SHELL EDUCATION

Leveled Texts for Science

Earth and Space Science

Table of Contents

What Is Differentiation?

Over the past few years, classrooms have evolved into diverse pools of learners. Gifted students, English language learners, special needs students, high achievers, underachievers, and average students all come together to learn from one teacher. The teacher is expected to meet their diverse needs in one classroom. It brings back memories of the one-room schoolhouse during early American history. Not too long ago, lessons were designed to be one size fits all. It was thought that students in the same grade level learned in similar ways. Today, we know that viewpoint to be faulty. Students have differing learning styles, come from different cultures, experience a variety of emotions, and have varied interests. For each subject, they also differ in academic readiness. At times, the challenges teachers face can be overwhelming, as they struggle to figure out how to create learning environments that address the differences they find in their students.

What is differentiation? Carol Ann Tomlinson at the University of Virginia says, “Differentiation is simply a teacher attending to the learning needs of a particular student or small group of students, rather than teaching a class as though all individuals in it were basically alike” (2000). Differentiation can be carried out by any teacher who keeps the learners at the forefront of his or her instruction. The effective teacher asks, “What am I going to do to shape instruction to meet the needs of all my learners?” One method or methodology will not reach all students.

Differentiation encompasses what is taught, how it is taught, and the products students create to show what they have learned. When differentiating curriculum, teachers become the organizers of learning opportunities within the classroom environment. These categories are often referred to as content, process, and product.

- **Content:** Differentiating the content means to put more depth into the curriculum through organizing the curriculum concepts and structure of knowledge.
- **Process:** Differentiating the process requires the use of varied instructional techniques and materials to enhance the learning of students.
- **Product:** When products are differentiated, cognitive development and the students’ abilities to express themselves improves.

Teachers should differentiate content, process, and product according to students’ characteristics. These characteristics include students’ readiness, learning styles, and interests.

- **Readiness:** If a learning experience aligns closely with students’ previous skills and understanding of a topic, they will learn better.
- **Learning styles:** Teachers should create assignments that allow students to complete work according to their personal preferences and styles.
- **Interests:** If a topic sparks excitement in the learners, then students will become involved in learning and better remember what is taught.

How to Differentiate Using This Product

The leveled texts in this series help teachers differentiate science content for their students. Each book has 15 topics, and each topic has a text written at four different reading levels. (See page 17 for more information.) These texts are written at a variety of reading levels, but all the levels remain strong in presenting the science content and vocabulary. Teachers can focus on the same content standard or objective for the whole class, but individual students can access the content at their instructional levels rather than at their frustration levels.

Determining your students' instructional reading levels is the first step in the process. It is important to assess their reading abilities often so they do not get tracked into one level. Below are suggested ways to use this resource, as well as other resources in your building, to determine students' reading levels.

- **Running records:** While your class is doing independent work, pull your below-grade-level students aside, one at a time. Have them read aloud the lowest level of a text (the star level) individually as you record any errors they make on your own copy of the text. If students read accurately and fluently and comprehend the material, move them up to the next level and repeat the process. Following the reading, ask comprehension questions to assess their understanding of the material. Assess their accuracy and fluency, mark the words they say incorrectly, and listen for fluent reading. Use your judgment to determine whether students seem frustrated as they read. As a general guideline, students reading below 90% accuracy are likely to feel frustrated as they read. There are also a variety of published reading assessment tools that can be used to assess students' reading levels with the running record format.
- **Refer to other resources:** Other ways to determine instructional reading levels include checking your students' Individualized Education Plans, asking the school's resource teachers, or reviewing test scores. All of these resources should be able to give you the further information you need to determine at which reading level to begin your students.

Teachers can also use the texts in this series to scaffold the content for their students. At the beginning of the year, students at the lowest reading levels may need focused teacher guidance. As the year progresses, teachers can begin giving students multiple levels of the same text to allow them to work independently to improve their comprehension. This means each student would have a copy of the text at his or her independent reading level and instructional reading level. As students read the instructional-level texts, they can use the lower texts to better understand the difficult vocabulary. By scaffolding the content in this way, teachers can support students as they move up through the reading levels. This will encourage students to work with texts that are closer to the grade level at which they will be tested.

