	E	R	A	S	O	M	P	I	Y	T
N	I	W	S	T	O	C	H	E	N	L	J

EXPLORE BIOLOGY

EXAMINE IT! *Integrate the Animal Cell Model into your lesson.*

- Use the provided Animal Cell Model to represent *model*.

REAL-WORLD CONNECTIONS

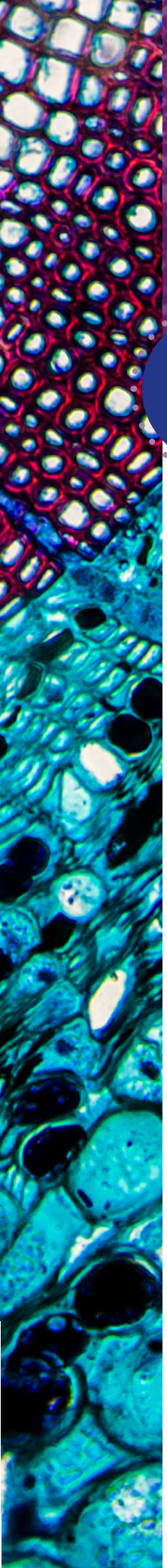
- Use everyday objects to represent vocabulary words, like a microscope, animation, and model. Make connections through experiences like conducting experiments and gathering data.
- Allow students to give definitions in their own words.

EXTENSION ACTIVITIES

- If repeating this lesson over days, choose 2-3 words per day to support a deeper understanding of the vocabulary.
- Discuss pros and cons, watch related videos, locate photographs.

Language Builder! Complete a Frayer Model graphic organizer for vocabulary words.

Write About It! Use the editable Word Search Writing Page to create a Word Search Activity for students to complete.



CHAPTER 1

LESSON 1

Big Idea 1

Student Workbook pages 6-7

Biology is the study of life.

LEARNING OBJECTIVES:

1. Biology is the study of life.
2. Biologists use experiments to learn about life.

MATERIALS:

Vocabulary Cards for *experiment*, *research*; **Animal Cell Model, Big Idea Card**

Optional: photos and/or objects to represent vocabulary words, printed Big Ideas page from **Student Book**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic knowledge of scientific research, living vs. nonliving things, complicated vs. simple

PREREQUISITE VOCABULARY:

field, gain, benefit, environment, result, community, similar, anatomy

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

WHAT TO EXPECT:

Watch for these language-building opportunities throughout the lesson.

Offer synonyms for words such as *field* and *perform*.

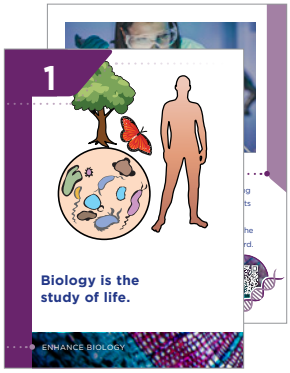
Have students give their answer in a declarative statement.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Bring in examples of laboratory equipment that would be used in an experiment. • Support content with photographs and graphics.	• When planning for discussions, provide photographs or videos that may spark ideas. Preprogram VODs or create communication boards.	• Provide students with vocabulary cards or a vocabulary list. Ask students to point to/circle/check off vocabulary as it is read within the passages. • Ask students to share what they know about research and experiments.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

INTRODUCTION



BIG IDEA *Follow along*

This chapter is called "What is Biology?" First, we reviewed the five Big Ideas in this chapter. Show the Big Ideas from page 3 or from the printed PDF. Show the Big Idea Card. **In the next few lessons, we will learn more about each Big Idea. Listen to the first Big Idea. Biology is the study of life.** Repeat if needed.

VOCABULARY *Identify vocabulary words*

Let's review the two vocabulary words that we will see in this passage.

Review the vocabulary words and definitions for *experiment* and *research*. Make sure students have a good understanding of the vocabulary words before reading the content.

COMPREHENSION *Follow along*

Turn to page 6 in your biology book. Read the Big Idea. **Biology is the study of life.**

Ask students to look around the room and point out an example of a living thing. You may also show students a living thing and a nonliving thing and have them show you the living thing.

Model if needed.

Point out the corresponding image and read the caption. **Biology studies living things, like plants.**

Point to the plant in the image.

Reinforce correct responses. If needed, model pointing to the plant. Re-ask.

EXPLORE

READ *Follow along and answer question*

Listen while I read the passage on page 6. Follow along in your book. In your biology book, vocabulary will be in bold text, like this. Point out *experiment.* Read the passage. **What does biology study?** Confirm correct responses. If needed, use a Reread Prompt.

Offer synonyms for words such as *field* and *perform*.

COMPREHENSION *Answer question*

Here is an image of a biology laboratory, where experiments are done. Point to the image. Read the caption for the image, text pointing as you read. **This is called a caption. The caption describes the image. Listen to the caption again.** Read the caption a second time.

Where are experiments often done?

Reinforce correct responses. If needed, use a Reread Prompt.

The Reread Prompt should begin with a Nonspecific Verbal Prompt, meaning you want to provide more information than simply the correct answer. In order to do that, you will need to add a sentence or two to your prompt. For example: 1. Nonspecific Verbal. **Biologists use experiments to learn about life. Experiments are often done in a laboratory.** Re-ask. 2. Specific Verbal. **Listen. Experiments are often done in a laboratory.** Re-ask. 3. Model providing the correct response either verbally or by pointing to the correct response option. Re-ask.

Have students give their answer in a declarative statement.

READ *Follow along and answer questions*

Turn to page 7 in your book. Follow along while I read and listen for the other vocabulary word, *research*.

Read the passage.

Explain that there are researchers around the world, in every country. These researchers share their results with each other. For example, a biologist in the United States might find out something through research and will share their results with a biologist in Japan. That biologist can then do their own research and share their findings. Give a specific example, like the research done on mRNA vaccines for COVID-19. **Why do scientists share the results of their research?** If needed, guide this discussion by providing relevant examples or asking guiding questions.

