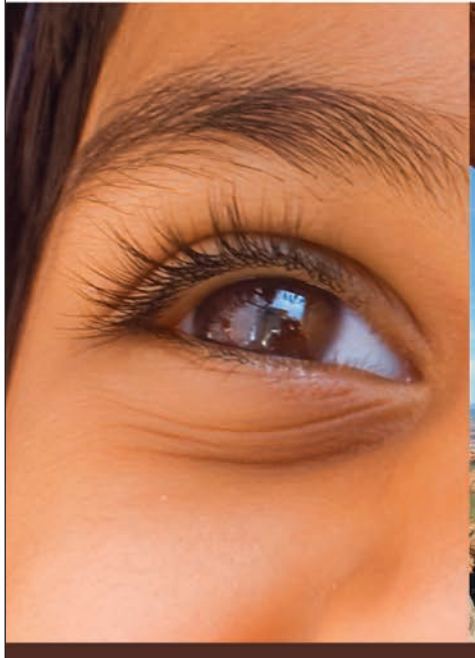
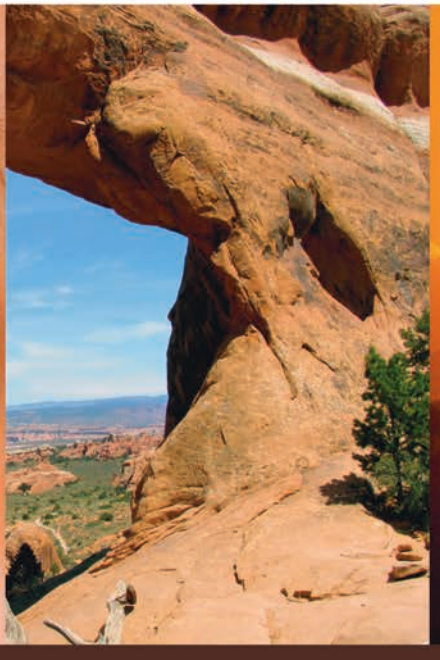
ATTAINMENT'S

Early Science
Implementation Guide

Bree Jimenez • Victoria Knight • Diane Browder

The Five Senses | The Rock Cycle | Earth and Sky | The Life Cycle

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ABOUT THE AUTHORS

Bree A. Jimenez, PhD, is an assistant professor of special education at the University of North Carolina, Greensboro. Dr. Jimenez has worked in the field of low-incidence disability for over 15 years, designing research on general curriculum access, writing textbook chapters, developing curricula, and creating content standards for state departments.

Dr. Jimenez works nationally through state departments of education and school systems conducting in-service for teachers, parents, and service providers of students with moderate-to-severe disabilities on assessment and general curriculum access. Her work focuses on general curriculum access, specifically math and science, for students with intellectual disabilities, including autism.

Victoria F. Knight, PhD, is an assistant professor in the Department of Special Education and Rehabilitation Counseling at the University of Kentucky, Lexington. Dr. Knight has over 10 years of experience working with students who have autism spectrum disorder (ASD) and students with moderate-to-severe disabilities.

Dr. Knight's research interests include general curriculum access, evidence-based practices for individuals with ASD and moderate-to-severe disabilities, applied behavior analysis, and technologies for students with autism. Dr. Knight has authored book chapters and publications pertaining to these topics, and has presented her research at state and national conferences.

Diane Browder, PhD, is the Lake and Edward P. Snyder Distinguished Professor of Special Education at the University of North Carolina, Charlotte. Dr. Browder has over two decades of research and writing on assessment and instruction for students with severe developmental disabilities. She received the 2009 Distinguished Researcher Award from the AERA Special Education SIG and the 2009 First Citizens Bank Scholar Award at the University of North Carolina, Charlotte. She currently serves as principal investigator for the IES What Works Clearinghouse review of research in intellectual disabilities. In 2011, Dr. Browder was recognized by the state of North Carolina with the O. Max Gardner Award for research that has made a contribution to humanity.

The authors express their gratitude to the teachers at the Charlotte-Mecklenburg Schools for their help in field-testing Early Science; Thai Williams for her help in developing the special accommodations; and Bethany Smith and Alicia Saunders for their assistance in creating materials.

OVERVIEW

Early Science is a researched curriculum for elementary-age students who have developmental disabilities, including those with moderate-to-severe intellectual disabilities, those with multiple disabilities (such as deaf/blind), and some students with autism. The purpose of *Early Science* is to provide a curriculum guide for teaching science that aligns to elementary-level content standards in science. The content of *Early Science* was taken directly from elementary general science standards. It is cross-referenced to the most frequently occurring science standards in multiple states, and was developed in collaboration with national experts in science education. These science experts also validated that the content of *Early Science* is aligned with targeted science constructs. The content emphasizes Earth and space science, life science, physical science, and inquiry.

When using *Early Science,* students are provided with access to science content that has been streamlined and prioritized, thereby giving an opportunity to learn grade level *content* but with alternate *achievement. Early Science* can be used in a variety of educational contexts. When embedding this instruction in general education, the teacher may use one or more components of the lesson. For example, Jimenez, Browder, Spooner, and DiBiase (2012) embedded time-delay training of science vocabulary, science concept statements, and the use of the KWHL Chart within inclusive classrooms. Similarly, the explicit instruction may be used to help students know how to describe science phenomena. Or, the Wonder Story may be used to augment readings from the general textbook.

Early Science is based on a conceptual model of science inquiry. The experiments are engaging for elementary-age students and give all students, even those with the most significant disabilities, the opportunities to engage with science concepts. All lessons follow a task analysis which guides instructors in the chain of student responses that helps students complete the activity. Lesson scripts are provided and are grounded in the research foundation of systematic instruction. The scripts also guide the instructor to use instructional methods (e.g., time-delay procedure, model-lead-test procedure, least intrusive prompts) considered evidence-based practice for teaching students with developmental disabilities.

