CHAPTER 5

Improving Academic Skills

STUDENT SNAPSHOT: Corrado

Corrado, a fifth-grade student with AS, receives his education in several inclusion classrooms. Corrado has difficulty with all academic skills, but especially with reading comprehension. In addition, he becomes easily frustrated and begins to yell and scream in class when given academic tasks that require abstract thinking or that require him to make inferences, such as math word problems. He needs ample time to make decisions and to answer questions, and he quickly loses his ability to focus academically if the material is not of interest to him. Due to his poor fine-motor skills, Corrado has illegible handwriting and is unable to staple papers and to cut on a straight line with scissors; therefore, academic tasks need to be assigned accordingly. In addition, Corrado frequently misplaces academic supplies, which, unintentionally, forces his teachers and aides to delay their instruction as they locate his materials. Because Corrado continues to demonstrate difficulty across academic subjects, his parents have requested a team meeting to plan for his future academic success.

OVERVIEW

With increasing numbers of students identified with HFA/AS in general education settings, educators must be increasingly aware of evidence-based strategies for improving educational outcomes for these students. Despite this need, a somewhat limited amount of research exists specifically evaluating interventions designed to improve the academic performance of students with HFA/AS (Delano, 2007b). Nonetheless, based on the existing literature in this domain, several interventions and structured teaching approaches are sug-

gested in this chapter to address the needs of students with HFA/AS. These general strategies and interventions should not be viewed as a one-size-fits-all set of approaches. Rather, educators are encouraged to take a scientific, data-based approach each time an intervention is implemented. Such an approach means that effectiveness is not assumed when implementing interventions. Instead, interventions are examined to determine their effectiveness with individual students each time they are implemented. Although the approaches described in this chapter are evidence-based, meaning there is general research support for their use, there is no guarantee that they will work for any individual student with HFA/AS. Thus it is recommended that educators collect data to determine an individual's response to intervention (see Chapter 4 for details on assessment options and Chapter 9 regarding collecting data and evaluating outcomes). This data-based approach to determining intervention efficacy is the best way to ensure positive student outcomes.

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One general academic challenge that students with HFA/AS often experience is that their attention may drift and they can become disconnected from activities occurring in the classroom (Silverman & Weinfeld, 2007). Thus they may miss task requirements described by the teacher. In addition, students with HFA/AS have more difficulty maintaining the same amount of information in their working memory than typical peers (Musarra, 2006; Silverman & Weinfeld, 2007). For these reasons, a number of the strategies offered in this chapter rely on visual supports or stimuli. The rationale behind the use of such strategies is that visual stimuli are nontransient. Information is presented and made external for students to review, process, and understand on a time line suited to their learning needs. By contrast, spoken language is a transient form of communication, meaning that spoken information is present for only a short time. Under those circumstances, the relevant information can be more easily missed, misunderstood, or misinterpreted.

This chapter is organized into two major sets of strategies: general strategies and specific strategies. The general strategies are those that cut across academic domains, whereas specific strategies are designed to address a specific academic domain (e.g., mathematics). The general strategies described in this chapter address the following areas: task presentation, teacher communication, priming, assignments, and homework and study skills. Specific strategies described in this chapter address skills of greatest concern to students with HFA/AS in the domains of reading, written expression, and mathematics.

GENERAL STRATEGIES

Task Presentation

Students with HFA/AS may experience difficulties with less structured tasks and with following directions (Church, Alisanski, & Amanullah, 2000). Thus presenting tasks in a struc-

tured fashion is the best approach for these students. In part, structuring tasks means, whenever possible, assigning short tasks with a clear end in sight and reinforcing each step of the process (Silverman & Weinfeld, 2007). In addition, tasks should be broken into

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component parts or small steps. Breaking down tasks is particularly important for complex tasks or those that involve multiple-step directions. Explicit directions for each step of the task also should be provided. Consider the vocabulary task presented in Figure 5.1, in which the student is required to generate and write sentences with new vocabulary words. In this example, each step of the task is broken down and described. A visual prompt to check one's work is provided as well. Finally, both verbal and visual cues are provided with respect to turning in the completed task.