Let's look at the image at the top of page 7. The caption says, "Biologists use equipment like test tubes and gloves to perform experiments". Point to text as you read. **This image shows a person doing an experiment. What are some pieces of equipment you see? What safety equipment is the biologist using? Why are these things important?** If needed, point out the glasses, gloves, test tubes, and pipette. Confirm correct responses.

CHECK FOR UNDERSTANDING

QUIZ *Answer at least one quiz question*

Now, let me ask you two questions. I will read the question and then I will give you three choices.

- Ask Q1 from quiz. ***What does biology study?*** Provide choices from quiz.
- Ask Q2 from quiz. ***Why is it important for scientists to share their results?*** Provide choices from quiz.

Confirm correct responses. If needed, return to the text, and use a Reread Prompt. Remember the hierarchy: 1. Nonspecific Verbal, re-ask. 2. Specific Verbal, re-ask. 3. Model selecting correct answer if using response options, and re-ask.

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

APPLY

DID YOU KNOW? *Engage in discussion*

Look at the bottom of page 7, at the section called "Did You Know?" Point to the title. Read the content.

Discuss scientific discoveries made during the Renaissance and their connection to art, like dissection. People learned about veins, nerves, muscles, and bones. They drew pictures to show how body parts and systems worked together. Show other images of dissection during the Renaissance.

CLOSING

Before we complete this lesson, let's review the Big Idea again.

Students may:

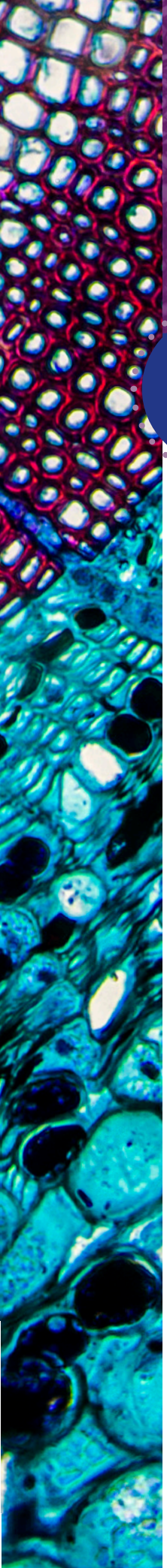
- Read the Big Idea from page 3.
- Assist in reading the Big Idea by reading select words.
- Select the Big Idea from an array of sentences.
- Select the photo from page 3 that illustrates the Big Idea.

REAL-WORLD CONNECTIONS

- Explore the various types of jobs related to biology. What type of training do they require? Discuss whether or not any students might be interested in this field of work. Locate videos discussing jobs in the field of biology.
- Collaborate with the biology teacher at your school. See if your students can visit the biology classroom to look at the equipment and see a demonstration.

EXTENSION ACTIVITIES

- Discuss or plan an activity to explain how to source and/or cite an article. Show students examples of scientific journals or magazines (Scientific American, Biology Today, Quanta Magazine). Show how research findings are reported. Explain the importance of reputable sources.
- Perform an experiment in class, like the dissection of a flower. Show the different parts of a flower and discuss how they work together.
- Ask to join one of the science teachers during a class when they will be conducting experiments.



CHAPTER 1

LESSON 2

Big Idea 2

Student Workbook pages 8-9

Biologists learn new things through research.

LEARNING OBJECTIVES:

1. Biologists learn new things through research.
2. Biologists use the scientific method to do research.

MATERIALS:

Vocabulary Cards for *laboratory, scientific method, research, experiment*; **Big Idea Card**

Optional: photos and/or objects to represent vocabulary words, printed Big Ideas page from **Student Book**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic understanding of scientific research and experiments

PREREQUISITE VOCABULARY:

biologist, perform, conclusion, hypothesis

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

WHAT TO EXPECT:

Watch for these language-building opportunities throughout the lesson.

Offer synonyms for words such as *perform* and *trusted.*

Have students explain why the scientific method is important in their own words.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Project a PowerPoint presentation showing the five main steps of the scientific method. • Use a graphic organizer to share facts about each of the scientists mentioned in the "Did You Know?" section.	• Offer the opportunity to answer yes/no as an alternative to using an array of response options e.g., **Is an experiment the most important step of the scientific method?** • Provide a graphic organizer that can be used to demonstrate understanding of the steps of the scientific method.	• Create a poster representing the steps of the scientific method. • Create experiments to be done in class, using the scientific method.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

INTRODUCTION

BIG IDEA *Follow along*

In this lesson, we will learn about the next Big Idea. Hold up a Student Book and show page 3 to the students or show the printed PDF, pointing to Big Idea 2. Show the Big Idea Card. **Biologists learn new things through research.** Repeat if needed.

VOCABULARY *Identify vocabulary words*

Let's review two vocabulary words that we will see in this passage.

Review the vocabulary words and definitions for *laboratory* and *scientific method.* Make sure students have a good understanding of the vocabulary words before reading the content.

Let's also review words from the chapter that you will see in this passage.

Review the vocabulary words and definitions for *research* and *experiment.*

COMPREHENSION *Follow along*

Turn to page 8 in your biology book. Read the Big Idea. **Biologists learn new things through research.** Point out the corresponding image and read the caption. Point to the image as you read the caption. **Look, these are some examples of laboratory equipment you may find in a biology lab. These are beakers.** Point to a beaker.

Ask, **Who can remember what the definition of *laboratory* is?**

Confirm correct responses. If needed, use LIP. A possible prompt hierarchy for a student *not using response options* would be: 1. Verbal. **Turn back to the vocabulary list or use your Glossary.** Re-ask. 2. Gestural & Verbal. Turn the students' book to the correct page and point to the word "laboratory". Say, **Here it is.** Re-ask. 3. Model. Text point while saying, **Listen. A laboratory is a place designed for scientific experiments.** Re-ask.