The curriculum consists of four units focusing on the five senses, the rock cycle, Earth and space, and the life cycles of plants and animals. The first unit, which focuses on the five senses, teaches students the process of science inquiry using their senses. Students use these skills throughout the other units. After teaching these units, you will find you can use the same format to introduce other content from the science standards in your state. The Scope and Sequence (pp. 6–9) summarizes the content for each of the units.

SCOPE AND SEQUENCE

Unit One					
Lesson	**Wonder Story**	**Wonder Question**	**Concept Statement**	**Vocabulary**	**Concept Development**
1 Science and Scientists	Questions	Who can do science?	A _____ asks questions about the natural world. (scientist)	science, scientist	scientist
2 Sight	After the Rain	What makes the rainbow's colors?	We can _____ colors and sizes. (see)	see, colors, sizes	see; colors: red, orange, yellow, green, blue, violet; sizes: large, small
3 Touch	Hide and Seek	How do I feel things?	We can _____ textures and shapes. (feel)	feel, textures, shapes	textures: soft, smooth, rough; shapes: circle, square, triangle
4 Smell and Taste	Mmm . . . That Smells Good!	How do I smell? How do I taste?	We can _____ odors and _____ flavors. (smell, taste)	smell, taste	smell; taste: sour, sweet, salty
5 Hearing	The Noisy World Around Me	How do I hear?	We can _____ sounds. (hear)	hear, sounds	sounds: loud, soft
6 My Five Senses	Walking in the Woods	What are my five senses?	We can observe properties with our five _____. (senses)	senses, observe	N/A

(Table continues)

Unit Two

Lesson	Wonder Story	Wonder Question	Concept Statement	Vocabulary	Concept Development
1 Rocks	Crunch	Are rocks different?	_____ are different. (Rocks)	rocks, different	rocks, different
2 More About Rocks	What Makes a Rock?	Is there something inside a rock?	Rocks are made of _____. (minerals)	minerals, inside	mineral, inside
3 How Rocks Are Made	So Many Rocks!	Do rocks change?	Rocks _____ to make new rocks. (change)	change Review: different	change
4 Soils	Worms and More Worms	What is soil made of?	Soil is made of _____ things. (different)	soil Review: different	soil, different
5 Land	The Great Outdoors	What is land made of?	All _____ has rocks and soil. (land)	land, same	land, same
6 Erosion	Wow! Wonderful Weather!	What changed the land?	_____ and _____ change the land. (Wind, water)	wind, water, erosion Review: land	Review: change

(Table continues)

SCOPE AND SEQUENCE *(continued)*

Unit Three					
Lesson	**Wonder Story**	**Wonder Question**	**Concept Statement**	**Vocabulary**	**Concept Development**
1 Life on Earth	The Greatest Planet	Where do I live?	We live on the _____. (Earth)	Earth	on, off
2 The Sun and the Moon	Something in the Sky	What do I see in the night sky?	The _____ and _____ are in the sky. (sun, moon)	sun, moon Review: Earth	round
3 Phases of the Moon	The Changing Moon	Does the moon change shape?	We can see the moon in the _____ sky. (night)	night Review: moon	full moon, night
4 The Function of the Sun	Fun in the Sun	Where does light come from?	The sun gives the Earth sunlight during the _____. (day)	sunlight, day	light, dark, day
5 Sunlight	Beams of Light	Why is there no sunlight at night?	The sun gives the Earth _____ during the day. (sunlight)	Review: sunlight, day	Review: day, night, light, dark
6 The Sun's Energy	A Hot Summer Day	What made me so hot?	The sun's heat is a form of _____. (energy)	heat, energy	heat

(Table continues)

Unit Four

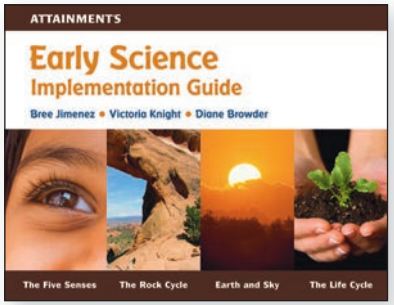
Lesson	Wonder Story	Wonder Question	Concept Statement	Vocabulary	Concept Development
1 Life and Living	Life on Earth	Does anything else live on Earth?	_____ and _____ live on the Earth. (Plants, animals)	plants, animals Review: change	on, off
2 Animal Life Cycles	My Dog Lucy	Do animals go through changes?	Animals and plants grow and _____. (change)	life cycle Review: change, animals	change
3 Plant Life Cycles	Grandma's Garden	Do plants change as they grow?	Animals and plants _____ and change. (grow)	grow Review: plants, life cycle	grow
4 Living Things	Movin' and Shakin'	How can I tell if something is living?	Plants and animals are _____. (living)	living Review: animals, plants	living
5 Animals	The Garden Rabbit	Why did the rabbit eat the garden?	Animals _____ plants. (need)	need Review: animals, plants, living	need
6 Decaying Matter	The Circle of Life	Do plants and animals stop living?	When animals and plants are dead, they _____. (decay)	dead, decay Review: living, change	living, dead

EARLY SCIENCE MATERIALS

Early Science comes with everything you need to get started teaching science concepts (except common items you have in your home or classroom).

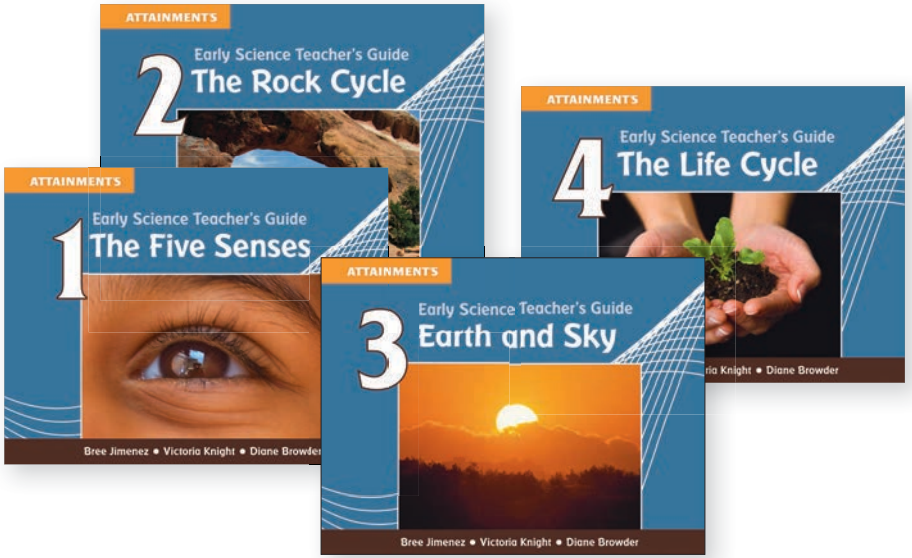
Implementation Guide

Describes the Scope and Sequence, research outcomes, how to teach using the curriculum, how to monitor students' progress, and appendixes referred to in the lessons.