When using lecture as a teacher presentation format, consider using visual aids such as pictures or graphics or providing lecture outlines or notes ahead of time with critical information highlighted. Providing guiding notes ahead of time serves as an advance organizer for the information to be presented and will assist the student in comprehending the material. Preteaching key vocabulary or important concepts beforehand also can enhance comprehension. Before the lecture, students can be provided with a rationale for the information to be presented that will help them to contextualize it. For example, before presenting a lecture describing a project the students will complete on the salmon life cycle, a teacher might say, "I am going to describe each part of the salmon life cycle before you do a project showing the life cycle. The reason I am going to describe each part of the life cycle first is so that you will be able to easily recognize each phase of the life cycle as you read about it in your research for this project." This rationale can be combined with an explanation of the goals of the lesson and can include visual tools such as concept maps (e.g., a life cycle concept map). To avoid overwhelming students with lecture presentation, a good rule of thumb is to match length of lecture time (in minutes) to the student's age. For a class of 7-year-olds, speak for 7 minutes, then give a break for a hands-on or interactive activity that helps process what they just heard. When using a lecture format, it also can be helpful to intersperse hands-on tasks or activities within the lecture period to help sustain attention and reinforce learning. For instance, with the salmon life cycle example, the teacher could stop briefly after explaining each phase and have students write a key word and/or draw their own representation for that phase directly on a life cycle concept map.

Teacher Communication

The way in which teachers communicate also can be an avenue of support for students with HFA/AS. For example, teachers can use proximity and prompting as a means of providing additional support to students who experience difficulties with executive function skills such as attention to task and organization (Silverman & Weinfeld, 2007). For example, it may be helpful to seat the child with HFA/AS in close proximity to the teacher or, at a minimum, in a location in the classroom where the student and the teacher are in each other's direct line

Materials: Paper, pencil, and word list.

Directions: Complete each step below. Put completed paper in the blue vocabulary box.

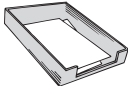| STEP	ACTION	CHECK MY WORK
1.	Take out a piece of paper.	
2.	Write your name in the upper right-hand corner.	
3.	Number the lines on your paper from 1 to 5, leaving two lines between each number.	
4.	Write each vocabulary word next to each number.	
5.	Write one sentence using the first word.	
6.	Reread sentence silently to yourself. Does it make sense?	
7.	Repeat steps 5 and 6 with remaining words.	
8.	Put completed work in **BLUE** vocabulary box.	Turn in work.

FIGURE 5.1. Vocabulary sentences task.

of sight. This arrangement can facilitate prompting the student to remain focused, as well as increase the opportunities for positive reinforcement. Importantly, proximity allows the use of nonverbal visual cues to the student, which teachers may find more effective for students with HFA/AS. In addition, simplify instructions by reducing the number of steps or words. Beyond oral explanation, write the instructions or steps down for the student. This suggestion is designed to eliminate distracting stimuli and focus student attention, again providing a visual cue that the student can refer back to if needed. Complex directions may need to be

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repeated. It is recommended that teachers check for understanding when directions are given orally. For example, have the student repeat or perform the first item, task, or problem with the teacher, paraprofessional, or another student.

Priming

Another general strategy that can be used to support the academic success of students with HFA/AS is priming (Koegel, Koegel, Frea, & Green-Hopkins, 2003; Myles & Adreon, 2001). Priming is a means of providing the student with task materials used for teaching prior to the lesson or showing materials that will be used in the lesson before the lesson occurs. Prim-

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ing also might involve previewing information or activities with which the individual is likely to have difficulty. The purposes of priming are: (1) to increase student competence, (2) to familiarize students with material, (3) to decrease frustration and anxiety, and (4) to allow exploration of concepts prior to instruction on them. In addition, priming is a strategy that links well to what is known about children with HFA/AS, namely that increasing predictability and familiarity significantly decrease confusion and problem behaviors.

Priming is an easy strategy to implement and is portable. Priming can occur immediately before the lesson or activity, the day before, or the evening or morning before. Priming can occur in the classroom or at home. Also, the priming activity can be conducted by anyone familiar with the lesson (e.g., teacher, teacher's aide, parent, etc.). A list or description of the activities that will occur can be one successful way to engage in priming. For example, if the activity is reading, the list should include the reading assignment, the number and type of questions the student will have to answer followed by an example, and whether the reading is to be done individually or in a small group. Other examples of priming activities include: prereading a story, reviewing a visual schedule, practicing with art supplies before doing an art project, talking about and showing a finished product, playing a game related to the activity, videotaping new activities and sites and showing the video before encountering the activity or site (e.g., showing a short video about the natural history museum before taking a field trip there), and using Social Stories™ (see Chapter 7 for a description of Social Stories). Finally, it is important to note that priming is most effective when it is brief, built into the student's routine, and conducted in a relaxed atmosphere in which the student will receive encouragement.