EXPLORE

READ *Follow along*

I will read the passage on page 8. Follow along in your book and listen for the vocabulary words *laboratory* and *scientific method*. Remember that the vocabulary words will be in bold text. Read the passage. When you read the sentence about the scientific method, remind students what *research* means. Review the definition for *research*.

Offer synonyms for words such as *perform* and *trusted*.

COMPREHENSION *Answer question*

Look at the image at the bottom of page 8. Point to the image. **In this passage, we learned about the scientific method.** Read the caption.

Ask, **What is the first step of the scientific method? What about the last step?**

Confirm correct responses. If needed, use LIP. 1. Visual/Verbal. Point to and name each step in the scientific method. Re-ask. 2. Model. Provide the correct answer, either verbally or by pointing to the correct response option. Re-ask.

Ask, **Which step of the scientific method gives you the answer to the question?** Confirm correct responses. If needed, use LIP. 1. Visual/Verbal. Point to and name each step in the scientific method. Re-ask. 2. Model. Provide the correct answer either verbally or by pointing to the correct response option. Re-ask.

READ *Follow along and answer question*

Turn to page 9 in your biology book. Follow along while I read. Read the passage.

Good listening. What is the most important step of research?

Reinforce correct responses. If needed, use LIP. A suggested prompt hierarchy is: 1. Visual. Point out the image on the top of page 8 and name the steps. Re-ask. 2. Verbal. Read the sentence from the passage. Re-ask. 3. Model. Point to and name the correct answer on the scientific method. Re-ask.

Review the small image on page 8. **Point to the most important step.**

Have students explain why the scientific method is important in their own words.

Let's look at the image at the top of page 9. The caption says, "The first step of the scientific method is making an observation". Point to text as you read. **What is the first step of the scientific method?** Confirm correct responses. If needed, use a Reread Prompt. Return to the small image on page 8. **Point to the first step of the scientific method.**

CHECK FOR UNDERSTANDING

QUIZ *Answer at least one quiz question*

Now, let me ask you two questions. I will read the question and then I will give you three choices.

- Ask Q3 from quiz. ***What do biologists have to follow to perform their research?*** Provide choices from quiz.
- Ask Q4 from quiz. ***What is the first step of the scientific method?*** Provide choices from quiz.

Confirm correct responses. If needed, return to the text, and use a Reread Prompt.

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

APPLY

DID YOU KNOW? *Engage in discussion*

Look at the bottom of page 9, at the section called "Did You Know?" Point to the title. Read the content. Point to and describe the image. **This is Isaac Newton. He was an important scientist in the 17th century. He didn't invent the scientific method, but he did make it universally known. Two other scientists are mentioned in the "Did You Know?" section. What are their names? When did they live?**

Confirm correct responses. If necessary, use a Reread Prompt.

Use this as an opportunity to research each scientist's contributions as a class. Relate the research back to the lesson content (including the scientific method).

Give students an opportunity to make a declarative statement about the scientific method using "I think" along with "because".

CLOSING

Before we complete this lesson, let's review the Big Idea again.

Students may:

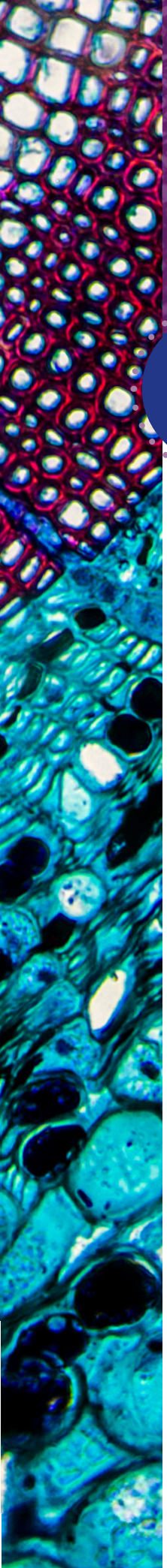
- Read the Big Idea from page 3.
- Assist in reading the Big Idea by reading select words.
- Select the Big Idea from an array of sentences.
- Select the photo from page 3 that illustrates the Big Idea.

REAL-WORLD CONNECTIONS

- Encourage students to make observations in their environment. Based on the observations, encourage them to ask questions.
- Do an experiment using the scientific method, such as the Bean Plant experiment. You will need four bean plants, pots, soil, and water. The question is: will a bean plant grow more quickly outside or inside? Students create a hypothesis and test the hypothesis by collecting data. Plant the four bean plants in four pots, with the same soil. Put two outside and two inside. Water all four. Observe and measure the plant growth over a chosen timeframe, recording the data. Have students analyze the data and come up with a conclusion. Whose hypothesis was right?

EXTENSION ACTIVITIES

- Create a matching activity to show the scientific method. Have one column represent the five main steps. Another column should include an example of each step. Have students match the step to the example.
- Research important biological experiments and point out each step of the scientific method used. Many examples can be found online.



CHAPTER 1

LESSON 3

Big Idea 3

Student Workbook pages 10-11

Tools are used to study biology.

LEARNING OBJECTIVES:

1. Tools are used to study biology.
2. Models and animations show representations of things people can't see with their eyes.

MATERIALS:

Vocabulary Cards for *model, animation, research, experiment*; **Animal Cell Model, Big Idea Card**

Optional: photos and/or objects to represent vocabulary words, printed Big Ideas page from **Student Book**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic understanding of research and experiments, technology

PREREQUISITE VOCABULARY:

technology, analyze, equipment, system, environment, findings, 3D, interactive

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression*, and *Engagement* into lesson steps. Preplan your discussion on biomedical technology by listing jobs in the field and finding multimedia examples of biomedical technology.

WHAT TO EXPECT:

Watch for these language-building opportunities throughout the lesson.