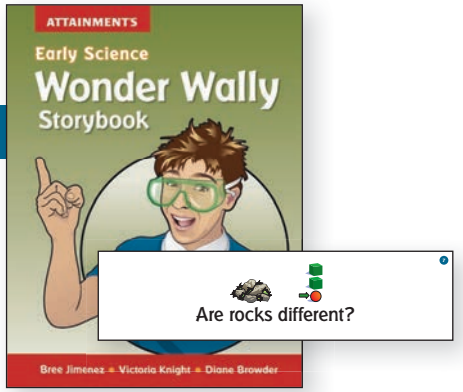
Teacher Guides with Scripted Lessons

Includes scripted lessons for each science unit.



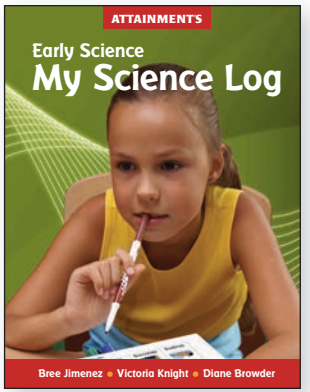
Wonder Wally Storybook

An engaging story gets students thinking about the science concept of the lesson. Wonder Question Cards begin the inquiry process.



My Science Log

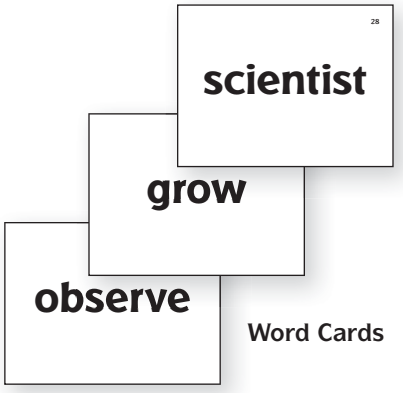
Each student keeps an individual science log of his or her own.



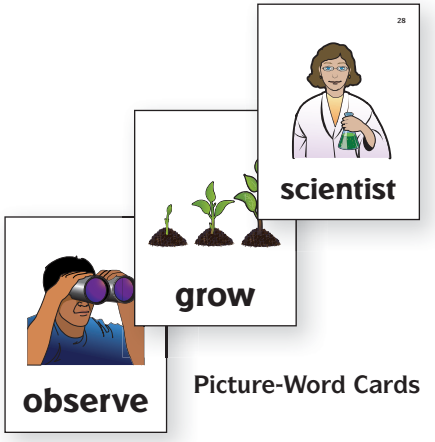
CD

Includes PDFs of the *Implementation Guide* and *My Science Log* for convenient printing from your computer.

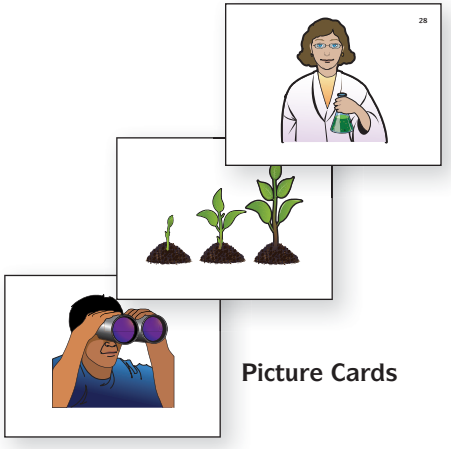
Lesson Materials



Word Cards



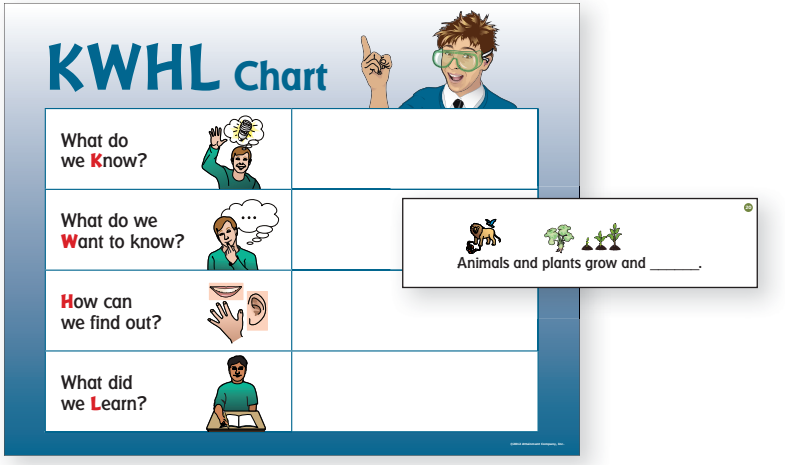
Picture-Word Cards



Picture Cards

Photo Cards

Wonder Wally Game



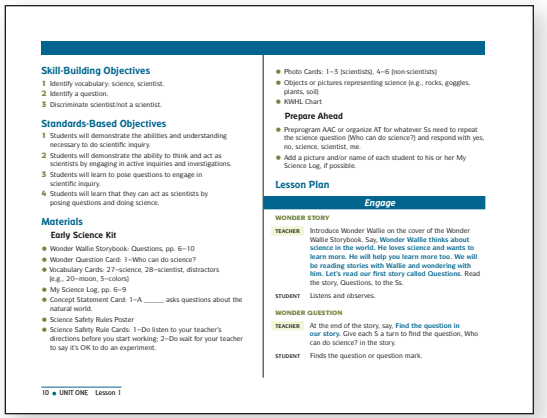
KWHL Chart and Concept Statement Cards

Science Safety Rule Poster and
Science Safety Rule Cards

Velcro tabs to adhere
cards to posters

USING THE EARLY SCIENCE CURRICULUM

As described earlier, there are four units of study in *Early Science:* The Five Senses, The Rock Cycle, Earth and Sky, and The Life Cycle. Each unit has six lessons emphasizing the "big ideas" of the unit, and a seventh lesson, which is a review of all unit concepts and vocabulary.