General Information About the Student Populations

Below-Grade-Level Students

By Dennis Benjamin

Gone are the days of a separate special education curriculum. Federal government regulations require that special needs students have access to the general education curriculum. For the vast majority of special needs students today, their Individualized Education Plans (IEPs) contain current and targeted performance levels but few short-term content objectives. In other words, the special needs students are required to learn the same content as their on-grade-level peers.

Be well aware of the accommodations and modifications written in students' IEPs. Use them in your teaching and assessment so they become routine. If you hold high expectations of success for all of your students, their efforts and performances will rise as well. Remember the root word of disability is ability. Go to the root needs of the learner and apply good teaching. The results will astound and please both of you.

English Language Learners

By Marcela von Vacano

Many school districts have chosen the inclusion model to integrate English language learners into mainstream classrooms. This model has its benefits as well as its drawbacks. One benefit is that English language learners may be able to learn from their peers by hearing and using English more frequently. One drawback is that these second-language learners cannot understand academic language and concepts without special instruction. They need sheltered instruction to take the first steps toward mastering English. In an inclusion classroom, the teacher may not have the time or necessary training to provide specialized instruction for these learners.

Acquiring a second language is a lengthy process that integrates listening, speaking, reading, and writing. Students who are newcomers to the English language are not able to process information until they have mastered a certain number of structures and vocabulary words. Students may learn social language in one or two years. However, academic language takes up to eight years for most students.

Teaching academic language requires good planning and effective implementation. Pacing, or the rate at which information is presented, is another important component in this process. English language learners need to hear the same word in context several times, and they need to practice structures to internalize the words. Reviewing and summarizing what was taught are absolutely necessary for English language learners.

On-Grade-Level Students

By Wendy Conklin

Often, on-grade-level students get overlooked when planning curriculum. More emphasis is usually placed on those who struggle and, at times, on those who excel. Teachers spend time teaching basic skills and even go below grade level to ensure that all students are up to speed. While this is a noble thing and is necessary at times, in the midst of it all, the on-grade-level students can get lost in the shuffle. We must not forget that differentiated strategies are good for the on-grade-level students, too. Providing activities that are too challenging can frustrate these students; on the other hand, assignments that are too easy can be boring and a waste of their time. The key to reaching this population successfully is to find just the right level of activities and questions while keeping a keen eye on their diverse learning styles.

Above-Grade-Level Students

By Wendy Conklin

In recent years, many state and school district budgets have cut funding that has in the past provided resources for their gifted and talented programs. The push and focus of schools nationwide is proficiency. It is important that students have the basic skills to read fluently, solve math problems, and grasp science concepts. As a result, funding has been redistributed in hopes of improving test scores on state and national standardized tests. In many cases, the attention has focused only on improving low test scores to the detriment of the gifted students who need to be challenged.

Differentiating the products you require from your students is a very effective and fairly easy way to meet the needs of gifted students. Actually, this simple change to your assignments will benefit all levels of students in your classroom. While some students are strong verbally, others express themselves better through nonlinguistic representation. After reading the texts in this book, students can express their comprehension through different means, such as drawings, plays, songs, skits, or videos. It is important to identify and address different learning styles. By giving more open-ended assignments, you allow for more creativity and diversity in your classroom. These differentiated products can easily be aligned with content standards. To assess these standards, use differentiated rubrics.

Strategies for Using the Leveled Texts

Below-Grade-Level Students

By Dennis Benjamin

Vocabulary Scavenger Hunt

A valuable prereading strategy is a Vocabulary Scavenger Hunt. Students preview the text and highlight unknown words. Students then write the words on specially divided pages. The pages are divided into quarters with the following headings: *Definition, Sentence, Examples, and Nonexamples.* A section called *Picture* is put over the middle of the chart.

Example Vocabulary Scavenger Hunt

astronomer

Definition a scientist who studies the universe and the objects within it	**Sentence** Astronomers use telescopes to discover new planets.
Examples Nicholas Copernicus; Galileo Galilei; Carl Sagan	**Nonexamples** George Washington; Ludwig van Beethoven; Rosa Parks

This encounter with new vocabulary enables students to use it properly. The definition identifies the word's meaning in student-friendly language. The sentence should be written so that the word is used in context. This helps the student make connections with background knowledge. Illustrating the sentence gives a visual clue. Examples help students prepare for factual questions from the teacher or on standardized assessments. Nonexamples help students prepare for ***not*** and ***except for*** test questions such as "All of these are explorers *except for*…" and "Which of these people is *not* an explorer?" Any information the student was unable to record before reading can be added after reading the text.