- When needed, use synonyms to explain vocabulary words and their definitions.
- Have students compare and contrast models and animations.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Collaborate with the general education science teacher on ways to make the content more concrete. • Use online animations to support the content (The DNA Learning Center has many animations online).	• Offer response options related to biomedical technology to allow students to express interest in this area.	• Have students watch animations about different biology concepts and come up with their own questions. • Explore real-world connections to biomedical technology.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

INTRODUCTION

BIG IDEA *Follow along*

In this lesson, we will learn about the next Big Idea. Hold up a Student Book and show page 3 to the students or show the printed PDF, pointing to Big Idea 3. Show the Big Idea Card. **Listen to the next Big Idea. Tools are used to study biology. Repeat if needed.**

VOCABULARY *Identify vocabulary words*

Let's review two vocabulary words that we will see in this passage.

Review the vocabulary words and definitions for *model* and *animation.* Make sure students have a good understanding of the vocabulary words before reading the content.

Let's also review words from the chapter that you will see in this passage.

Review the vocabulary words and definitions for *research* and *experiment.*

When needed, use synonyms to explain vocabulary words and their definitions.

COMPREHENSION *Answer question*

Turn to page 10 in your biology book. Read the Big Idea. **Tools are used to study biology.**

Go back and point out the images on pages 7, 8, and 9 and say, **These are tools used to study biology. Can you remember what these tools were called?**

If needed, model the correct response, and re-ask.

EXPLORE

READ *Follow along and answer question*

I will read the passage on page 10. Follow along in your book. Remember that vocabulary words are in bold and to listen for the word *model*. Read the passage. Ask, **Why are some experiments possible now that weren't possible before?**

Confirm correct responses. Note that several responses could be correct. Possible responses include *better technology, better equipment,* and *special computer programs*. If needed, use a Reread Prompt.

Take the time here to show students any additional models gathered for this lesson. Explain each model.

COMPREHENSION *Answer question*

Point to the image on the bottom of page 10. **This image shows a model.** Point out the caption. **The caption says, "Technology allows scientists to create models of small molecules". We will discuss molecules more in depth in future chapters. The model is showing something that is so small it can't be seen with the human eye.**

Ask, **What is one thing that technology has allowed scientists to create?**

Confirm correct responses. **Yes, technology has allowed scientists to create models.**

If needed, use LIP. 1. Verbal. **Listen for the answer while I read the caption again.** Read the caption and re-ask. 2. Model. Provide the correct answer verbally for a student who can generate their own answer or by pointing to the correct response option. Re-ask. 3. Physical guidance. For students using response options, guide student to the correct response.

Ask, **Who can remember what the definition of a model is?** Confirm correct responses.

If needed, use LIP. A possible prompt hierarchy for a student *using a multigrid voice output device* would be: 1. Point to the options on the student's device. **Look at your device for the word _____.** Re-ask. 2. Model. **Listen. Press the word _____ to play the prerecorded word and definition.** Re-ask. 3. Physical guidance. Assist the student in selecting the correct response option on the voice output device.

READ *Follow along and answer question*

Turn to page 11 in your biology book. Remember that vocabulary words are in bold and to listen for the word *animation*. Read the passage.

Good listening. What do biologists use animations for?

Reinforce correct responses. Correct responses may include *to explain findings, to show things people can't see with their eyes.* If needed, use a Reread Prompt targeting the answer *to explain findings*.

Remember that biologists create animations to help explain their findings. Animations can also help us understand something that we cannot see with our eyes. Show several examples of animations used in biology. Choose animations that will be relevant and meaningful to your students. After watching several examples, ask questions to check for understanding.

EXPLORE

READ *Follow along and answer question*

Does seeing an animation of (insert what the animation was about) **help you to understand it better?** Encourage students to explain how it helps.

Can you think of something that may be shown using an animation?

Let's look at the image at the top of page 11. The caption says, "Animations can show things like the insides of a cell". Point to text as you read. **This image shows a screenshot of an animation of the inside of a cell. Why would it be helpful to have an animation that shows the inside of a cell?**

Reinforce any plausible answers. For example, we can't see the inside of a cell with just our eyes, so we need an animation to look at all the parts.

If needed, model a Think-Aloud. Model thinking out loud about how to answer this question and then re-ask. For example, **I think an animation would be helpful because we can watch biological processes occur over and over, unlike a microscope with which we might only see things once.** After re-asking, if students do not provide a plausible answer, model the answer you are looking for.

Have students compare and contrast models and animations using a graphic organizer. If needed, support language by listing the five senses and making the comparisons based on those e.g., **Can you see a model? What about an animation?**

CHECK FOR UNDERSTANDING

QUIZ *Answer at least one quiz question*

Now, let me ask you two questions. I will read the question and then I will give you three choices.

- Ask Q5 from quiz. ***How has biology benefited from technology?*** Provide choices from quiz.
- Ask Q6 from quiz. ***What can animations show?*** Provide choices from quiz.

Confirm correct responses. If needed, use a Reread Prompt.

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

APPLY

DID YOU KNOW? *Engage in discussion*

Look at the bottom of page 11, at the section called "Did You Know?" Point to the title. Read the content. Point to and describe the image. This image shows a 3D illustration of a modern surgical robot.

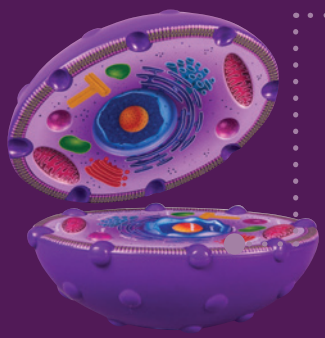
Discuss the differences between engineering, technology, and biology. Discuss examples of biomedical technology, like artificial organs, robot surgeons, 3D bioprinting, 3D medical imaging, and laser surgery. Show students videos and images of biomedical technology. Discuss different jobs in this field, like an equipment technician, a clinical lab technologist, or biomedical engineer.