Skill-Building Objectives

1 Identify vocabulary: science, scientist.
2 Identify a question.
3 Discriminate scientist/not a scientist.

Standards-Based Objectives

1 Students will demonstrate the abilities and understanding necessary to do scientific inquiry.
2 Students will demonstrate the ability to think and act as scientists by engaging in active inquiries and investigations.
3 Students will learn to pose questions to engage in scientific inquiry.
4 Students will learn that they can act as scientists by posing questions and doing science.

Materials

Early Science Kit

- Wonder Wallie Storybook: Questions, pp. 6–10
- Wonder Question Card: 1–Who can do science?
- Vocabulary Cards: 27–science, 28–scientist, distractors (e.g., 20–moon, 3–colors)
- My Science Log, pp. 6–9
- Concept Statement Card: 1–A _____ asks questions about the natural world.
- Science Safety Rules Poster
- Science Safety Rule Cards: 1–Do listen to your teacher's directions before you start working; 2–Do wait for your teacher to say it's OK to do an experiment.
- Photo Cards: 1–3 (scientists), 4–6 (non-scientists)
- Objects or pictures representing science (e.g., rocks, goggles, plants, soil)
- KWHL Chart

Prepare Ahead

- Preprogram AAC or organize AT for whatever Ss need to repeat the science question (Who can do science?) and respond with yes, no, science, scientist, me.
- Add a picture and/or name of each student to his or her My Science Log, if possible.

Lesson Plan

Engage

WONDER STORY

TEACHER Introduce Wonder Wallie on the cover of the Wonder Wallie Storybook. Say, **Wonder Wallie thinks about science in the world. He loves science and wants to learn more. He will help you learn more too. We will be reading stories with Wallie and wondering with him. Let's read our first story called Questions.** Read the story, Questions, to the Ss.

STUDENT Listens and observes.

WONDER QUESTION

TEACHER At the end of the story, say, **Find the question in our story.** Give each S a turn to find the question, Who can do science? in the story.

STUDENT Finds the question or question mark.

10 ● UNIT ONE Lesson 1

All lessons list the Skill-Building Objective as well as the Standards-Based Objective the lesson is aligned to. Materials needed for the lesson are listed. Some are provided but there are other, more common, materials you will need to gather. Some lessons also require you to prepare items ahead of teaching the lesson, especially preprogramming of alternative/augmentative communication (AAC) devices or other assistive technologies that will allow students to actively engage in the science activity. Lessons are designed to be repeated, and ideas are listed for repeated lessons.

Teaching components are repeated across all units and lessons. These include:

1. Guided inquiry
2. Scripted lessons
3. Wonder Story
4. Science safety
5. Explicit Instruction of vocabulary and concepts (using time-delay procedure, least intrusive prompting system, example/non-example procedure)
6. Task analysis summary
7. Special accommodations

Guided Inquiry

Each of the six lessons in a unit follows a sequence of guided inquiry, which is to engage, investigate, describe, explain, and report:

1. Students **engage** with the Wonder Story and they learn specific vocabulary for the lesson.
2. Students **investigate** the topic of the lesson, make predictions about the outcome of the experiment, and conduct the experiment that helps them experience the concept being taught.
3. Students **describe** concepts and attributes of the science materials and the experiment.
4. Students **explain** what they found by reviewing their predictions and sharing their science discoveries.
5. Finally, students **report** their findings using their science logs.

By using guided inquiry, students learn "how to learn" about their natural world. All scripts guide you through teaching the inquiry process.

Table 2 describes how *Early Science* embeds the guided inquiry elements within each unit. The essential features of inquiry listed in the first column are based on the science standards of the National Research Council (2002).

Over the course of the four units, students also develop inquiry skills by posing and answering questions during the lessons. This is

TABLE 2 Guided Inquiry Process in Early Science

Essential Features of Inquiry	Step	Early Science Activity	UNIT ONE The Five Senses	UNIT TWO The Rock Cycle	UNIT THREE Earth and Sky	UNIT FOUR The Life Cycle
The learner engages in scientifically oriented questions.	Engage	Students listen to a science wonder story read aloud; the story introduces the science question.	Students learn to identify the question (?) and point to the text as it is read.	Students identify the question and point to the text as it is read.	Students point to the question text as it is read, then complete the missing word in the question.	Students point to the question text as it is read, then complete the missing word in the question.
The learner gives priority to evidence in responding to a question.	Investigate	Students make a prediction about the science question and then conduct a hands-on science activity.	Students select a logical option as a prediction, given choices.	Students select a logical option as a prediction, given choices.	Students generate a prediction statement.	Students generate a prediction statement.
The learner formulates explanations from evidence.	Describe	Students identify attributes of science materials.	Students use their senses to explore by color, shape, size, texture, odor, taste, and sound. Students discriminate between yes and no.	Students discriminate between yes and no and demonstrate understanding of concepts: rocks, mineral, change, different, same, inside, soil, and land.	Students discriminate between yes and no and demonstrate understanding of concepts: on, off, round, day, night, light, dark, full moon, and heat.	Students discriminate between yes and no and demonstrate understanding of concepts: grow, plants, animals, living, need, and dead (and review on, off, same, different, and change).