Graphic Organizers to Find Similarities and Differences

Setting a purpose for reading content focuses the learner. One purpose for reading can be to identify similarities and differences. This is a skill that must be directly taught, modeled, and applied. The authors of *Classroom Instruction That Works state* that identifying similarities and differences "might be considered the core of all learning" (Marzano, Pickering, and Pollock 2001, 14). Higher-level tasks include comparing and classifying information and using metaphors and analogies. One way to scaffold these skills is through the use of graphic organizers, which help students focus on the essential information and organize their thoughts.

Example Classifying Graphic Organizer

Astronaut/ Cosmonaut	Nation	Major Space Achievement	Date of Achievement	Spacecraft/ Mission
Yuri Gagarin	Soviet Union	First person to travel in space	April 12, 1961	*Vostok 1*
Alan Shepard	United States	First American in space	May 5, 1961	*Freedom 7*
Alexei A. Leonov	Soviet Union	First spacewalk	March 18, 1965	*Voskhod 2*
Neil A. Armstrong	United States	First person on the moon	July 16, 1969	*Apollo 11*

The Riddles Graphic Organizer allows students to compare and contrast the astronauts using riddles. Students first complete a chart you've designed. Then, using that chart, they can write summary sentences. They do this by using the riddle clues and reading across the chart. Students can also read down the chart and write summary sentences. With the chart below, students could write the following sentences: Gagarin and Leonov represented the Soviet Union in space. Neil Armstrong and Alan Shepard walked on the moon.

Example Riddles Graphic Organizer

Who am I?	Gagarin	Shepard	Leonov	Armstrong
I walked on the moon.		x		x
I represented the Soviet Union in space.	x		x	
I was the first person from my nation to explore space.	x	x		
I was a pilot before I became an astronaut.	x	x	x	x
I went into space in 1961.	x	x		

Framed Outline

This is an underused technique that bears great results. Many below-grade-level students have problems with reading comprehension. They need a framework to help them attack the text and gain confidence in comprehending the material. Once students gain confidence and learn how to locate factual information, the teacher can fade out this technique.

There are two steps to successfully using this technique. First, the teacher writes cloze sentences. Second, the students complete the cloze activity and write summary sentences.

Example Framed Outline

On July 21, 1969, the first _____ walked on the moon. His name was Neil _____ . He and astronaut Edwin E. "Buzz" Aldrin Jr. spent more than two hours _____ on the moon. They wore bulky _____ .

Summary Sentences:

On July 21, 1969, U.S. astronauts Neil Armstong and Edwin E. Adrin Jr. became the first humans to step foot on the moon. The Apollo 11 astronauts trained for years before becoming space pioneers.

Modeling Written Responses

A frequent criticism heard by educators is that below-grade-level students write poor

responses to content-area questions. This problem can be remedied if resource and classroom teachers model what good answers look like. While this may seem like common sense, few teachers take the time to do this. They just assume all children know how to respond in writing.

This is a technique you may want to use before asking your students to respond to the comprehension questions associated with the leveled texts in this series. First, read the question aloud. Then, write the question on an overhead and talk aloud about how you would go about answering the question. Next, write the answer using a complete sentence that accurately answers the question. Repeat the procedure for several questions so that students make the connection that quality written responses are your expectation.

English Language Learners

By Marcela von Vacano

Effective teaching for English language learners requires effective planning. In order to achieve success, teachers need to understand and use a conceptual framework to help them plan lessons and units. There are six major components to any framework. Each is described in more detail below.

1. Select and Define Concepts and Language Objectives—Before having students read one of the texts in this book, the teacher must first choose a science concept and language objective (reading, writing, listening, or speaking) appropriate for the grade level. Then, the next step is to clearly define the concept to be taught. This requires knowledge of the subject matter, alignment with local and state objectives, and careful formulation of a statement that defines the concept. This concept represents the overarching idea. The science concept should be written on a piece of paper and posted in a visible place in the classroom.

By the definition of the concept, post a set of key language objectives. Based on the content and language objectives, select essential vocabulary from the text. The number of new words selected should be based on students' English language levels. Post these words on a word wall that may be arranged alphabetically or by themes.