CLOSING

Before we complete this lesson, let's review the Big Idea again.

Students may:

- Read the Big Idea from page 3.
- Assist in reading the Big Idea by reading select words.
- Select the Big Idea from an array of sentences.
- Select the photo from page 3 that illustrates the Big Idea.



EXAMINE IT! *Integrate the Animal Cell Model into your lesson.*

- Use the provided Animal Cell Model to show an example of another model used in biology. You may also use the cell model to confirm that students understand the difference between a model and a non-model. If you are able to, gather several examples of models and non-models (ordinary items in the classroom such as a plant, a stapler, a book). Use the sample script for example/non-example and adapt the script to fit the examples and non-examples that you have.
- Show students the provided Animal Cell Model. Show how it relates to the animation image.

REAL-WORLD CONNECTIONS

- **Examine It!** Pass around the provided Animal Cell Model to discuss the concept of models in biology. Show students how the different parts can be seen in the model, but not with the human eye.
- Watch biology-related animations that are interesting or personally relevant to your students. For example, watch an animation about how plants grow, or one showing a heartbeat.
- Visit a local science museum.

EXTENSION ACTIVITIES

- Have students watch an animation and write down their thoughts or any questions they have after watching the video. Many examples can be found on YouTube.

CHAPTER 1

LESSON 4

Big Idea 4

Student Workbook pages 12-13

Research can be done in the laboratory or in the field.

LEARNING OBJECTIVES:

1. Research can be done in the laboratory or in the field.
2. Biologists use microscopes.

MATERIALS:

Vocabulary Cards for *fieldwork, microscope, research, laboratory, experiment*; microscope, **Big Idea Card**

Optional: photos and/or objects to represent vocabulary words, printed Big Ideas page from **Student Book**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic understanding of research, experiments

PREREQUISITE VOCABULARY:

equipment, forest, frequently, magnify

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression*, and *Engagement* into lesson steps.

WHAT TO EXPECT:

Watch for these language-building opportunities throughout the lesson.

Use picture supports and synonyms for vocabulary words and their definitions.

Offer synonyms for words such as *natural* and *frequently*.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Bring in a microscope and small items (blades of grass, a penny, sand, or soil) for students to look at.	• Offer the opportunity to answer yes/no as an alternative to using an array of response options e.g., **Is fieldwork done in the laboratory?**	• Have students participate in fieldwork in class and collect their own samples. • Show students videos of different fieldwork examples. Many can be found on YouTube.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

INTRODUCTION

BIG IDEA *Follow along*

In this lesson, we will learn about the next Big Idea. Hold up a Student Book and show page 3 to the students, pointing to Big Idea 4 or show the printed PDF. Read the next Big Idea. **Research can be done in the laboratory or in the field. In the field means in the natural environment.** Repeat if needed.

VOCABULARY *Identify vocabulary words*

Let's review two vocabulary words that we will see in this passage.

Review the vocabulary words and definitions for *fieldwork* and *microscope*. Make sure students have a good understanding of the vocabulary words before reading the content.

Let's also review words from the chapter that you will see in this passage. Review the vocabulary words and definitions for *research, experiment,* and *laboratory*.

Use picture supports and synonyms for vocabulary words and their definitions.

COMPREHENSION *Answer questions*

Ask students to turn to page 12. Point to and read the title. Ask, **Where can research be done?** Reinforce correct responses. If needed, use a Reread Prompt. The Reread Prompt should begin with a Nonspecific Verbal Prompt, meaning you want to provide more information than simply the correct answer. In order to do that, you will need to add a sentence or two to your prompt. For example: 1. Nonspecific Verbal. **Research can be done by biologists and can happen in different locations. Research can be done in the laboratory or in the field.** Re-ask. 2. Specific Verbal. **Listen. Research can be done in the laboratory or in the field.** Re-ask. 3. Model providing the correct response, either verbally, or by pointing to the correct response option. Re-ask.

Ask, **What do you think it means for research to be done in the field?** Confirm correct responses. If needed, prompt. Be sure to make the connection between the term *fieldwork* and the phrase *in the field.*

Point out the corresponding image. Read the caption. Explain that the biologist in this image is doing research in a laboratory.

EXPLORE

READ *Follow along and answer questions*

Listen while I read the passage on page 12. Follow along in your book. Listen for the vocabulary word *fieldwork*.

How do you think research in the field is different from research done in the laboratory? If needed, provide two photos that show clear differences. Reinforce correct responses.

Ask, **What is an example of fieldwork?** Confirm correct responses. If needed, use a Reread Prompt.

Ask, **Can you think of an example of fieldwork that isn't written here in the text?** If needed, offer examples (study tadpoles in a creek, birds in the sky, lily pads in a swamp).

Offer synonyms for words such as *natural* and *frequently*.

COMPREHENSION *Answer question and participate in activity*

Let's look at the image on the bottom of page 12. Point to the image. **This image shows some scientists doing fieldwork in a river.** Point out the caption. **The caption says, "Biologists collect samples while doing fieldwork".**

Ask, **What do you think it means to collect samples? What do you think they are doing in the river?** Reinforce and confirm correct responses. Answers may vary.

If needed, model a Think-Aloud. Model thinking out loud about how to answer this question and then re-ask. For example, **Let's think about what the key words in the sentence tell us. *Collect* means I pick up something and take it; samples are usually pieces of something, like a sample of fabric.** After re-asking, if a student does not provide a plausible answer, model the answer you are looking for.

Discuss the concept of collecting samples. If possible, go outside and collect a soil sample.

READ *Follow along and answer questions*

Turn to page 13 in your biology book. Follow along while I read. Read the passage.

Good listening. How do microscopes work? Reinforce correct responses. If needed, use a Reread Prompt. 1. Nonspecific Verbal, re-ask. 2. Specific verbal, re-ask. 3. Model and re-ask.