Assignments

Some students with HFA/AS will need additional time to complete tasks, whereas other students with HFA/AS will need tasks to be shortened (i.e., reducing the number of items to

be completed). One option for adjusting assignments that is helpful for students with HFA/AS is to divide worksheets into sections and have the students complete them one section at a time. Mark the sections that need to be completed. Give one worksheet or assignment at a time to be completed before moving on to another. This approach will allow more frequent feedback to the student while also reducing the task load. Also, use worksheets keyed to text page numbers or highlight select items to be completed as a way to provide a visual cue. In some cases, it also may be helpful to consider an alternate grading scheme such as using the number correct/number attempted $\times 100 = \%$.

Given that students with HFA/AS tend to spend large amounts of time concentrating on facts that will not be tested and may be considered less important, teachers should consider identifying exactly what material or information for which the student will be responsible. It will be helpful to teach students explicitly to use informational resources such as an index, table of contents, glossary, maps, and so forth. In addition, teach students how to find key words and concepts in directions and instructions (Silverman & Weinfeld, 2007). To provide greater structure in assignments, create task lists or job cards. These task lists or job cards may include such elements as step-by-step instructions, a list of materials needed to complete the task, the amount of time allocated for the task (if applicable), and prompts or information on how to stay engaged in the tasks. A sample of a task list that includes many of these elements can be seen in Figure 5.1. Such task lists or job cards may also color-code content and indicate where work is to be turned in (e.g., a folder or box of the same color; see Figure 5.1). Finally, a model of what is expected on assignments or a specific list of criteria for grading assignments may be helpful. In short, making expectations explicit for the student is key.

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Homework and Study Skills

Taking Notes

Students with HFA/AS may experience great difficulty with listening and writing at the same time. In addition, poor motor skills can affect both skill and motivation with respect to taking notes. Because note-taking skills increase in importance as students advance in grade (i.e., they are particularly important for middle- and high-school students), attention to teaching these skills directly and/or providing additional support is needed. Ideas that might help alleviate these concerns involve presenting alternatives or options for students to obtain notes through other means. For example, a peer can take notes and then share them with the student with HFA/AS. Students also may be allowed to use the computer or other assistive device to take notes. Another option might be for the teacher to provide the student with notes that have key words or phrases omitted for the student to fill in, thus

requiring active engagement during a lecture. A student also could tape-record lectures so that he or she may study from those "auditory" notes rather than from written notes. In a similar manner, taping text and allowing the student to listen to and read it for purposes of repetition can help with retention of material while studying. Finally, skimming and scanning are helpful study skills to teach as a way to help the student distinguish relevant from irrelevant information.

Homework and Assignment Notebooks

When giving homework, provide the student with the written homework assignment or check to ensure that the student has accurately written down the assignment. Once it is taught explicitly, an assignment notebook can be a useful organizational strategy, as well as a place to keep a record of assignments and expectations. Like other assignments, long homework assignments may seem daunting to the student and could create problems with the student's spending an undesirably long period of time attempting to complete it. To alleviate this problem, apply similar strategies to the homework as those applied for other assignments. Break homework assignments down (e.g., fewer math problems per page and in larger font) and/or reduced the total amount of homework required if the student already has mastered the material.

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Studying and Taking Tests

Students with HFA/AS often experience difficulties with studying and test taking due to executive function difficulties (i.e., organizational skills, sustaining attention). These issues, combined with the potential to experience increased anxiety, can render test taking a formidable challenge. Empowering students by teaching specific study and test-taking skills can help alleviate these concerns. Instruction in these strategies is particularly important for students in middle and high school.

An example of a studying and test-taking strategy with some research support for its use with students with HFA/AS comes from the *Test-Taking Strategy Instructor's Manual* (Hughes, Schumaker, Deshler, & Mercer, 2002). Materials from this manual were used with four high-school-age students with ASD in a study conducted by Songlee et al. (2008). The manual provides scripted lessons and explicit instruction in the strategies. In their study, the effectiveness of the strategies was examined using a multiple-probe design. Salient features of the strategies taught to the participants included the use of mnemonic devices, positive self-talk, strategies for approaching tests (e.g., "carefully read all instructions"), ways to reduce or chunk information, and strategies for choosing responses on tests (e.g., avoiding absolutes). Results of the study were very positive; students were successful in their application of the strategies as a result of instruction, the results generalized to tests that did not align directly with the strategy, and students' strategy use maintained 2 weeks postintervention.