(Table continues)

TABLE 2 *(continued)*

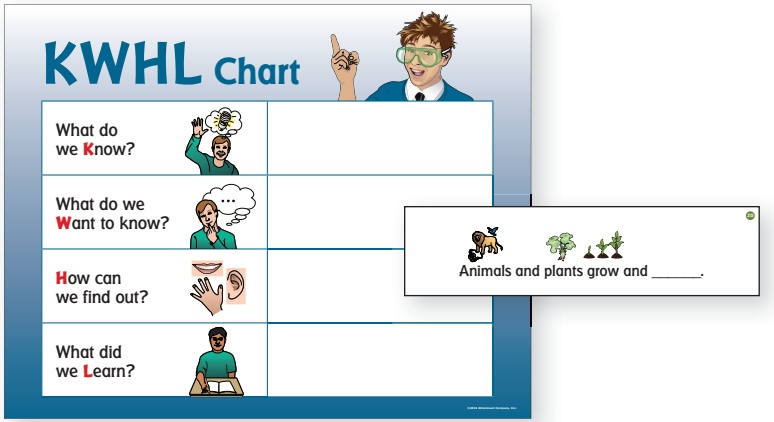
Essential Features of Inquiry	Step	Early Science Activity	UNIT ONE The Five Senses	UNIT TWO The Rock Cycle	UNIT THREE Earth and Sky	UNIT FOUR The Life Cycle
Learner connects explanations to scientific knowledge.	Explain	Students review their predictions, identify their scientific findings, and make connections.	Students accept or reject their predictions.	Students accept or reject their predictions.	Students match their predictions to the scientific findings and correct predictions if needed.	Students complete a scientific finding statement, match it to their predictions, and correct prediction if needed.
Learner communicates and justifies explanation.	Report	Students complete concept statements.	Students complete six concept statements.	Students complete six concept statements.	Students complete six concept statements and justify their responses (I know this because _____).	Students complete six concept statements and justify their responses (I know this because _____).

TABLE 3 KWHL Chart

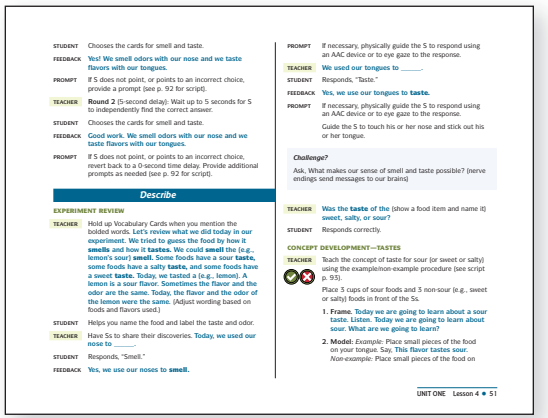
	Unit 1	Unit 2	Unit 3	Unit 4
KWHL Chart **K** What do we **K**now? **W** What do we **W**ant to know? **H** **H**ow can we find out? **L** What did we **L**earn?	The teacher models L.	Teacher models W and directs students for L.	Teacher models K and H and directs students for W and L.	Teacher directs students for K, W, H, and L.

achieved through use of a graphic organizer, the KWHL Chart, and various cards (attached to the chart using the Velcro® tabs).

Table 3 shows how the inquiry questions of the KWHL Chart develop across the four units. The KWHL Chart allows students to self-direct their learning and builds self-determinations skills. These self-determination skills will carry over into later school years as well as to other subject areas (e.g., English/Language Arts).



Scripted Lessons

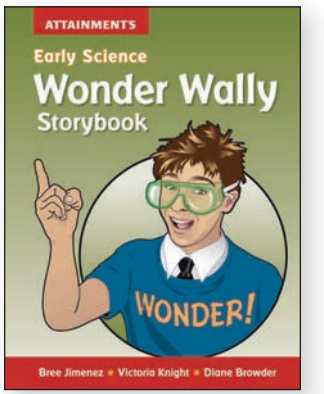


Lessons in *Early Science* are scripted to make them easier to teach and to minimize your teaching preparation. The teacher script is color-coded in blue to allow for ease of reading. To prepare to teach an *Early Science* lesson, look over the script to become familiar with the format. Lesson vocabulary is bolded to draw attention to additional opportunities for building meaning during the lesson. The format of the lesson clearly lists the expected, independent student response, but it also describes how to prompt students who may not respond independently and therefore need prompting.

Lessons should be repeated multiple times. Teachers in the pilot study repeated each lesson every day for a week and taught science four to five days per week. Students will benefit from this repetition to learn the science concepts. By the last day of teaching a lesson multiple times, the students will participate more independently in the science experiment and in the vocabulary and concept development. However, if students are responding correctly and independently to items in the Student Report, you can move on to the next lesson with fewer repetitions.

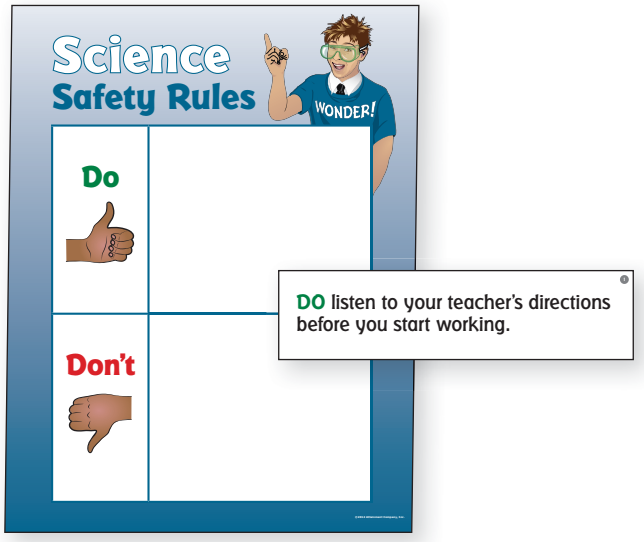
Wonder Stories

At the beginning of each lesson, a story is read from the Wonder Wally Storybook. This story and Wonder Wally help to make the science concept have real-life meaning. The stories are written to be engaging for elementary students. To begin each lesson, read the story aloud showing the illustrations as you read. End by having the students find the wonder question and then have students help you read the text on the corresponding Wonder Question Card. This question helps students become quiet for the lesson and sets up the inquiry focus.