Who can tell me what it means to magnify something? Confirm correct responses. If needed, provide the correct answer, and demonstrate magnifying an object with a magnifying glass, or a magnifying app on a phone.

Project images of several types of microscopes and their uses. If possible, borrow a microscope from a science classroom and pass it around to students.

Let's look at the image at the top of page 13. The caption says, "Biologists use microscopes to see very small things". Point to text as you read. **This image shows a person using a microscope. What do you think he is looking at?** Accept plausible responses. Offer some of your own (plant parts, a soil sample, sand). Note that whatever the person is looking at would have to be very small to fit under the microscope. This is a good opportunity to expand on the idea of samples and help students understand that you may not look at an entire object, but rather a sample of that object. If possible, use a microscope to look at the soil sample you collected in class.

CHECK FOR UNDERSTANDING

QUIZ *Answer at least one quiz question*

Now, let me ask you two questions. I will read the question and then I will give you three choices.

- Ask Q7 from quiz. ***Where is fieldwork performed?*** Provide choices from quiz.
- Ask Q8 from quiz. ***How do microscopes work?*** Provide choices from quiz.

Reinforce and confirm correct responses. If needed, return to the text, and use a Reread Prompt.

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

APPLY

DID YOU KNOW? *Engage in discussion*

Look at the bottom of page 13, at the section called "Did You Know?" Point to the title. Read the content.

Ask, **What types of equipment have we already discussed in this chapter? Can you think of any other equipment that may be in a biology laboratory?** If needed, name the items in the image.

Discuss laboratory safety. Talk about the importance of wearing gloves, goggles, a mask, and a lab coat. Discuss different reasons for safety protocols—like fires, exposure to infections, fungi, or bacteria, and radioactive hazards.

CLOSING

Before we complete this lesson, let's review the Big Idea again.

Students may:

- Read the Big Idea from page 3.
- Assist in reading the Big Idea by reading select words.
- Select the Big Idea from an array of sentences.
- Select the image from page 3 that illustrates the Big Idea.

EXAMINE IT! *Integrate the Animal Cell Model into your lesson.*

- Use the provided Animal Cell Model to show students an example of something that may be looked at using a microscope. We can't see these tiny parts of animals and plants, but we use things like microscopes and other technology to know more about them.

REAL-WORLD CONNECTIONS

- Gather some safety equipment that would be used in a science lab or in fieldwork. Discuss the purpose that each piece of equipment serves.
- Discuss current or classic movies about research in a lab or in the field, such as the Jurassic Park movies. Discuss how these movies portrayed research. Compare and contrast these portrayals with research in the real world.

EXTENSION ACTIVITIES

- Create a Venn diagram comparing fieldwork and laboratory research.
- Have students come up with their own question that they believe could be answered through fieldwork. Have them complete this fieldwork at home and present their findings to the class.

CHAPTER 1

LESSON 5

Big Idea 5

Student Workbook pages 14-15

Biology is always changing.

LEARNING OBJECTIVES:

1. Biology is always changing.
2. Biology changes as more data is collected.

MATERIALS:

Vocabulary Cards for *data, innovation, experiment, research*; **Big Idea Card**

Optional: photos and/or objects to represent vocabulary words, printed Big Ideas page from **Student Book**; *see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

basic understanding of experiments, research, and the scientific method

PREREQUISITE VOCABULARY:

collect, conduct, analyze, hypothesis, collaborate, conclusion, educated, opinion

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

WHAT TO EXPECT:

Watch for these language-building opportunities throughout the lesson.

- Use picture supports and physical objects for vocabulary words and their definitions.
- Have students come up with an example of an *educated opinion* they may have.
- Have students give a declarative statement about the Nobel Prize.

UNIVERSAL DESIGN FOR LEARNING

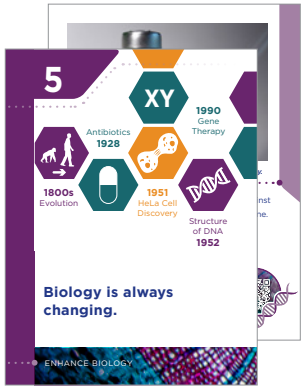
Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Provide a larger version of the image on page 14. • Show examples found online of data collection; provide meaningful examples of what it means to analyze data.	• Offer the opportunity to answer yes/no as an alternative to using an array of response options e.g., **Do biologists keep their research to themselves after reaching a conclusion?** • Plan response options and preprogram VODs for students to answer questions.	• Have students pick a question, and then collect, analyze, and share the data. • Give examples of innovations that are relevant to your students.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

INTRODUCTION

BIG IDEA *Follow along*

In this lesson, we will learn about the last Big Idea for Chapter 1. Hold up a Student Book and show page 3 to the students, pointing to Big Idea 5 or show the printed PDF. Show the Big Idea Card. Read the Big Idea. **Biology is always changing.** Repeat if needed.



VOCABULARY *Identify vocabulary words*

Let's review two vocabulary words that we will see in this lesson.

Review the vocabulary words and definitions for *data* and *innovation*. Make sure students have a good understanding of the vocabulary words before reading the content.

Use picture supports and physical objects for vocabulary words and their definitions (examples of data charts, inventions).

COMPREHENSION *Follow along*

Turn to page 14 in your biology book. Read the Big Idea. **Biology is always changing.** Point to the image at the top of the page. **This image shows a timeline of different discoveries in biology.** Take the time to describe the image in your own words and provide additional details about the events listed in the graphic. Read the caption and then ask some specific questions about the graphic.

Confirm correct responses. If needed, use LIP. For example, 1. Gesture. Point to the graphic and say, **Look at the graphic to find the answer.** Re-ask. 2. Model. Provide the answer by pointing to and reading the answer from the graphic. Re-ask.

Ask, **Do you think the study of biology has improved over time? Why or why not?** Encourage discussion. If needed, ask guiding questions.

