The Scientific Research Base for AGS Globe Textbooks

Debby Houston, Ph.D.
Consultant
Learning Systems Institute
Florida State University
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AGS Globe publishes textbooks, instructional materials, and assessments for students with a wide range of special needs. Curriculum materials from AGS Globe are widely recognized for their effectiveness in regular and special needs classrooms with students at risk for failure in middle school and high school. The company publishes high-interest, low-reading level textbooks and worktexts to help reluctant or struggling readers master core curriculum subjects, including health, language arts, mathematics, reading and literature, science, and social studies, as well as transition and life skills.

AGS Globe products reflect attributes of effective textbooks and instruction identified in a substantial base of research. These attributes include design elements and instructional methodologies configured to allow students greater access to subject area content. Content access is facilitated by controlled reading level, coherent text, and vocabulary development. Effective instructional design is accomplished by applying research to the construction of lessons, learning activities, and assessments. Altogether, these attributes promote ease of understanding for struggling or diverse learners, especially when they include multiple means of adjusting instruction to match learner needs.

The purpose of this report is to document how AGS Globe textbooks are aligned with scientific research that supports best practices in pedagogy, instructional design, and instructional techniques.
History of the AGS Globe Textbook Series

American Guidance Service (AGS), was established in 1957 and initially developed a line of reputable assessment instruments. From its inception, the company has demonstrated a strong commitment to product excellence, customer partnerships, and meeting special needs. Over time, the product line has been revised and expanded to meet the changing needs of customers. In addition to an expanded array of assessments, the product line eventually included comprehensive language development kits, early childhood curricula, classroom guidance products, parent training materials, software, and video products.

In 1991, AGS acquired a line of textbooks designed for students with special needs. These textbooks focused on basic secondary level academic subjects and utilized a simplified textual and conceptual treatment. AGS Globe is committed to the continued development of middle school and high school textbook products that focus on meeting the needs of diverse learners, providing quality product content and design, and ensuring that all students have access to the skills and knowledge they need to be successful adults.

The current line of AGS Globe textbooks provides content in the areas of health, language arts, life skills, literature, mathematics, science, and social studies for middle school and high school students with special needs. All texts are produced in hard cover with a full-color design. Consumable Student Workbooks accompany each textbook title to provide additional practice. The wraparound Teacher’s Edition for each title includes the complete Student Edition plus lesson overviews, teaching strategies, application activities, ideas for projects, and learning style alternatives to assist with planning instruction. For each title, a Teacher’s Resource Library on CD-ROM that includes the Student Workbook, mastery tests, and other reproducible material is available to customize instruction and assessment to match learner needs. Most content areas offer a set of teaching strategies transparencies designed to facilitate student organization and comprehension. Skill Track Software, a CD-ROM program that includes student reviews and assessments along with performance management software, is available for most textbook titles. This multifaceted series of materials is designed to meet the needs of a diversity of curricula, teachers, and students.
The Need for High-Quality Instructional Materials for Diverse Learners

The requirements of the federal No Child Left Behind Act of 2001 clearly state the expectation that all children will learn and progress in school. Students with disabilities; English language challenges such as English as a second language (ESL), English language learners (ELL), or limited English proficiency (LEP); and other diverse experiential, cultural, and socioeconomic differences, have unique learner characteristics that often make it difficult for them to succeed in traditional instruction (Carnine, 1994). Yet, they are not exempt from the demands to meet higher national and local standards. To assist students at risk for failure in meeting these demands, educators need to ensure that students have access and respond to high-quality instruction. The quality of instruction is influenced by the quality of the instructional tools and techniques available to teachers (Simmons & Kameenui, 1996).

A study to improve the usability of textbooks for students reading below grade level identified four broad criteria for texts. The first criterion is to include material that links to student experience and piques student interest. The second criterion is to support instruction that teaches comprehension skills and content concurrently. The third criterion is to use well-organized writing that includes features to assist comprehension. The fourth criterion is to include novel assessments that allow students to actively engage in the learning process by consolidating their new knowledge with existing knowledge (Ciborowski, 1992).

Reading comprehension is a critical factor in the acquisition of content. The reading level of the text must be within a range that allows the student to comprehend the information (Allington, 2002; Chall & Conard, 1991). Comprehension is aided by high-quality texts that include structural features that make it easy for the learner to access the content in the text (Armbruster & Anderson, 1988; Ciborowski, 1992; Tyree, Fiore, & Cook, 1994). The content of the text should match the learning goals and support student understanding and achievement of the concepts (Reiser & Dick, 1996).

Target Population: Students with Special Needs

AGS Globe textbooks are designed to meet the special needs of diverse learners at middle school and high school levels who read below grade level due to disabilities, diverse language and cultural experiences, and/or other learning differences. Middle and high school students who read below grade level lack vocabulary knowledge, have limited comprehension strategies, and are less able to use the structure of text to gain meaning (Baker, Kameenui, & Simmons, 1998; Chambliss, 1994; Tyree et al., 1994). These students require structured, explicit text accompanied by instruction to help them learn to gain meaning from the content presented (Dickson, Simmons, & Kameenui, 1998b; Marzano, 1998; Seidenberg, 1989).

Research Support for AGS Globe Textbooks

The following report is divided into three main sections: text difficulty, instructional design, and learner support strategies. Each section represents a major theme in the research and summarizes the research that is the basis for the design and development of AGS Globe textbooks. Subsections under each topic discuss specific textbook attributes substantiated by the research. Each subsection concludes with a table that illustrates how research-based attributes are utilized in AGS Globe textbook products. Standards alignment is addressed at the end of the report.
The discussion of text difficulty focuses on two major prongs. The first is reading level. This includes the readability of the text, language usage, and nature of vocabulary used in the text. The second prong is text organization. This refers to page layout, presentation characteristics, and text structure. When all of these characteristics are addressed as the text is written, the resulting text is “considerate,” which means it is easy to read and understand and can facilitate learning (Armbruster & Anderson, 1988).