SPECIFIC STRATEGIES

Reading Support

Typically, though not always, students with HFA/AS have good reading-decoding and word-reading skills. They may even have excellent vocabulary knowledge. However, reading comprehension remains an area of difficulty for many of these students (Nation, Clarke, Wright, & Williams, 2006). One reason it is believed that reading comprehension problems occur is that students with HFA/AS have difficulties with pragmatic language comprehension despite otherwise normal language abilities (Loukusa et al., 2007a; Norbury & Bishop, 2002). These deficits affect the ability to properly apply contextual information when answering comprehension questions. In particular, students with HFA/AS have difficulty focusing on *relevant* contextual information (Norbury & Bishop, 2002). Further, even when students can appropriately use context to answer comprehension questions accurately, they experience difficulty when asked to explain their correct answers. Although evidence suggests that the difficulties students have in answering questions decrease as students develop, students with HFA/AS still lag behind typical peers (Loukusa et al., 2007a). In a study further examining why students gave incorrect explanations, Loukusa et al. (2007b) suggested that these students tend to overgeneralize their own world knowledge. Also, when explaining their answers, students with HFA/AS tend to engage in frequent topic drifts. These topic drifts are more common in younger children with HFA/AS as compared with older children with HFA/AS. Loukusa et al. (2007b) concluded that because of difficulties inhibiting their train of thought, students with HFA/AS continued processing and thinking out loud even after they already had given a relevant answer. The tendency toward topic drift can contribute to difficulties in integrating or synthesizing information as well, further affecting comprehension.

Given this information, instruction should focus on specific skill development and teaching reading comprehension strategies, as well as on increasing student awareness of which skills and strategies are effective in producing correct responses and why. Further, techniques that sustain student attention to cues within the text and that assist with comprehension are important. In

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the sections that follow, several specific reading support strategies are offered as potential ways to enhance the reading comprehension of students with HFA/AS. Once again, many of the strategies rely on visual supports, and they are organized by those that are generally applied before, during, and after reading.

Before-Reading Strategies

One strategy that may be used before reading is priming background knowledge. The technique of priming was described earlier in this chapter. The purpose of applying this strategy to reading is to help students use what they already know about a topic to understand the

information they are expected to obtain from text and to support them in integrating that information into their existing schema about the topic. Priming is a useful strategy for many students, and it is particularly useful for students with HFA/AS who may experience difficulty when they are expected to link information in text to previously learned concepts. To maximize the utility of this strategy while preventing topic drift or overgeneralization of prior knowledge, consider two possible ideas described by O'Connor and Klein (2004). First, instead of prereading questions, use an abstract of the passage to activate prior knowledge that is relevant and accurate with respect to the passage. Second, use graphic organizers as a means of activating or priming background knowledge. For example, a topic wheel can be used to engage the class or group of students in a discussion of what they already know about a topic. Information from students is entered into each section of the wheel. For example, Figure 5.2 shows a topic wheel about salmon that could be used to activate prior knowledge before students read about the salmon life cycle. Additional examples of graphic organizers are presented later in this chapter.