EXPLORE

READ *Follow along and answer question*

Listen while I read the passage on page 14. Follow along in your book. Remember that vocabulary words are in bold text and to listen for *data*. Read the passage. If needed, use a synonym for the word *analyze* such as "think about" or "consider".

Ask, **What do biologists do after conducting an experiment?**

Confirm correct responses. If needed, use Reread Prompt. Reinforce the importance of sharing data with other scientists. If necessary, review the scientific method. Explain that reporting your results comes at the end of the scientific method.

COMPREHENSION *Answer question*

Let's look at the image on the bottom of page 14. Point to and describe the image. This image shows scientists collecting fieldwork data by weighing penguins when they cross the bridge to and from the ocean. Point out the caption. **The caption says, "Scientists can collect data out in the field".**

Ask, **What can scientists collect out in the field?**

Confirm correct responses. If needed, use a Reread Prompt. Remember to add additional information to your Nonspecific Verbal Prompt.

Discuss how this data will then be shared with other scientists. Discuss the importance of sample sizes—many penguins must be weighed for the data to be relevant.

READ *Follow along and answer questions*

Turn to page 15 in your biology book. Follow along while I read more about the metric system. Remember that vocabulary words are in bold text and to listen for *innovation*. Read the passage.

Ask, **What needs to happen if new data goes against old data?**

Confirm correct responses. If needed, use a Reread Prompt.

Ask, **Does anyone remember which step "data" is in the scientific method?** Review the scientific method image on page 8.

Let's look at the image at the top of page 15. The caption says, "Some biological innovations are used to keep us healthy". Point to text as you read. **This image shows a smallpox vaccine. Someone who takes a smallpox vaccine is less likely to get smallpox. Smallpox is a disease that was eradicated in 1980 in the U.S. since so many people got vaccinated. This is an example of an innovation developed due to a lot of biological research.**

Ask, **Can you think of any other biological innovations?** Encourage discussion. Show videos and images of other biological innovations, like vitamins, insulin, and antibiotics.

Have students come up with an example of an *educated opinion* they may have (on their favorite sport, video game, food, or something scientific).

CHECK FOR UNDERSTANDING

QUIZ *Answer at least one quiz question*

Now, let me ask you two questions. I will read the question and then I will give you three choices.

- Ask Q9 from quiz. ***What do scientists have to do to make a conclusion?*** Provide choices from quiz.
- Ask Q10 from quiz. ***What happens if new data goes against old data?*** Provide choices from quiz.

Reinforce correct responses. If needed, return to the text and use a Reread Prompt.

Refer back to the KWL chart to see if any questions have been addressed. If so, review the question and see if the students can complete the L portion of the chart.

APPLY

DID YOU KNOW? *Engage in discussion*

Use the "Did You Know?" as a discussion topic.

Discuss the Nobel Prize and notable winners in biological fields, like Emil Adolf von Behring, Gerty Cori, and Alexander Fleming. Discuss important innovations and ask students which innovations they think deserve a prize.

Have students use the image to create a declarative statement about the Nobel Prize.

CLOSING

Before we complete this lesson, let's review the Big Idea again.

Students may:

- Read the Big Idea from page 3.
- Assist in reading the Big Idea by reading select words.
- Select the Big Idea from an array of sentences.
- Select the image from page 3 that illustrates the Big Idea.

REAL-WORLD CONNECTIONS

- Have students create a poster or PowerPoint presentation showing a timeline of important discoveries or innovations in biology.

EXTENSION ACTIVITIES

- Have students research a biologist and present on them and their findings/ innovations to the class.
- Use a KWL chart to learn more about innovations in biology.
- Extend learning about fieldwork by exploring research with penguins as well as other wildlife.

CHAPTER 1

DISCOVERY

Discovery

Student Workbook page 16

Discovery

LEARNING OBJECTIVES:

1. The scientific method must always be followed.
2. A lot of data needs to be collected for it to be relevant.

MATERIALS:

cups, tap water, ice, thermometers, **Discovery Worksheet**

PREREQUISITE KNOWLEDGE:

experiments, the scientific method, data

PREREQUISITE VOCABULARY:

liquid, hypothesis, thermometer, temperature

DISCOVERY

Let's do an Experiment!

Now that we know about experiments, let's try one for ourselves. Take two cups and fill them up with liquid tap water. What do you think will happen if you add ice to one of the cups of water? Will it be colder or warmer than the other cup? Let's use the scientific method. First, make a hypothesis. Then, carry out the experiment. Add ice to one of the cups. Now, use a thermometer to get the necessary data. Take the temperature of each cup. Which cup of water is colder? Was your hypothesis correct?

For this experiment, you need two cups, water, and ice.

Observation, Question, Hypothesis, Experiment, Data, Conclusion

It is important to follow the scientific method when carrying out an experiment.

Make a Conclusion

Now that you have performed the experiment, you can make a conclusion. Record your data on the Discovery Worksheet provided by your instructor. Use the data collected to decide which cup is colder. We know that science is most accurate when data is shared and compared. Let's share our results with our classmates. Did everyone get the same results? Take note of all your classmates' data on the Discovery Worksheet. If people have different results, we can do the experiment again to improve accuracy.

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UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Provide a larger version of the data collection form. • Use a whiteboard to record students' hypotheses and results. • Provide the steps of the experiment on individual documents or on a whiteboard.	• Offer the opportunity to answer yes/no as an alternative to answering a question e.g., **Will the cup with ice be colder than the cup without ice?** • Use word banks and synonyms and highlight important nouns/underline important verbs.	• Allow partial participation in the experiment.

Provide supports for important words in the text. Nouns | Verbs | Adjectives

Examine It! **Language Builder!** **Challenge!**

DISCOVERY

PART 1 *Follow along and make a hypothesis*

Turn to page 16 in your book. Let's read the title. Let's do an Experiment!