**Reading Level**

Reading level has been a long-standing measure of whether text is matched to a student’s ability to understand what is read (Anderson & Armbruster, 1984b; Chall & Conard, 1991). The term is typically used to denote the degree of effort needed to decode and make meaning of the text. This discussion of reading level will consider three areas. The first is the use of readability formulas to ascertain a global estimate of the level of text difficulty. The second is the complexity and sequence of the written language in the text. The third area is the use and development of technical and new vocabulary within the text.
**Text Difficulty**

**Readability**

Readability formulas are used to provide general information about reading level. They are designed to quickly and objectively measure word difficulty and sentence length to determine the reading level of text (Chall & Conard, 1991). Anderson and Armbruster (1984b) determined that when error estimates are applied to a readability score using a formula, the result is a very large range of reading levels within which the “true” reading level can be located. They also found that the formula does not adjust for structural characteristics that organize and signal information to the reader and thus aid comprehension. These characteristics may result in longer sentences, which typically result in higher difficulty ratings when calculated using the formula (Anderson & Armbruster, 1984b; Beck & McKeown, 1986). Subsequent investigations suggest that because of the variability within a calculated reading level, reading formulas should be used to estimate or determine a global estimate of the reading level of text (Davison, 1984; Schumm & Strickler, 1991).

**Language Complexity and Sequence**

Textbook language is a factor that determines how well students are able to access information. Text written with an active, rather than passive, voice improves readability (McAlpine & Weston, 1994). Seidenberg (1989) found that well-sequenced, explicitly written texts support comprehension by helping students identify the main idea, summarize, and outline information from the text. Results of a research synthesis indicate that literal comprehension is improved for adolescents when the text structure is simple and in narrative form (Curtis, 2002).

Results of studies concerning attributes of effective instructional materials conducted over a five-year period indicate that limiting complex sentences, especially those with numbers of clauses and noun strings, and using concise language improve the readability of texts (McAlpine & Weston, 1994). However, sentence length may be increased without decreasing reader comprehension when explicit language is used to signal connections between facts and ideas (Anderson & Armbruster, 1984b).
Vocabulary Use and Development

Students must know the meaning of technical and new words if they are to comprehend what they read (Chambliss, 1994). Within written text, various techniques can be used to highlight new or important vocabulary (Tyree et al., 1994; McAlpine & Weston, 1994). These include signals and cues to alert the reader that an important vocabulary word is being encountered. Two research syntheses have found that it is important for students to have multiple exposures to both the vocabulary words and the signals that are used (Kameenui & Simmons, 1990; Marzano, 1998).

Direct instruction in vocabulary meaning and how it is used provides a boost in learning when compared to merely drawing attention to the words (Kameenui & Simmons, 1990; Marzano, 1998). Vocabulary instruction that includes pre-teaching difficult words and their meanings, previewing text to emphasize those select words, and pairing new words with images in context is shown to improve comprehension and student ability to use text (Curtis, 2002; Kameenui & Simmons; Marzano; National Reading Panel, 2000). Instruction and practice in how to use a glossary and understand text conventions that signal or cue vocabulary use in the text improve student vocabulary knowledge (Kameenui & Simmons).

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| Students need access to textbooks written at a level they can read and understand. | Readability | - Grade 4.0 or lower readability using the Spache formula  
- Controlled vocabulary matched to student reading ability  
- Simple sentence structures  
- Limited sentence length |
| Students struggling with vocabulary and text comprehension need textbooks with accessible language. | Language complexity and sequence | - Simple, direct language using an active voice  
- Clear organization to facilitate understanding  
- Explicit language signals to show sequence of and links between concepts and ideas |
| Students need content-related vocabulary instruction in the context of readable and meaningful text. | Vocabulary use and development | - New vocabulary boldfaced on first occurrence, used in context, and defined in a sidebar  
- Glossary with pronunciation, definition, and relevant graphic illustrations for all vocabulary words  
- Activities to introduce vocabulary provided in Teacher’s Edition  
- Multiple exposures to new vocabulary in text and practice exercises |
Lesson 2 REVIEW
Write your answers to these questions on a separate sheet of paper. Write complete sentences.

1. Name the five kingdoms of living things.
2. List two differences between plants and animals.
3. How are protists similar to plants and animals?
4. What is an important function of fungi?
5. Why are bacteria placed in a kingdom by themselves?
Text Organization

A second feature that affects text difficulty is how the text is organized (Anderson & Armbruster, 1984a). Dickson et al. (1998b) identify two components of text organization: physical presentation and text structure. Physical presentation includes print characteristics and page layout. It also includes presentation characteristics such as organization of content (e.g., headings and subheadings), signals to show connections, and cues to indicate important information in the textbook. Text structure is primarily concerned with cohesiveness of text, which refers to the use of sequences and patterns to clearly lead the reader to identify relationships between facts and concepts.

Print Characteristics and Page Layout

The visual presentation of text and the arrangement of words on a page can ease reading of content. Research studies indicate that the use of simple serif or sans serif type improves both reading speed and comprehension (Mansfield, Legge, & Bane, 1996; McAlpine & Weston, 1994). Likewise, readers benefit from the use of text printed with unjustified right margins (McAlpine & Weston).

Presentation Characteristics

A synthesis of research on text organization reveals that text that uses clear organizational patterns, including an orderly presentation of the main idea and supporting details, improves comprehension (Anderson & Armbruster, 1984a, 1988; Dickson, Simmons, & Kameenui, 1995a, 1995b). Orderly presentation includes signals that provide structure for the reader, such as previews, consistent use of titles and headings, and summaries of the text. Cues such as underlined or boldface type alert the reader to new or important information.

Significant differences exist among students in their awareness and strategic use of presentation characteristics (Baker et al., 1998; Marzano, 1998). Teaching students about attributes of orderly presentation improves their ability to use signals to locate ideas that are emphasized in the text (Dickson et al., 1995a). Comprehension improves when teachers work with students to build awareness of text organization and provide direct instruction in the use of text structure (Dickson et al., 1995a). When text is not explicit or clearly organized, students can be taught to use decision rules and organizers that provide structure for identifying the main idea and supporting details for concepts presented in text passages (Seidenberg, 1989).