2. Build Background Knowledge—Some English language learners may have a lot of knowledge in their native language, while others may have little or no knowledge. The teacher will want to build the background knowledge of the students using different strategies such as the following:

> **Visuals:** Use posters, photographs, postcards, newspapers, magazines, drawings, and video clips of the topic you are presenting. The texts in this series include multiple primary sources for your use.
>
> **Realia:** Bring real-life objects to the classroom. If you are teaching about the plant life cycle, bring in items such as soil, seeds, roots, leaves, and flowers.
>
> **Vocabulary and Word Wall:** Introduce key vocabulary in context. Create families of words. Have students draw pictures that illustrate the words and write sentences about the words. Also be sure you have posted the words on a word wall in your classroom.

Desk Dictionaries: Have students create their own desk dictionaries using index cards. On one side, they should draw a picture of the word. On the opposite side, they should write the word in their own language and in English.

3. Teach Concepts and Language Objectives—The teacher must present content and language objectives clearly. He or she must engage students using a hook and must pace the delivery of instruction, taking into consideration students' English language levels. The concept or concepts to be taught must be stated clearly. Use the first languages of the students whenever possible or assign other students who speak the same languages to mentor and to work cooperatively with the English language learners.

Lev Semenovich Vygotsky, a Russian psychologist, wrote about the Zone of Proximal Development (ZPD). This theory states that good instruction must fill the gap that exists between the present knowledge of a child and the child's potential. Scaffolding instruction is an important component when planning and teaching lessons. English language learners cannot jump stages of language and content development. You must determine where the students are in the learning process and teach to the next level using several small steps to get to the desired outcome. With the leveled texts in this series and periodic assessment of students' language levels, teachers can support students as they climb the academic ladder.

4. Practice Concepts and Language Objectives—English language learners need to practice what they learn with engaging activities. Most people retain knowledge best after applying what they learn to their own lives. This is definitely true for English language learners. Students can apply content and language knowledge by creating projects, stories, skits, poems, or artifacts that show what they learned. Some activities should be geared to the right side of the brain, like those listed above. For students who are left-brain dominant, activities such as defining words and concepts, using graphic organizers, and explaining procedures should be developed. The following teaching strategies are effective in helping students practice both language and content:

Simulations: Students learn by doing. For example, when teaching about the plant life cycle, you can have students figure out what they would need to grow a plant. First, they need to make a list and collect the necessary items, such as a clay pot or empty milk jug, planting soil, seeds, and water. They can fill the pot or jug with soil and plant a seed. They will need to water the plant daily, and make sure it gets enough sun. Lastly, students can measure and record how much the plant grows in a week, two weeks, or one month.

Literature response: Read a text from this book. Have students choose two people described or introduced in the text. Ask students to create a conversation the people might have. Or, you can have students write journal entries about events in the daily lives of the famous scientists.

Have a short debate: Make a controversial statement such as, "It isn't necessary for humans to explore space." After reading a text in this book, have students think about the question and take a position. As students present their ideas, one student can act as a moderator.

Interview: Students may interview a member of the family or a neighbor in order to obtain information regarding a topic from the texts in this book. For example: What

was the reaction when Apollo 11 astronauts walked on the moon?

5. Evaluation and Alternative Assessments—We know that evaluation is used to inform instruction. Students must have the opportunity to show their understanding of concepts in different ways and not only through standard assessments. Use both formative and summative assessment to ensure that you are effectively meeting your content and language objectives. Formative assessment is used to plan effective lessons for a particular group of students. Summative assessment is used to find out how much the students have learned. Other authentic assessments that show day-to-day progress are: text retelling, teacher rating scales, student self-evaluations, cloze testing, holistic scoring of writing samples, performance assessments, and portfolios. Periodically assessing student learning will help you ensure that students continue to receive the correct levels of texts.

6. Home-School Connection—The home-school connection is an important component in the learning process for English language learners. Parents are the first teachers, and they establish expectations for their children. These expectations help shape the behavior of their children. By asking parents to be active participants in the education of their children, students get a double dose of support and encouragement. As a result, families become partners in the education of their children and chances for success in your classroom increase.

You can send home copies of the texts in this series for parents to read with their children. You can even send multiple levels to meet the needs of your second-language parents as well as your students. In this way, you are sharing your science content standards with your whole second-language community.