Follow along while I read the first passage. Begin reading the passage. As you read, stop to complete the directions given. When you fill the two cups with tap water, allow each student to feel the water in each of their cups. Stop when you ask students to come up with their own hypothesis. **What do you think will happen if you add ice to one of the cups of water? Will it be colder or warmer than the other cup?** Write down students' hypotheses.

Point out the image at the top of the page. **This image shows one cup of water with ice, and one cup of water without ice. We are going to model this image for our experiment.**

Continue reading the passage and following the steps. After collecting the temperatures, ask students to write down their results. Finish the passage by asking the final questions.

Confirm correct responses. If needed, model using the students' data to answer the questions.

THINK-ALOUD QUESTION

What do you think will happen if you add ice to a cup of water?

Ask students to define *experiment* using their own words.

PART 2 *Follow along and participate in activity*

The title of this next section is "Make a Conclusion". Do you remember what a conclusion is? What step of the scientific method is the conclusion? What do you think this passage will ask us to do?

Review the scientific method image on page 16.

Follow along while I read the second passage. Read the passage.

Let's first make a conclusion. Which cup is colder, the one with or without ice? Confirm correct responses. If needed, model a Think-Aloud. You may have everyone raise their hand if their cup with ice was colder and then count them. You may circle the colder cup on everyone's data sheet and show that.

Let's compare this conclusion to your hypotheses. Whose hypothesis was right? Confirm correct responses. If necessary, use LIP. This is a good opportunity to explain that a hypothesis is just a guess and that you need an experiment to prove it right or wrong. This is also a good opportunity to show that even if the hypothesis is wrong, there is still value in the research or experiment because it provides solid data. Provide some meaningful examples of times when scientists might hope their hypothesis is wrong.

Now, let's compare everyone's data. Does it match up? Does anyone's data stand out as different? Do you think we need to do this experiment again? If needed, ask guiding questions.

Discuss the importance of collecting a lot of data for the data to be relevant. **Do you think this data would be relevant if we only used one of your results? Why or why not? What if the thermometer was broken and caused incorrect results?** If needed, ask guiding questions, e.g., **If a thermometer is broken, can you trust the temperature it gives you?**

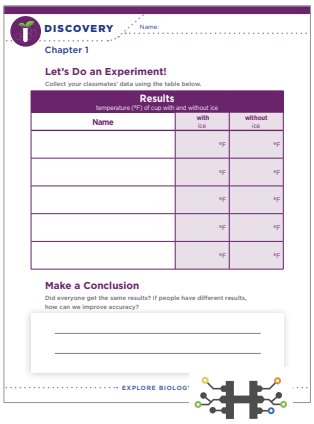
WRITE ABOUT IT

WORKSHEET *Complete worksheet*

Complete the editable Discovery Worksheet. Provide students with the printed or digital worksheet.

Now that we have made our own conclusion, let's share our data with our classmates! Here is your worksheet to complete. If needed, read the worksheet directions aloud. Students may:

- Complete the Discovery Worksheet independently and turn it in for teacher feedback.
- Have the worksheet read by a teacher or peer. Complete the worksheet by pasting prewritten data onto the sheet.
- Scribe to a teacher or peer to complete the worksheet.
- Have two plausible, but different, responses read aloud and select a response to complete the worksheet.


DISCOVERY

Name:

Chapter 1

Let's Do an Experiment!

Collect your classmates' data using the table below.

Results

Temperature (°F) of cup with and without ice

Name	with ice	without ice
	°F	°F
	°F	°F
	°F	°F
	°F	°F
	°F	°F

Make a Conclusion

Did everyone get the same results? If people have different results, how can we improve accuracy?

EXPLORE BIOLOG

Create a word bank to add verbs, nouns, and prepositions to fill-in-the-blank sentences.

CHECK FOR UNDERSTANDING *Answer questions*

Ask, **Why is it important to follow the scientific method? Would this experiment be possible if we started with a conclusion and ended with a hypothesis?**

Ask, **Why does a lot of data need to be collected for it to be relevant?** Confirm correct responses. If needed, use LIP.

CLOSING

This lesson taught us a lot about data collection and how to follow the scientific method in real life. After we take a quiz, our next chapter will teach us all about living things, the focus of biology!

CONCLUSION

DEEPER UNDERSTANDING *Watch video again*

Let's rewatch the video about the five Big Ideas from this chapter. This video will let us review what we already learned.

Use the QR code to access the video clip for Chapter 1.

Ask students one or two questions about the video. Reinforce and confirm correct responses. If needed, use LIP. A suggested hierarchy for students using response options would be 1. Verbal (listen to video), re-ask. 2. Model, re-ask. 3. Physical. Provide physical guidance for the student to point to the correct response.

REAL-WORLD CONNECTIONS

- Do the experiment again in different ways, such as using a heat source instead of ice or a liquid other than water.
- Have students come up with their own experiment that could be done in class.

EXTENSION ACTIVITIES

- Have students learn about the peer review process.
- Take advantage of opportunities to join a biology class at your school to experience the scientific method from start to finish.

REVIEW/QUIZ

Review/Quiz
Student Workbook pages 17-18

Review/Quiz

WRITE ABOUT IT!

CHOOSE THE METHOD THAT WORKS FOR YOU:

- Have students complete the Big Ideas worksheet independently.
- Read each Big Idea sentence, along with the response options, to the student. Allow the student to answer verbally or select a response option.

Students may opt to give their answers out loud instead of writing them down. Have them use declarative statements.

REVIEW

Prepare for the quiz by reviewing the Big Idea and Vocabulary Cards for the chapter.

QUIZ

CHOOSE THE METHOD THAT WORKS FOR YOU:

- Have the students take the quiz in the consumable Student Workbook independently.
- Read the questions and choices to the students and have them circle or point to their answers.
- Use the quiz as a chapter review and not as a comprehension assessment.

The quiz is also available in two digital formats: PDF and .goworksheet file for use with the free **GoWorksheet iPad App.** Find a customizable quiz document with which you can offer two answer options or three answer options on the HUB.