From Economics Student Text

- Clean and uncluttered page layout
- Simple font use improves reading speed and comprehension
- Line length of under five inches eases readability
- Unjustified right margins benefit readers
- Titles and headings are consistent throughout
- Lessons begin with an introductory paragraph
- Concepts are clearly presented
- Text links to students’ background knowledge
- Primary information appears in the main column
- Bold print cues highlight new vocabulary
- Examples and other supportive information are set off in sidebars and boxes
- Photos and illustrations reinforce lesson content
Text Difficulty

Text Structure

Text structure can facilitate how students use and learn from what is written. Beck and McKeown (1986) and Dickson et al. (1995a) found that text structure is useful for narrative and expository text and can be explicitly matched to the purpose of the text (e.g., to compare/contrast, describe, or argue). Beck and McKeown found that story grammars can be used to teach the sequence of ideas in narrative text. Similarly, using an explicit structure matched to the expository genre and purpose of the text also aids comprehension and learning (Beck & McKeown; Beck, McKeown, & Grommoll, 1989; Dickson et al.). Structural features of considerate textbooks include clear relationships between the concepts presented, a match between text structure and the target audience, and a structure that corresponds to the genre and purpose of the text (e.g., to compare and contrast, tell a story, or present facts) (Beck et al.).

A coherent text, one with a logical and explicit presentation of relationships between and within concepts, provides smooth transitions between ideas presented in the text and improves comprehension (Anderson & Armbruster, 1984a). A series of studies to measure how the clear expression of major ideas facilitates coherence indicates that text written using coherent phrases to link information within and between sentences improves comprehension (Anderson & Armbruster, 1984a, 1984b). Even though the use of language that signals these connections may result in longer sentences, comprehension improves.

However, students with diverse learning needs have difficulty identifying main ideas, supporting details, and text cues that assist with comprehension (Dickson, Simmons, & Kameenui, 1998a; Seidenberg, 1989). These learners have increased comprehension when there are explicit statements of text purpose, adequate explanations of information, and links to the students’ background knowledge (McNamara, Kintsche, Songer, & Kintsche, 1996; Beck & McKeown, 1986; Dickson et al., 1995a).
Instructional design refers to a systematic process used to develop a plan intended to guide students to effectively meet learning needs and goals (Gagne, Briggs, & Wager, 1988). This section addresses the instructional design of information presented in textbooks. The first subsection addresses lesson structure—the framework used to guide students through the learning process. The second subsection addresses assessment—the methods used to determine the degree to which students have made progress toward learning goals.

Lesson Structure

The elements of effective lessons can be grouped into three steps (Kameenui & Simmons, 1990). The first element introduces the lesson and prepares students to learn. The second provides instruction and guides students to practice what they have learned. The third element provides opportunities for students to apply what they have learned and make generalizations. The teacher also assesses learning and gives feedback to the learner.

Step 1: Introduce the Lesson and Prepare Students to Learn

The introduction of the lesson begins with informing students of the learning goal, motivating them to engage in learning the goal, and prompting connections to prior learning and student background (Dixon, Carnine, Lee, Wallin, & Chard, 1998; Reiser & Dick, 1996). The learning goal is a statement of what students will be able to do at the conclusion of the instruction and is the guide for the entire lesson (Reiser & Dick). It can also be used to communicate expectations about the lesson to students. Students become motivated to learn information when they understand why it is important and how it fits with what they already know or are familiar with, such as their experiences, previous learning, or personal interests (Reiser & Dick; Ciborowski, 1992).

Anderson (1984) reports that reading content that is connected to a student’s background knowledge and experience positively influences reading comprehension scores. A review of research on effective features of textbook design found that linking text to previously learned content and skills helps students connect to the new information (Tyree et al., 1994). Reading comprehension also greatly improves when students have knowledge relevant to the topic and vocabulary used in textbook content (Armbruster & Anderson, 1988).

Warm-Up Activity

Find out what students already know about percent by asking them to explain what is meant by a score of 95% on a test. Ask students to share other experiences they have had involving percents.

Teaching the Lesson

Give examples of how to find a percent of an amount other than 100. Show a 10-by-5 grid with 10 squares shaded. Review ratios and proportion and show how 10 out of 50 is in the same proportion as 20 out of 100 and that both examples show 20% shaded. Repeat with other representations of 20%, such as 5 out of 25 or 40 out of 200.

Reinforce and Extend

Some students may benefit from tactile experience. Ask students to shade several figures showing various percents on 10-by-10 grid paper.
Instruction consists of explicitly communicating content, presenting multiple examples, and providing guided practice (Reiser & Dick, 1996). A summary of research indicates that lesson content is communicated effectively when the lesson design incorporates adequate explanations, periodic checks for student understanding, demonstrations or modeling of content, and active student involvement (Dixon et al., 1998). A meta-analysis of effective instruction for students with learning disabilities by Swanson (2000) ascertained that the power of instruction is increased by sequencing (such as step-by-step presentation, prompts, and task breakdown), using whole-to-part instruction, direct questioning and responses, and modeling by the teacher.

A meta-analysis of effective learning strategies reveals that multiple exposures to models, concepts, and attributes improve student understanding of concepts within lesson content (Marzano, 1998). Effectiveness is enhanced when examples of a concept actually model or demonstrate attributes of the concept. The range of examples should demonstrate all variables of the concept being taught, including relevant and irrelevant attributes (Jones, Wilson, & Bhojwani, 1997). The same research synthesis established that examples must be at the student's functioning level and must be of sufficient number to allow the student to move toward mastery of the skill.

Jarrett (1999) reviewed the research on effective instructional practices and found that students improve their problem-solving skills when teachers provide explicit instruction and guided practice in how to solve problems. Using multiple clear examples, with each step described and modeled, improves student ability to solve math problems (Allsopp, 1990). Similarly, a research synthesis on text organization in reading indicates that students are able to better utilize steps in a process when teachers use “thinking aloud” strategies, that is, when they cue students on how to proceed through the comprehension process (Dickson et al., 1998a).