Science Safety

Safety is an important component in all science lessons. Students need to understand that inquiry-based science activities allow them to explore the world around them, but to do that, they must think about the materials they will be working with and remain safe at all



times. Six of the following science rules are introduced in Unit One, and rule 7 is introduced in Unit Two:

1. Do listen to your teacher's directions before you start working.
2. Do wait for your teacher to say it's OK to do an experiment.
3. Don't put any materials used in the experiment on yourself or others.
4. Do wait for your teacher to say it's OK to touch the science materials.
5. Don't eat or drink science materials unless your teacher says it's OK.
6. Don't smell science materials unless your teacher says it's OK.
7. Do protect your eyes when your teacher tells you to.

These rules are reviewed and highlighted in lessons where specific safety is appropriate. At least one science rule is included in each lesson and is reviewed in the Investigate portion of the lesson. The teaching script is provided to describe why a particular rule is important. A blank Science Safety Poster and Science Safety Rule Cards are provided. Mount the poster on a wall in your classroom and then use the Velcro tabs to attach the lesson's Science Safety Rule Card(s) to it. Students are asked to help post the Science Safety Rule Card on the poster, which then serves as a visual reminder of safety as students participate in the experiments.

Explicit Instruction of Vocabulary and Concepts

After the Wonder Story is read, the lesson script provides guidance for teaching the science vocabulary and concepts. Students with developmental disabilities often lack this vocabulary. To be able to talk about what they learn, students need to acquire these terms and concepts. These vocabulary terms and concepts require explicit instruction, and this instruction should be taught at a brisk pace with rapid student turns. The student's interest in the lesson will wane if this section of the lesson is too slow. Three evidenced-based explicit instruction practices are built into the scripts to teach vocabulary and concepts:

1. The time-delay procedure
2. The system of least intrusive prompts
3. The example/non-example procedure

These procedures are abbreviated in the lesson plans, so it is important to take time before teaching the lessons to learn the expanded scripts for the procedures. The full, expanded scripts are included at the end of every unit.

Time-Delay Procedure

The time-delay procedure is a method of systematic prompting and fading of a prompt using small increments of time. The teaching of science vocabulary and science concepts (concept statements) uses time delay as a method of instruction. The rationale for using a time-delay procedure is that it suppresses errors. The time-delay procedure is an evidenced-based practice (Jameson, McDonnell, Polychronis, & Ruesen, 2008; Spooner, Knight, Browder, Jimenez, & DiBiase, 2011).

For vocabulary teaching using the time-delay procedure, several versions of Vocabulary Cards are provided: Picture-Word Cards (with picture and text), Picture Cards (with picture only), and Word Cards (with text only). Based on your students' needs, use the Vocabulary

Cards that are appropriate. Use the Picture-Word Cards for your students who are emerging readers; use the Word Cards with students who are reading.

The Vocabulary Cards are presented in rounds:

- Round 1 is 0-second time delay for prompting and is considered a warm-up round. There should be no errors in this round (unless the student refuses to respond or cannot initiate a response). When the student is comfortable and successful at 0-second time delay, move on to Round 2.
- Round 2 provides students with the opportunity to respond independently. In Round 2, give the student up to 5 seconds (or whatever time you select) to respond before giving a prompt. If the student is unsuccessful at a 5-second time delay, return to Round 1 (0-second time delay).
- If you are using the Word Cards, also use a round of the time-delay procedure where students match the Word Card to the Picture Card (see the expanded script at the end of any unit for more information).

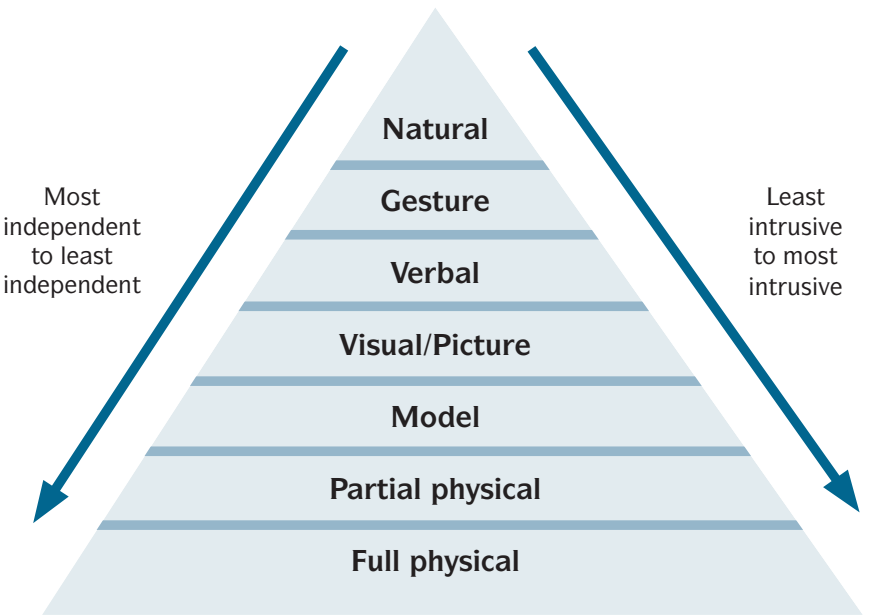
When using the time-delay procedure, you will want to consider these questions for each student:

1. What type of response do you want from the student: Point to the answer? Pull a card from a choice board? Eye gaze to the answer?
2. To respond, will the student use receptive only or receptive and expressive responding: Point to the answer only? Point to the answer and say it? Use an AAC device to respond?
3. If the student requires a prompt, what type of model will you give (e.g., if the student is to say it while pointing to the word, model saying the word while pointing to it; if the student is to point only, model pointing)?
4. How many "warm up" trials will you give at 0-second time delay?
5. How long will you wait before prompting the student for Round 2: 5 seconds? Or work progressively starting with 8 seconds, then 6 seconds, then 4, etc.?