Above-Grade-Level Students

By Wendy Conklin

Open-Ended Questions and Activities

Teachers need to be aware of activities that provide a ceiling that is too low for gifted students. When given activities like this, gifted students become bored. We know these students can do more, but how much more? Offering open-ended questions and activities will give high-ability students the opportunities to perform at or above their ability levels. For example, ask students to evaluate scientific topics described in the texts, such as: “Do you think the United States should be continuing space exploration?” or “What do you think our government should do to deal with global warming?” These questions require students to form opinions, think deeply about the issues, and form pro and con statements in their minds. To questions like these, there really is not one right answer.

The generic, open-ended question stems listed below can be adapted to any topic. There is one leveled comprehension question for each text in this book. These question stems can be used to develop further comprehension questions for the leveled texts.

- In what ways did…
- How might you have done this differently…
- What if…

- What are some possible explanations for…
- How does this affect…
- Explain several reasons why…
- What problems does this create…
- Describe the ways…
- What is the best…
- What is the worst…
- What is the likelihood…
- Predict the outcome…
- Form a hypothesis…
- What are three ways to classify…
- Support your reason…
- Compare this to modern times…
- Make a plan for…
- Propose a solution…
- What is an alternative to…

Student-Directed Learning

Because they are academically advanced, above-grade-level students are often the leaders in classrooms. They are more self-sufficient learners, too. As a result, there are some student-directed strategies that teachers can employ successfully with these students. Remember to use the texts in this book as jumpstarts so that students will be interested in finding out more about the science concepts presented. Above-grade-level students may enjoy any of the following activities:

- Writing their own questions, exchanging their questions with others, and grading the responses.
- Reviewing the lesson and teaching the topic to another group of students.
- Reading other nonfiction texts about these science concepts to further expand their knowledge.
- Writing the quizzes and tests to go along with the texts.
- Creating illustrated time lines to be displayed as visuals for the entire class.
- Putting together multimedia presentations about the scientific breakthroughs and concepts.

Tiered Assignments

Teachers can differentiate lessons by using tiered assignments, or scaffolded lessons. Tiered assignments are parallel tasks designed to have varied levels of depth, complexity,

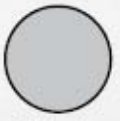
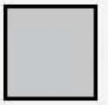
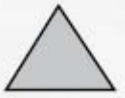
and abstractness. All students work toward one goal, concept, or outcome, but the lesson is tiered to allow for different levels of readiness and performance levels. As students work, they build on their prior knowledge and understanding. Students are motivated to be successful according to their own readiness and learning preferences.

Guidelines for writing tiered lessons include the following:

1. Pick the skill, concept, or generalization that needs to be learned.
2. Think of an on-grade-level activity that teaches this skill, concept, or generalization.
3. Assess the students using classroom discussions, quizzes, tests, or journal entries and place them in groups.
4. Take another look at the activity from Step 2. Modify this activity to meet the needs of the below-grade-level and above-grade-level learners in the class. Add complexity and depth for the above-grade-level students. Add vocabulary support and concrete examples for the below-grade-level students.

How to Use This Product

Readability Chart

Title of the Text	 Star	 Circle	 Square	 Triangle
Jet Streams and Trade Winds	1.9	3.1	4.7	6.5
The Water Cycle	1.6	3.1	4.7	6.5
Tornadoes and Hurricanes	1.8	3.4	4.6	6.7
Structure of the Earth	2.1	3.5	5.2	6.5
Earthquakes and Volcanoes	2.2	3.0	4.9	6.6
Plate Tectonics	2.2	3.5	5.1	7.0
Wegener Solves a Puzzle	2.0	3.5	5.1	6.6
The Rock Cycle	1.8	3.4	4.5	7.1
Fun with Fossils	2.0	3.2	5.0	6.9
The Inner Planets	2.2	3.1	4.8	6.7
The Outer Planets	2.1	3.4	4.9	6.5
Our Place in Space	2.2	3.4	5.2	6.7
Other Citizens of the Solar System	2.1	3.1	5.0	6.9
The Astronomer's Toolbox	2.2	3.4	4.8	6.8
The Journey to Space	1.7	3.1	4.9	6.7

Components of the Product

Primary Sources

- Each level of text includes multiple primary sources. These documents, photographs, and illustrations add interest to the texts. The scientific images also serve as visual support for second language learners. They make the texts more context rich and bring the texts to life.