Strategies can be used to organize the presentation of concepts and models and guide student learning (Vaughn, Gersten, & Chard, 2000). For subject areas such as math, studies conducted at the kindergarten and middle school levels show that the use of hands-on manipulatives is a strategy that has positive benefits for student learning (Dixon et al., 1998).
When using strategies or other techniques to help students organize their learning, it is important to teach students to model the strategy through multiple examples and then to provide multiple opportunities for students to apply the strategy to solve problems with guidance from the teacher (Montague, 1997).

**Step 3: Provide Opportunities for Applied Practice and Generalization**

The practice and application of skills build automatic use of information and ensure student mastery of skills and concepts (Carnine, 1989; Marzano, 1998; Marzano, Pickering, & Pollock, 2001). A meta-analysis of effective instructional practices reveals that students require daily practice when a concept is initially presented. Once students can apply the concept accurately, periodic practice over longer intervals of time is required to sustain the learning. Finally, a periodic review that links the concept to new information promotes connections to new concepts (Carnine; Marzano; Marzano et al.; Simmons, Kameenui, Dickson, Chard, Gunn, & Baker, 1994).

Once students have learned the basic information, it is important to facilitate both the generalization of the learning to other settings and a deeper understanding of content (Marzano, 1998). A meta-analysis of writing instruction research indicates that providing a review that uses a variety of purposes and applications promotes transfer of knowledge to new tasks (Stein, Dixon, & Isaacson, 1994). Marzano also found that graphic organizers can be used to provide structure that will assist students with organizing information and generalizing information and patterns.

Students benefit from feedback on their practice and assessment performance. Feedback throughout the instructional process and after independent practice increases student understanding and clarifies misconceptions (Allsopp, 1990; Reiser & Dick, 1996). Feedback should tell students what is correct and incorrect, be timely, and be specific to the criteria expected for the student to show mastery of learning (Marzano, 1998; Marzano et al., 2001).

**Exercise F** Make the conversions asked for in these word problems.

1. “55% cotton.” What fraction is cotton? 6. Joe is batting .408. What percent is this?
2. The Bluebirds win 0.625 of their games. What percent do they win? 7. “22% down on a car.” What fraction is this?
3. 48% are girls. What fraction are girls? 8. Sales are up 6.4%. What is this as a decimal?
4. 87% pass the test. What fraction passes? 9. “16% unemployed.” What fraction are unemployed?
5. “1/4 off all prices.” What is the percent off? 10. “4 out of 5 doctors

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**Career Connection**

Lead a class discussion about the use of percents in the financial-planning industry. Cut out and ask students to cut out articles and advertisements from newspapers that focus on financial planning, rates for mutual funds, certificates of deposit, treasury bonds, and so on. Read through the information and focus on the use of percents with interest rates. Talk about how financial planners use percents to make a plan for investing a sum of money in different places. If possible, invite a financial planner to class to provide more information about financial planning and the use of percents.

**Calculator**

Provide students with additional practice in expressing numbers as percents. Have students use a calculator to determine a percent for each situation. Students should round to the nearest whole percent. Give problems such as the following:
- 52 out of 73 people surveyed (71%)
- 113 students in a group of 290 (39%)
- 976 of 1,200 patients (81%)
- 3,995 of the 4,628 homes in town (86%)

**From Basic Math Skills**

Teacher’s Edition provides abundant application activities
### Instructional Design

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| Instruction that includes the components of effective instruction, utilizes effective strategies and interventions to facilitate student learning, and aligns with standards improves learning for all students, especially diverse learners and students who are struggling. | **Step 1:** Goals and lesson introduction; prepare students to learn | **In the Student Edition:**  
- Chapter and lesson introductions  
- Goals for Learning  
**In the Teacher's Edition:**  
- Lesson objectives  
- Explicit 3-Step Teaching Plan begins with “Warm-Up Activity” to inform students of objectives, connect to previous learning and background knowledge, review skills, and motivate students to engage in learning |
| **Step 2:** Explicit instruction and guided practice | **In the Student Edition:**  
- Short, manageable lessons break content and skills into smaller step-by-step, part-by-part pieces  
- Systematic presentation of lesson concepts and skills  
- Models or examples throughout lessons link directly to the explanation of the concept  
- Multiple opportunities for direct practice throughout  
- Sidebar notes review skills and give reminders of important facts and information  
**In the Teacher's Edition:**  
- 3-Step Teaching Plan for each lesson includes “Teaching the Lesson” to help teachers present and clarify lesson skills and concepts and to guide practice  
- Supplemental strategies and activities for each lesson |
| **Step 3:** Applied practice and generalization | **In the Student Edition:**  
- Each skill or concept lesson is followed by direct practice or review questions  
- Multiple exercises throughout  
- Generalization and application activities in sidebars and lessons  
**In the Teacher's Edition:**  
- 3-Step Teaching Plan concludes with “Reinforce and Extend” to reinforce, reteach, and extend lesson skills and concepts  
- Multiple supplemental and alternative activities  
- Career, home, and community application exercises  
**In the Teacher's Resource Library:**  
- Multiple exercises in Student Workbook and reproducibles offer applications, content extensions, additional practice, and alternative activities at a lower (Grade 2 Spache) readability  
**Skill Track Software:**  
- Monitors student learning and guides teacher feedback to student |
Assessment
The concluding activity in the instructional process is to assess what students have learned. The assessment should match the objectives of the lesson (Reiser & Dick, 1996). The assessment can take many forms, depending on the nature of the concept and purpose of the lesson. Students with diverse needs may need alternate methods to demonstrate their knowledge (Jarrett, 1999). In a summary of research about effective assessment practices, Jarrett indicates that performance assessments, portfolios, and concept maps allow students to demonstrate their understanding and communicate what they have learned. Rubrics are also useful for both measuring student understanding and judging final products.

While the final assessment of student learning is important, formative assessment can occur during all stages of the instructional process and can inform learners and teachers about progress toward learning objectives (Jarrett, 1999). In an analysis of research on instructional materials for diverse learners, Tyree et al. (1994) indicate that activities for direct and frequent measurement of skills in lessons and units help students and teachers monitor progress. They also found that response to questions and participation in discussions are methods that can assess student learning of facts, problem solving, inferences, and summarization.