System of Least Intrusive Prompts

A system of least intrusive prompts (LIP) is used in *Early Science*. This system is an evidenced-based practice (Browder et al., 2012; Spooner, Knight, Browder, & Smith, 2011; Mims, Browder, & Spooner, 2010; Mims, Hudson, & Browder, in press) that places prompts given to students into a hierarchy from the least intrusive and most independent (e.g., giving a natural cue) to the most intrusive and least independent (physically guiding the student to respond). Figure 1 illustrates this hierarchy.

FIGURE 1 Least Intrusive Prompt Hierarchy



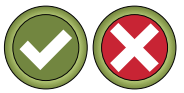
To use LIP, first encourage the student to show what he or she knows independently; if the student does not respond within the wait time you have established, use the least intrusive prompt in the hierarchy to prompt him or her. Examples of each type of prompting are given in Table 4, and the hierarchy is included at the end of every unit for your reference.

This system encourages correct and independent responding and it decreases praise as the learner responds to natural cues. For each step of the prompting hierarchy, if there is no response or an incorrect response from the student, continue to the next level of prompting. You may not need to use the entire prompt hierarchy every time. For instance, for the student in the example, he may first need a natural cue, then a verbal prompt, and finally, a model prompt.

Consider the following information when deciding how to prompt individual students:

1. Which prompts will the prompt hierarchy consist of?
2. What should the wait time be before prompting?
3. What will your error correction procedure be?
4. How will you reinforce the student?

Example/Non-example Procedure



During the inquiry-based science lesson, there are opportunities for students to learn the descriptors and concepts they need to be able to talk about the science materials and experiments. Explicit instruction using a model-lead-test format is written into the lesson plan script and is referred to as the example/non-example procedure. This evidenced-based procedure described by experts in explicit instruction (Archer & Hughes, 2011; Bursuck & Damer, 2011; Englemann & Carnine, 1991; Kaméenui & Simmons, 1990) is an evidenced-based practice for students with disabilities as well

Table 4 Examples of Prompts in a Least Intrusive Prompt

Task: The student is to write an answer on the line in this science concept statement in his science log: All soils are _____. (The student is able to write independently.)	
1st prompt: Natural Cue ↓	The student has not responded so the teacher asks, "What do you think?"
2nd prompt: Gesture ↓	The student has still not responded, so the teacher points to the statement and the blank.
3rd prompt: Verbal ↓	The student has still not responded, so the teacher says, "Fill in the answer in your report."
4th prompt: Visual/Picture ↓	The student has still not responded, so the teacher shows a picture of different soils.
5th prompt: Model ↓	The student has still not responded, so the teacher models by writing the word *different* below the line.
6th prompt: Partial Physical ↓	The student has still not responded, so the teacher guides the student from the elbow to fill in the answer.
Last prompt: Full Physical	The student has still not responded, so the teacher uses hand-over-hand assistance to help the student write the word *different* on the line.

(Knight, 2010; Knight, Smith, Spooner, Jimenez, & Browder, in press). The example/non-example procedure is abbreviated in the scripts so it is important to take some time before teaching the lessons to learn it.

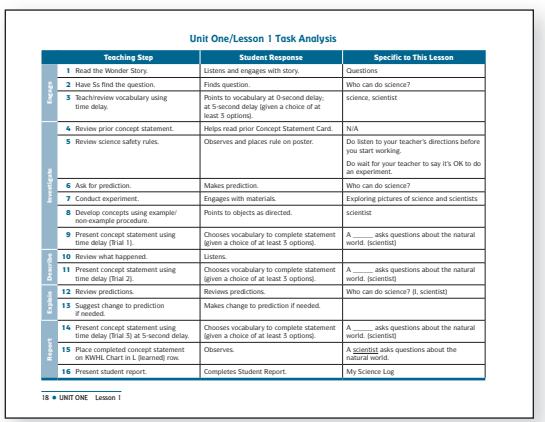
There are three related scripts:

1. Concept development using the example/non-example procedure
2. Concept development using the example/non-example procedure with a yes/no response
3. Concept development: Teaching a yes/no response for the example/non-example procedure

The first two expanded scripts can be found at the ends of Units Two, Three, and Four. The third script is used to initially teach students to use a yes/no response; this script uses objects that are familiar to the student so learning to use a yes/no response can be the focus. This procedure is first used in Unit One, so this script can be found at the end of Unit One.

Task Analysis Summary

Since lessons are repeated and lessons in a unit follow an identical sequence, you may find it easier to use the Lesson Task Analysis summary found at the end of each lesson when teaching the lessons. Over time, the scripts will become automatic to you and just knowing the specifics within a lesson may make it easier for you to conduct a lesson.



Unit One/Lesson 1 Task Analysis

	Teaching Step	Student Response	Specific to This Lesson
Engage	1 Read the Wonder Story.	Listens and engages with story.	Questions
	2 Have Ss find the question.	Finds question.	Who can do science?
	3 Teach/review vocabulary using time delay.	Points to vocabulary at 0-second delay; at 5-second delay (given a choice of at least 3 options).	science, scientist
Investigate	4 Review prior concept statement.	Helps read prior Concept Statement Card.	N/A
	5 Review science safety rules.	Observes and places rule on poster.	Do listen to your teacher's directions before you start working. Do wait for your teacher to say it's OK to do an experiment.
	6 Ask for prediction.	Makes prediction.	Who can do science?
	7 Conduct experiment.	Engages with materials.	Exploring pictures of science and scientists
	8 Develop concepts using example/non-example procedure.	Points to objects as directed.	scientist
	9 Present concept statement using time delay (Trial 1).	Chooses vocabulary to complete statement (given a choice of at least 3 options).	A _____ asks questions about the natural world. (scientist)
Describe	10 Review what happened.	Listens.	
	11 Present concept statement using time delay (Trial 2).	Chooses vocabulary to complete statement (given a choice of at least 3 options).	A _____ asks questions about the natural world. (scientist)
Explain	12 Review predictions.	Reviews predictions.	Who can do science? (I, scientist)
	13 Suggest change to prediction if needed.	Makes change to prediction if needed.	
Report	14 Present concept statement using time delay (Trial 3) at 5-second delay.	Chooses vocabulary to complete statement (given a choice of at least 3 options).	A _____ asks questions about the natural world. (scientist)
	15 Place completed concept statement on KWHL Chart in L (learned) row.	Observes.	A scientist asks questions about the natural world.
	16 Present student report.	Completes Student Report.	My Science Log