Comprehension Questions

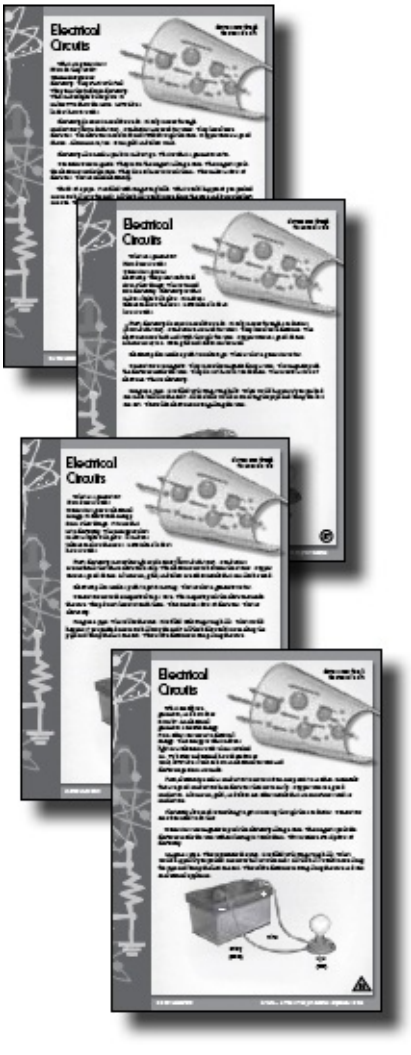
- Each level of text includes one comprehension question. Like the texts, the

comprehension questions were leveled by an expert. They are written to allow all students to be successful within a whole-class discussion. The questions for the same topic are closely linked so that the teacher can ask a question on that topic and all students will be able to answer. The lowest-level students might focus on the facts, while the upper-level students can delve deeper into the meanings.

- Teachers may want to base their whole-class question on the square level questions. Those were the starting points for all the other leveled questions.

The Levels

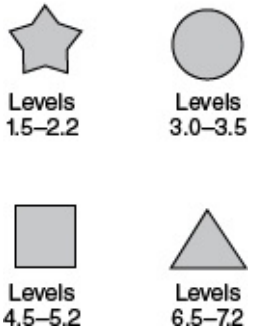
- There are 15 topics in this book. Each topic is leveled to four different reading levels. The images and fonts used for each level within a topic look the same.
- Behind each page number, you'll see a shape. These shapes indicate the reading levels of each piece so that you can make sure students are working with the correct texts. The reading levels fall into the ranges indicated to the left. See the chart at left for specific levels of each.



Leveling Process

- The texts in this series are taken from the *Science Readers* kits published by Teacher Created Materials. A reading expert went through the texts and leveled each one to create four distinct reading levels.

- After that, a special education expert and an English language learner expert carefully reviewed the lowest two levels and suggested changes that would help their students comprehend the texts better.
- The texts were then leveled one final time to ensure the editorial changes made during the process kept them within the ranges described to the left.



Tips for Managing the Product

How to Prepare the Texts

- When you copy these texts, be sure you set your copier to copy photographs. Run a few test pages and adjust the contrast as necessary. If you want the students to be able to appreciate the images, you need to carefully prepare the texts for them.
- You also have full-color versions of the texts provided in PDF form on the CD. (See page 144 for more information.) Depending on how many copies you need to make, printing the full-color versions and copying those might work best for you.
- Keep in mind that you should copy two-sided to two-sided if you pull the pages out of the book. The shapes behind the page numbers will help you keep the pages organized as you prepare them.

Distributing the Texts

Some teachers wonder about how to hand the texts out within one classroom. They worry that students will feel insulted if they do not get the same papers as their neighbors. The first step in dealing with these texts is to set up your classroom as a place where all students learn at their individual instructional levels. Making this clear as a fact of life in your classroom is key. Otherwise, the students may constantly ask about why their work is different. You do not need to get into the technicalities of the reading levels. Just state it as a fact that every student will not be working on the same assignment every day. If you do this, then passing out the varied levels is not a problem. Just pass them to the correct students as you circle the room.

If you would rather not have students openly aware of the differences in the texts, you can try these ways to pass out the materials:

- Make a pile in your hands from star to triangle. Put your finger between the circle and square levels. As you approach each student, you pull from the top (star), above your finger (circle), below your finger (square), or the bottom (triangle). If you do not hesitate too much in front of each desk, the students will probably not notice.