### Assessment

#### Assessment Principles
Assessment should measure student progress on learning goals over the course of a lesson, chapter, or content-area textbook.

#### Research-Based Characteristics
Measurement of learning goals mastery

#### AGS Globe Textbook Features
- Chapter assessment activities correlate to chapter Goals for Learning:
  - Chapter reviews
  - End-of-chapter tests
  - Cumulative midterm and final mastery tests
- Alternative chapter assessments
- Skill Track Software assesses and tracks individual student performance by lesson and chapter

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**Chapter 1 Mastery Test A**

**Directions:** Circle the letter of the best answer.

1. Identify the name of the place for the underlined digit: 2,603.
   - A) millions
   - B) ten-thousands
   - C) thousands
   - D) hundreds

2. How is 6,849,000 written in words?
   - A) three hundred four million, nine hundred eighty thousand
   - B) three hundred four million, nine hundred eighty thousand
   - C) three hundred forty million, nine hundred eighty thousand
   - D) three hundred four million, nine hundred eighty thousand

3. What is 3,207,000 rounded to the nearest hundred thousand?
   - A) 3,200,000
   - B) 3,200,000
   - C) 3,200,000
   - D) 3,200,000

4. Jasmine bought a bagel for $0.55, juice for $6.10, and a magazine for $3.50. If she handed the clerk $10.00, how much change should Jasmine receive?
   - A) $6.20
   - B) $6.20
   - C) $6.20
   - D) $6.20

5. Kim’s scooter can travel 80 miles on 1 gallon of gas. How many gallons of gas does Kim’s scooter use in one year? How many miles can Kim’s scooter travel in one year?
   - A) 3
   - B) 3
   - C) 3
   - D) 3

6. From Basic Math Skills Teacher’s Resource Library Chapter, Midterm, and Final Mastery Tests can be printed from a convenient CD-ROM

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**From Basic Math Skills Skill Track Software**

Software provides hundreds of practice questions for assessing skill and concept acquisition

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AGS Globe Textbooks
Textbooks can include features that provide organizational assistance to students and instructional assistance to teachers who use them (Ciborowski, 1992; Steele, 2002). This section of the report focuses on textbook features that assist teachers in instructional delivery or guide students toward more effective use of the textbook. Four areas are described. First, organizational tools that help students structure information are discussed. Second, instructional process techniques for using textbooks in conjunction with best practices are presented. Third, effective assessment support strategies are described. Finally, differentiated instruction methods to meet individual student needs are addressed.

**Organizational Tools**

Textbooks can include specific organizational tools to assist students in structuring information. Two approaches are discussed here: advance organizers and graphic organizers.

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**Advance Organizers**

Advance organizers are preview tools used at the beginning of a lesson to orient students and facilitate progression through the concepts in the text. Use of advance organizers assists secondary students to learn content area information and skills, focus on learning objectives, and build connections (Allsopp, 1990; Curtis, 2002; Marzano et al., 1999). A meta-analysis of effective instructional practice research indicates that advance organizers are most useful when text information is not written in a considerate sequence. The meta-analysis also indicates that different types of organizers produce different learner results, and that advance organizers can be used to facilitate higher-level learning (Marzano, 1998).

Dickson et al. (1995b) conducted a synthesis of research on text organization that reveals that instruction in the features of text organization facilitates student comprehension. Likewise, explicitly reviewing the text helps teachers determine student knowledge about text organization and the type of support that might be needed to facilitate text comprehension (Schumm & Strickler, 1991).

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**How to Use This Book: A Study Guide**

Welcome to Basic English Composition. This book focuses on practical writing skills that you can use now and later in life. You may be wondering why you should study English composition. Think about how many times each day you put your ideas in writing. How often do you need to write something—a paragraph, a phone message, a letter, an e-mail message, or a report? We write to express our thoughts and ideas, and to share information with other people. In this book, you will learn how to write and punctuate topic sentences and paragraphs. You will practice writing letters, messages, memos, e-mail messages, and reports. You will also learn how to prepare for written tests and how to write essay answers. In addition, you will practice your grammar and vocabulary skills, and spend some time using references and resources.

As you read this book, notice how each lesson is organized. Information is presented and then followed by examples and activities. Read the information. Then practice what you have read. If you have trouble with a lesson, try reading it again. It is important that you understand how to use this book before you start to read it. It is also important to know how to be successful in this course. The first section of the book can help you to achieve these things.

**How to Study**

These tips can help you study more effectively:

* Plan a regular time to study.
* Choose a desk or table in a quiet place where you will not be distracted. Find a spot that has good lighting.
* Gather all the books, pencils, paper, and other equipment you will need to complete your assignments.
* Decide on a goal. For example: “I will finish reading and taking notes on Chapter 1, Lesson 1, by 8:00.”
* Take a five- to ten-minute break every hour to keep alert.
* If you start to feel sleepy, take a break and get some fresh air.

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**From Basic English Composition**

Each text opens with a section showing students how to use the book and how it is organized.
Graphic Organizers

Visual cues and graphic organizers emphasize important ideas in text and aid student comprehension (Dickson et al., 1995a). A summary of multiple studies conducted by Lovitt and Horton (1994) indicates that graphic organizers can be used before instruction as an orientation activity and during instruction as a teacher-led activity or a student-directed activity, provided that the teacher cues students on when to use the organizer. Results of a study using graphic organizers in science and social studies classes indicate that the use of student-directed organizers with teacher cues and structure results in better achievement than does self-study alone (Horton, Lovitt, & Bergerud, 1990). Chambliss (1994) reports that graphic organizers are more effective when they are matched to the purpose of the text (e.g., to inform, argue, or explain). They are also effective in teaching similarities and differences (Marzano et al., 2001).

Using Graphic Organizers

A graphic organizer is a visual representation of information. It can help you see how ideas are related to each other. A graphic organizer can help you study for a test or organize information before you write. Here are some examples.

Venn Diagram
A Venn diagram can help you compare and contrast two things. For example, this diagram compares and contrasts solar energy and wind energy. The characteristics of solar energy are listed in the left circle. The characteristics of wind energy are listed in the right circle. The characteristics that both have are listed in the intersection of the circles.