18 ● UNIT ONE Lesson 1

Special Accommodations

Each lesson describes how to prepare any special accommodations an individual student may need. The accommodations are important to make so all students can actively participate in the science lesson. Special accommodations should address the needs of students who may be nonverbal, those who need more support, those who do not access picture symbols or are building their understanding of symbols, or those who have hearing and/or visual impairments. Remember, students should always be assessed in the same manner in which the materials and concepts are presented during the lessons (e.g., during the lesson, the student grasps the mineral from a set of 3 objects to complete the concept statement, Rocks are made of _____, and so testing should also use objects).

Assistive Technology

Providing students with assistive technology (AT) options is so vital during instruction and while assessing students with significant cognitive disabilities. This allows students to have the best chance at "showing what they know" and being active participants (versus passive) in the learning process. AT comes in many different forms and refers to "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability" (IDEA, 2004, Sec. 620[1]). It is also important to consider AT options for students with visual and/or hearing impairments (e.g., amplifiers for students with hearing impairments, light boxes for students with visual impairments). AT includes preprogramming alternative/augmentative communication (AAC) devices, providing enlarged images, or providing options for students who eyegaze as their form of response.

Deaf/Blind Students

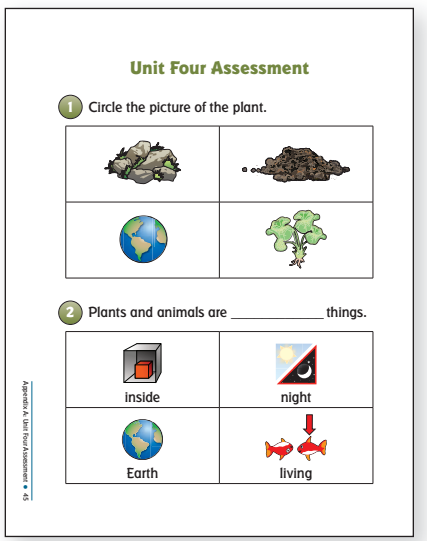
Students with dual sensory impairments (deaf/blind) participate in the classroom curriculum. For this population of students, it

is important to remember to help students be as successful as possible. It is rare when a student truly has no vision or hearing, thus finding the student's strength is crucial. If the student has more vision than hearing, then instruction of academic content should be presented in a format that is conducive to this strength (e.g., enlarged text paired with pictures or objects, a light box to highlight materials). If the student has more hearing than vision, then provide instruction using more of an auditory format (e.g., book on tape), but don't forget to include information students can receive tactually.

Monitoring Progress Using Early Science Assessments

Early Science assessments should be used throughout instruction to assess a student's acquisition and maintenance of skills. Assessment is conducted in two ways:

1. **Student Report.** Each lesson includes a Student Report in each student's My Science Log that can be used to track students' mastery of vocabulary and concepts within each lesson. A PDF version of My Science Log is provided on the CD for convenient printing of additional copies of the Student Report.
2. **Unit Assessments.** Unit assessments allow students to demonstrate retention of the unit's vocabulary and "big ideas." These assessments are found in Appendix A and on the CD for convenient printing.


Unit Four Assessment

1 Circle the picture of the plant.

2 Plants and animals are _____ things.

inside

night

Earth

living

Appendix A: Unit Four Assessment • 43

While most students are able to complete the Student Reports and unit assessments by pointing to or circling the correct answer, remember to make special accommodations for individual students as needed. The goal is to help students "show what they know" as they participate in the assessment. All students should be given an opportunity to participate in the assessments on a daily and unit basis.

Remember that the Student Reports are a part of the lesson, but they are also a great way to provide students with additional support in learning the "big ideas" of the lesson and can be given as a "test." The Student Report may also be completed as a small group activity to measure what information students are still working on acquiring.

A student's progress can be tracked using the Progress Monitoring Form (found in Appendix B and on the CD). This form is filled out per individual student. Enter data on the form that reflects the number of the student's correct and independent responses to the Student Report at the end of each lesson and the end of Unit Assessment data.

Although this Progress Monitoring Form allows you to record and track individual student data, it also allows you to make instructional decisions about when students are ready to move on to the next lesson within a unit. Note that not all students will score at 100% on the skills, so it is important to look for growth over several days of instruction, but continue to progress through the lessons at a brisk pace. You are encouraged to teach lessons multiple times to ensure that students are gaining generalizable skills rather than just "exposure" to the content and big ideas of the lessons. However, do not teach a lesson any more than five instructional days.

In the following example, the teacher has already completed Lessons 1, 2, and 3 (that data was recorded on another progress sheet). The teacher is now teaching the final three lessons of Unit Two. Jamie's teacher only taught Lesson 4 twice each because the data suggested

Progress Monitoring Form

Student Name Jamie Teacher _____

Unit Two Accommodations _____

Directions: Enter the number of independent correct responses from the Student's Report for each lesson or from his or her Unit Assessment.

	Date 10/15	Date 10/16	Date 10/17	Date 10/18	Date 10/22	Date 10/23	Date 10/24	Date 10/28	Date 10/29
Lesson 1									
Lesson 2									
Lesson 3									
Lesson 4	4/5	5/5							
Lesson 5			3/5	4/5	5/5				
Lesson 6						2/5	4/5	4/5	
Unit Assessment									10/12 (83%)

that Jamie was ready to move onto Lesson 5 (i.e., Jamie answered 5/5 questions correctly after the second day of Lesson 4).

The teacher taught Lesson 5 three times, and Jamie also did well independently responding correctly to 5 of 5 items in the Student Report. The teacher moved on to Lesson 6, etc. Jamie then took the unit assessment and scored 83% (10/12) independent correct responses.