- Begin the class period with an opening activity. Put the texts in different places around the room. As students work quietly, circulate and direct students to the right locations for retrieving the texts you want them to use.
- Organize the texts in small piles by seating arrangement so that when you arrive at a group of desks you have just the levels you need.

Correlation to Standards

The No Child Left Behind (NCLB) legislation mandates that all states adopt academic standards that identify the skills students will learn in kindergarten through twelfth grade. While many states had already adopted academic standards prior to NCLB, the legislation set requirements to ensure the standards were detailed and comprehensive.

Standards are designed to focus instruction and guide adoption of curricula.
Standards are statements that describe the criteria necessary for students to meet specific academic goals. They define the knowledge, skills, and content students should acquire at each level. Standards are also used to develop standardized tests to evaluate students' academic progress.

In many states today, teachers are required to demonstrate how their lessons meet state standards. State standards are used in the development of Shell Education products, so educators can be assured that they meet the academic requirements of each state.

How to Find Your State Correlations

Shell Education is committed to producing educational materials that are research and standards based. In this effort, all products are correlated to the academic standards of the 50 states, the District of Columbia, and the Department of Defense Dependent Schools. A correlation report customized for your state can be printed directly from the following website: http://www.shelleducation.com. If you require assistance in printing correlation reports, please contact Customer Service at 1-800-877-3450.

McREL Compendium

Shell Education uses the Mid-continent Research for Education and Learning (McREL) Compendium to create standards correlations. Each year, McREL analyzes state standards and revises the compendium. By following this procedure, they are able to produce a general compilation of national standards.

Each reading comprehension strategy assessed in this book is based on one or more McREL content standards. The following chart shows the McREL standards that correlate to each lesson used in the book. To see a state-specific correlation, visit the Shell Education website at http://www.shelleducation.com.

McREL	Benchmark	Text
1.1	Knows the composition and structure of the Earth's	Jet Streams and Trade

	atmosphere	Winds
1.2.	Knows the processes involved in the water cycle and their effects on climatic patterns	The Water Cycle
1.3.	Knows that the Sun is the principle energy source for phenomena on the Earth's surface	The Water Cycle
1.4.	Knows factors that can impact the Earth's climate	Tornadoes and Hurricanes
1.5	Knows how the tilt of the Earth's axis and the Earth's revolution around the Sun affect seasons and weather patterns	Our Place in Space
1.6.	Knows ways in which clouds affect weather and climate	Tornadoes and Hurricanes
1.7.	Knows the properties that make water an essential component of the Earth system	The Water Cycle
2.1	Knows that the Earth is comprised of layers including a core, mantle, lithosphere, hydrosphere, and atmosphere	Structure of the Earth
2.2	Knows how land forms are created through a combination of constructive and destructive forces	Plate Tectonics
2.3	Knows components of soil and other factors that influence soil texture, fertility, and resistance to erosion	The Rock Cycle
2.4	Knows that the Earth's crust is divided into plates that move at extremely slow rates in response to movements in the mantle	Plate Tectonics
2.5.	Knows processes involved in the rock cycle	The Rock Cycle
2.6	Knows that sedimentary, igneous, and metamorphic rocks contain evidence of the minerals, temperatures, and forces that created them	The Rock Cycle
2.7	Knows how successive layers of sedimentary rock and the fossils contained within them can be used to confirm the age, history, and changing life forms of the Earth, and how this evidence is affected by the folding, breaking, and uplifting of layers	Fun with Fossils

2.8	Knows that fossils provide important evidence of how environmental conditions have changed on the Earth over time	Fun with Fossils
3.1.	Knows characteristics and movement patterns of the nine planets in our solar system	The Inner Planets; The Outer Planets
3.2	Knows how the regular and predictable motions of the Earth and moon explain phenomena on Earth	Our Place in Space
3.3.	Knows characteristics of the sun and its position in the universe	Our Place in Space
3.4	Knows that gravitational force keeps planets in orbit around the Sun and moons in orbit around the planets	The Inner Planets; The Outer Planets; Other Citizens of the Solar System
3.5.	Knows characteristics and movement patterns of asteroids, comets, and meteors Other	Citizens of the Solar System
3.6	Knows that the universe consists of many billions of galaxies and that incomprehensible distances separate these galaxies and stars from one another and from the Earth	The Astronomer's Toolbox
3.7	Knows that the planet Earth and our solar system appear to be somewhat unique, although similar systems might yet be discovered in the universe	The Inner Planets; Our Place in Space