Column Chart
Column charts can help you organize information into groups, or categories. Grouping things in this format helps make the information easier to understand and remember. For example, this four-column chart groups information about each of the four biomes. A column chart can be divided into any number of columns or rows. The chart can be as simple as a two-column list of words or as complex as a multiple-column, multiple-row table of data.

Network Tree
A network tree organizer shows how ideas are connected to one another. Network trees can help you identify main ideas or concepts linked to related ideas. For example, this network tree identifies concepts linked to the concept of conservation. You can also use network trees to rank ideas from most important to least important.

From General Science Student Text
Textbook explains how graphic organizers can be used to study and organize information
Instructional Process Techniques

Textbooks can be designed to include best practice strategies that teachers can use to facilitate learning. Four such strategies that keep students actively engaged in learning are discussed here: cooperative learning, student self-monitoring and questioning, real-life examples, and mnemonics.

Cooperative Learning

Cooperative learning is a team activity that allows students to interact with each other to facilitate the learning of all group members. Research syntheses of cooperative learning studies indicate that cooperative learning results in positive achievement for all students, including diverse populations, across all grade levels. Cross-ability grouping is the most powerful cooperative learning configuration (Johnson, Johnson, & Stanne, 2000; Marzano, 1998; Vaughn, Bos, & Schumm, 1997). Jarrett’s (1999) summary of research on instructional procedures in science indicates that cooperative learning improves the level of student discourse and improves problem solving. Cooperative teams also have been found to result in higher homework completion rates and higher accuracy scores on assignments (Maccini & Hughes, 1997).

Student Self-Monitoring and Questioning

Student self-monitoring and questioning strategies provide students with tools to guide their learning. A synthesis of effective instruction research indicates instruction that uses student self-monitoring and questioning strategies to check recall, keep students actively engaged, and chart progress, improves student comprehension and awareness of learning (Tyree et al., 1994; Dickson, Collins, Simmons, & Kameenui, 1998). Student performance improves when students are taught to be aware of and regulate strategy use (Maccini & Hughes, 1997).

A meta-analysis of effective instruction research by Marzano et al. (2001) indicates that questioning is useful before and after learning and that student answers are deeper when teachers allow wait time after posing questions. The analysis also supports the use of cues and questions tied to important concept attributes rather than those that are novel or unusual. Finally, the researchers found that posing higher-level questions results in deeper learning.

3 Reinforce and Extend

**Group Problem Solving**

Suggest students work in small groups to solve the following problem.

The following is information about the student lunch program at Marquette School.

<table>
<thead>
<tr>
<th>Tuesday, October 14</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cost per lunch</td>
<td>$0.40</td>
</tr>
<tr>
<td>uneaten lunches</td>
<td>43</td>
</tr>
<tr>
<td>total spent on lunches</td>
<td>$62.80</td>
</tr>
</tbody>
</table>

The school orders enough lunches for all students but does not pay for any uneaten lunches. How many students are in Marquette School? 

\[0.40(x) - 0.40(43) = 62.80; x = 200\]

Invite groups to present their solutions, including any equations they may have used, as a “Just the Facts” segment of the lunchtime news. Students can assign roles to group members such as writer, announcer, designer, and coordinator.

**From Algebra Teacher’s Edition**

Group Problem Solving activities facilitate cooperative learning

**From Algebra Student Text**

Boxed extension activities stimulate higher-level thinking
Real-Life Examples

Real-life examples help students to connect the information and skills they have learned to their own life experiences and better generalize the skills they have learned to other areas (Roderick & Camburn, 1999; Marzano, 1998). Learning is positively correlated with curriculum that offers a wide range of examples that teach relevant and irrelevant attributes with no misleading cues (Jones et al., 1997). A summary of research on effective textbook design indicates the importance of multiple examples that include real-world applications (Tyree et al., 1994). A summary of adolescent reading research (Curtis, 2002) determined that providing students with real-life examples as well as in-school examples improves comprehension and cognitive strategy use.

Mnemonics

Mnemonics promote retention of ideas by using memory strategies (Schumm & Strickler, 1991). Miller and Mercer (1993) determined that middle school math students are able to use mnemonic strategies at the representation (solving equations) and abstract (applying steps to problem solving) levels to retrieve information from memory to help them improve math performance. Mnemonic devices can facilitate the recall of simple facts and vocabulary to complete science activities (Munk, Bruckert, Call, Stoehrmann, & Radandt, 1998). They have been found to assist with the transfer and retrieval of information in long-term memory (Deshler, Ellis, & Lenz, 1996). Mnemonics also help students remember lists and spelling rules, as well as procedures that require multiple responses (Miller & Mercer, 1993).

Teaching the Lesson

Before students read the lesson, have them write on paper each vocabulary word and what they think it means. As students read, have them review what they wrote and add notes to correct or extend information about the words. Direct students to the diagram on page 79. Ask them to name the planets beginning with the one closest to the sun. (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto) Explain that one way to remember the order of the planets is to use a memory aid. For example, the words in the sentence “My very eager mother just served us nine pizzas” begin with the same letters as the names of the planets.
Assessment Support

There are several ways textbooks can incorporate features that facilitate an accurate assessment of student learning. Deshler et al. (1996) provide a summary of research on effective test-taking strategies by students with learning disabilities. They found that students with learning disabilities are not aware of test-taking strategies, and even when they receive strategy instruction, their use of such strategies is on a limited basis.

Research on adapting science textbooks conducted by Lovitt and Horton (1994) indicates that student study guides are effective when matched to student ability level. The research also indicates that best results occur when teachers cue students to use study guides. The use of study guides with peers is less powerful. However, both are superior to studying alone without guidance. In a study of middle and high school student use of study guides in science and social studies, Horton and Lovitt (1989) found that middle school students perform higher on student-completed study guides when allowed to compare their answers to teacher answers. The researchers also found that high school students perform higher on teacher-directed study guides. In both instances, study guides are more effective than student self-study.

For students with diverse needs, assessments that monitor student progress are important to ensure that these students are progressing toward mastery of learning goals. This is demonstrated by Tyree et al. (1994), whose research analysis indicates that activities for direct and frequent measurement of skills in lessons and units help teachers monitor student progress. Jones et al. (1997) found that frequent assessments that are tied to specific tasks within the overall goal provide information on mastery level and the need for instructional changes.

Chapter 9 REVIEW

Vocabulary Review
Choose the word or phrase from the Word Bank that best matches each phrase. Write the answer on your paper.
1. steady winds north and south of the equator
2. height above the earth's surface
3. what falls from the atmosphere
4. what water vapor does to become cloud droplets
5. water that falls from the atmosphere
6. what liquid water does to become water vapor
7. winds near the poles that blow from the east
8. pattern of wind movement around the earth
9. low, flat, gray clouds
10. high, wispy clouds

Concept Review
11. Refer to the diagram. Name each lettered layer of the atmosphere. Write your answers on your paper.

Choose the word or phrase that best completes each sentence. Write the letter of the answer on your paper.
12. The gases of the atmosphere that move in cycles as living things use them are ________.
   A. oxygen, carbon dioxide, and nitrogen
   B. methane, hydrogen, and helium
   C. argon, neon, and ozone
   D. nitrogen, xenon, and oxygen

13. The ________ reflects radio signals.
   A. troposphere
   B. stratosphere
   C. mesosphere
   D. ionosphere

14. The ________ is important because it absorbs most of the harmful ultraviolet radiation from the sun.
   A. troposphere
   B. stratosphere
   C. mesosphere
   D. ionosphere

15. Fluffy, white clouds are called ________.
   A. cirrus clouds
   B. stratus clouds
   C. cumulus clouds
   D. rain clouds

16. Rain forms when ________.
   A. cumulus clouds are present
   B. radno waves reflect from a layer of the atmosphere
   C. water collects as heavy droplets in clouds
   D. sunlight hits the earth at an indirect angle

17. A continuous cycle of rising warm air and falling cold air is called ________.
   A. water vapor
   B. the nitrogen cycle
   C. the wind belts
   D. a wind cell

18. The prevailing westerlies are ________.
   A. winds coming from the west
   B. the wind belts nearest the equator
   C. trade winds
   D. winds blowing to the west

Critical Thinking
Write the answer to each of the following questions.
19. When a rain forest is destroyed, how does this affect the composition of the atmosphere?
20. Moist air is pushed up a mountainside, as shown. How might the weather on the right side of the mountain be different from that on the left side?

Test-Taking Tip
Do not wait until the night before a test to study. Plan your study time so that you can get a good night's sleep before a test.

From Earth Science Student Text
◆ Chapter and lesson reviews prepare students for tests
◆ Chapter reviews reinforce vocabulary, concepts, and critical thinking skills
◆ Textbooks offer helpful test-taking tips
<table>
<thead>
<tr>
<th>Learner Support Strategy Principles</th>
<th>Research-Based Characteristics</th>
<th>AGS Globe Textbook Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective strategies and instructional techniques support student learning and improve student performance.</td>
<td>Organizational tools • Advance organizers • Graphic organizers</td>
<td>• “How to Use This Book” feature explicitly teaches text organization (Student and Teacher’s Editions) • Graphic and visual organizers preview chapter and lesson content • Transparencies and reproducibles for graphic organizers appropriate to the subject matter allow teacher to demonstrate and guide student understanding of important ideas • Graphic organizers arrange lesson content visually—charts, graphs, tables, diagrams, bulleted lists, arrows, graphics, illustrations, and captions</td>
</tr>
<tr>
<td>Instructional process techniques • Cooperative learning • Student self-monitoring and questioning</td>
<td>• Real-life examples • Mnemonics</td>
<td>• Activities for group learning and problem solving provided in Teacher’s Edition • Chapter and lesson headings presented as questions or statements to guide reading • Chapter reviews and summaries highlight major points • Student monitoring activities provided in the Teacher’s Resource Library • Unit or chapter projects focus on linking and application of unit or chapter concepts • Home, career, and community applications • Sidebar features and activities directly link content to real-life applications • Mnemonics provided to help students remember content and steps in procedures or problem solving</td>
</tr>
<tr>
<td>Textbooks can incorporate features to facilitate and support assessment of learning, allowing teachers to monitor student progress and provide information on mastery level and the need for instructional changes.</td>
<td>Assessment support</td>
<td>• Texts include integrated test-taking tips for students • Lesson and chapter reviews provided before formal assessments • Workbook and reproducible activities in the Teacher’s Resource Library provide additional monitoring of student progress • Alternative Assessments for each chapter offer performance-based items for diverse learners • Skill Track Software provides multiple versions of assessments</td>
</tr>
</tbody>
</table>
**Learning Support Strategies**

**Learning Styles**

The learning style activities in the Algebra Teacher’s Edition provide activities to help students with special needs understand the lesson. These activities focus on the following learning styles: Visual/Spatial, Auditory/Verbal, Body/Kinesthetic, Logical/Mathematical, Interpersonal/Group Learning, LEP/ESL. These styles reflect Howard Gardner’s theory of multiple intelligences. The writing activities suggested in this Student Text are appropriate for students who fit Gardner’s description of Verbal/Linguistic Intelligence.

**Differentiated Instruction**

Differentiated instruction is an approach that teachers use to organize instruction that adjusts for diverse learning needs within a classroom (Tomlinson, 1999). Its principal focus is on providing flexible instruction that meets individual learner needs. This approach is documented in the literature and has numerous accounts of teacher and school implementation, although peer-reviewed, comparative research is not currently available (Hall, 2002).

Roderick and Camburn (1999) conducted a study of factors that influence recovery from failure in high school courses. They suggest that adolescent students are more successful when tasks are matched to their academic skills, developmental stage, and personal skills and knowledge. Student outcomes are also enhanced when tasks are structured to provide both challenge and support to the learner. In the development of its textbooks, AGS Globe incorporates certain principles from within the differentiated instruction approach that are useful for organizing and presenting strategies that teachers can use to address the needs of diverse learners at risk for academic failure.

**Flexible Instruction**

Differentiated instruction asserts that teaching based on student instruction and assessment information builds flexibility into the instructional process. A major AGS Globe textbook feature that facilitates flexible instruction is step-by-step, part-by-part lesson design. Student lessons break chapter content and skills into smaller, manageable pieces. The use of step-by-step lesson design facilitates the adjustment of teaching activities and assessments to meet individual needs. AGS Globe textbooks feature alternative learning activities and multiple assessments throughout each Teacher’s Edition and related ancillary products. The description of the research base that supports an explicit instructional design sequence is addressed in the “Instructional Design” section of this report.

**From Algebra Teacher’s Edition**

- Lesson activities are designed to capitalize on students’ individual strengths and dominant learning styles.
- Various activities address these different learning styles: Visual/Spatial, Auditory/Verbal, Body/Kinesthetic, Logical/Mathematical, Interpersonal/Group Learning, LEP/ESL.
- Special LEP/ESL activities provide support for students learning English and lesson content at the same time.
Learning Styles

Another principle in differentiated instruction is the importance of addressing individual differences such as readiness, interest, and how students best learn. One way to structure planning for individual differences is based on the theory of multiple intelligences (Gardner, 1983; Lazear, 1999). Multiple intelligences theory asserts that intelligence is multifaceted and does not rely solely on those facets typically valued in traditional schooling—verbal and quantitative aptitudes. This theory has been used to provide frameworks to develop multiple methods to approach student learning experiences (Orlich, Harder, Callahan, & Gibson, 2001).

Multiple intelligences theory is based on research from many disciplines and divides intellectual aptitude into eight categories: bodily/kinesthetic, interpersonal, intrapersonal, logical/mathematical, musical/rhythmic, naturalist, verbal/linguistic, and visual/spatial (Lazear, 1999). While comparative research to test this theory and its applications in the classroom is not complete, teachers have found the theoretical structure useful in stimulating their thinking about instruction (Fasko, 2001; Lazear, 1999; Orlich et al., 2001).

The basic premise behind multiple intelligences theory is that there are many ways individuals process and learn information. These different types of intelligences prompt a wide variety of ideas about how students might engage in learning. AGS Globe uses the categories from multiple intelligences theory to organize suggestions for addressing unique learner needs that teachers may encounter in the classroom. It is well documented that diverse learners, such as students with disabilities or English language learners, require adapted activities and additional practice (Carnine, 1994; Gersten & Baker, 2000). AGS Globe provides a variety of alternative learning activities designed to provide teachers with models to address the needs of diverse learners in the Learning Styles features in the Teacher’s Edition for each textbook.

<table>
<thead>
<tr>
<th>Differentiated Instruction Principle</th>
<th>Text Characteristics</th>
<th>AGS Globe Textbook Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student learning is more successful when tasks are aligned with academic skill levels and adjustments are made to allow students multiple means to engage and express their learning strengths and styles.</td>
<td>Flexible instruction</td>
<td>• Multiple features, including Learning Styles activities, help teachers match assignments to students’ abilities and interests</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning styles</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Auditory/Verbal</td>
<td></td>
</tr>
<tr>
<td>• Body/Kinesthetic</td>
<td></td>
</tr>
<tr>
<td>• Interpersonal/Group Learning</td>
<td></td>
</tr>
<tr>
<td>• LEP/ESL</td>
<td></td>
</tr>
<tr>
<td>• Logical/Mathematical</td>
<td></td>
</tr>
<tr>
<td>• Visual/Spatial</td>
<td></td>
</tr>
</tbody>
</table>

• Learning Styles activities provide a wide range of activities to address diverse learner characteristics
• LEP/ESL activities provide support for students who are learning English and lesson content concurrently
In an analysis of how national standards and reform activities interact with instruction for students with learning disabilities, Miller and Mercer (1997) conclude that it is important to align instruction to national standards for subject areas when those standards exist. Miller and Mercer also indicate that it is important to connect instruction to state standards, particularly when those standards are used to establish testing and graduation requirements. However, standards can be so broad that they do not give a clear indication of instructional goals or sequence (Matlock, Fielder, & Walsh, 2001; Stein et al., 1994). In a discussion of the implications of standards, the researchers determined that when language arts standards in particular are so broad that they do not address specific goals, it is difficult to interpret how to best address the needs of diverse learners to facilitate meeting the standards. Matlock et al. (2001) determined that, given the importance of aligning student goals to standards, there must be some interpretation of how the standards translate into instructional sequences and lessons for students.

**Standards Alignment**

**Correlation of Basic Math Skills to the NCTM Standards**

**STANDARD 1 Number and Operations**

Instructional programs from prekindergarten through grade 12 should enable all students to:

- understand numbers, ways of representing numbers, relationships among numbers, and number systems;
- understand meanings of operations and how they relate to one another;
- compute fluently and make reasonable estimates.

**Basic Math Skills**


**STANDARD 2 Algebra**

Instructional programs from prekindergarten through grade 12 should enable all students to:

- understand patterns, relations, and functions;
- represent and analyze mathematical situations and structures using algebraic symbols;
- use mathematical models to represent and understand quantitative relationships;
- analyze change in various contexts.

**Basic Math Skills**


**STANDARD 3 Geometry**

Instructional programs from prekindergarten through grade 12 should enable all students to:

- analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships;
- specify locations and describe spatial relationships using coordinate geometry and other representational systems;
- apply transformations and use symmetry to analyze mathematical situations;
- use visualization, spatial reasoning, and geometric modeling to solve problems.

**Basic Math Skills**

- Pages 170–189, 362–386.

**STANDARD 4 Measurement**

Instructional programs from prekindergarten through grade 12 should enable all students to:

- understand measurable attributes of objects and the units, systems, and processes of measurement;
- apply appropriate techniques, tools, and formulas to determine measurements.

**Basic Math Skills**


From *Basic Math Skills* Teacher’s Edition

Detailed correlations to national standards are included in the Teacher’s Editions and correlations to state grade-level or course-specific content standards are available on request.


References


Steele, M. (2002). Strategies for helping students who have learning disabilities in mathematics. Mathematics Teaching in the Middle School, 8(3), 140–143.


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