Another useful prereading technique is called a picture walk (Zimmerman & Hutchins, 2003). In a manner similar to priming, students use the picture walk strategy to review illustrations within a story and make predictions about what might happen. The illustrations are used to confirm predictions. The information discussed as part of the picture walk
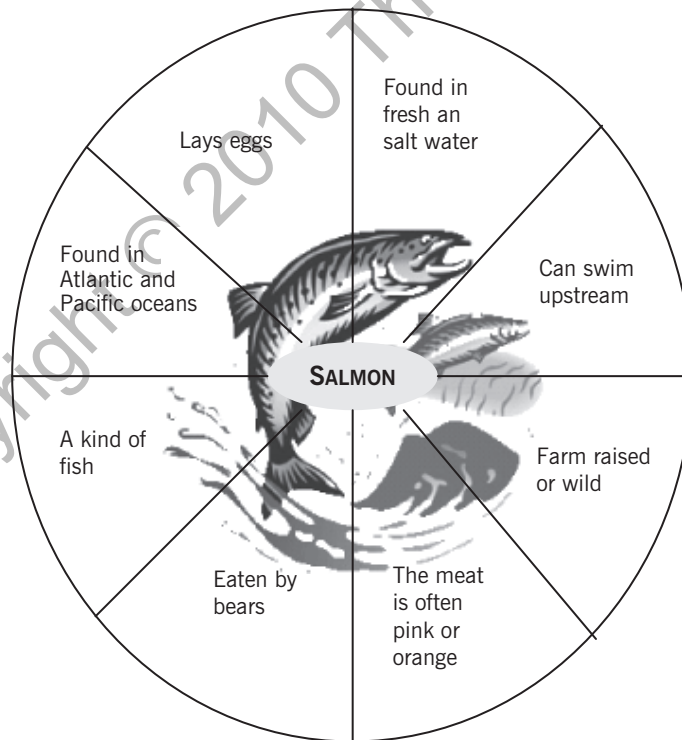

FIGURE 5.2. Sample topic wheel (graphic organizer) used as a prereading strategy.

provides a framework for the additional information the student will obtain while reading the text. Use of the picture walk strategy also can facilitate recall of details when comprehension questions are asked.

Finally, Silverman and Weinfeld (2007) provide additional prereading strategies that can be taught to prevent common problems with comprehension. They suggest that reading comprehension can be enhanced by carefully explaining ambiguous language such as metaphors, similes, idioms, and figures of speech that students might encounter as they are reading. They also suggest explaining the use of sarcasm and jokes with double meanings. Finally, they suggest that the use of nicknames be avoided or, if used, that they be explained to students so that they understand that, even though another name is used to refer to a person, its use does not indicate disrespect.

During-Reading Strategies

Using a think-aloud strategy is particularly helpful when focusing on strategies for predicting, questioning, clarifying, and summarizing (Gately, 2008). Essentially, the think-aloud process involves the teacher making the thought processes involved in each of these strategies explicit for the student. Thus, as text is read, the teacher periodically stops and discusses what he or she is thinking at that moment as it relates to the story. The idea is to make the teacher's thinking and the connection of this thinking to what is being read concrete and obvious to the student. After this type of teacher modeling occurs, students are asked to discuss their thoughts about what they are reading as well as to pose and answer questions.

Another during-reading strategy that may be helpful is goal structure mapping (Sundbye, 1998). This visual mapping strategy is used to help students understand chains of events, how the actions of characters in a story influence one another, and how events are organized in a story. It is particularly useful for students with HFA/AS with respect to their understanding of why a particular character might feel a certain way or engage in a particular action. Using the goal structure map, the student places information on each character and their actions into boxes and maps them out next to each of the other main characters in a sequential order. Then arrows are drawn to show how characters' actions influence other characters' actions.

Another strategy that can support students' reading comprehension as they read is anaphoric cuing, or cuing students to attend to pragmatic signals that inform them to search for a referent in the text (e.g., to search for and determine the referent for a particular pronoun). O'Connor and Klein (2004) determined the effectiveness of a cuing intervention designed to facilitate text understanding with a group of students with

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HFA/AS. The rationale behind the cueing process is that it allows students to monitor their comprehension as they read and also prompts them to use a rereading strategy, something

While Bill and Fred were getting ready to leave for lunch, something caught their

attention. As Bill stood looking out his window, **he** noticed people walking around on the
                                    (Bill, Fred, Larry)

roof of the building next door. Bill could not figure out what was going on up on the roof.

What might **they** be doing up there on the roof? As he thought about this . . .
  (birds, Fred and Bill, people)

FIGURE 5.3. Anaphoric cuing example.

good readers often do to maintain comprehension. In this intervention, the notion of anaphora as a short way of saying something in the story that has been said before is described to the student. Then, the student reads the passage. Whenever the student comes to one of these "shortcuts" that was encountered in text, three choices are presented underneath the shortcut word (i.e., a pronoun). Students are asked to select the correct referent for the shortcut word. In the O'Connor and Klein (2004) study, data demonstrated that anaphoric cuing increased students' passage comprehension significantly and produced moderate effect sizes. Figure 5.3 provides a framework for designing an anaphoric cuing intervention.

Although it could be time-intensive for teachers to place anaphoric cues into passages students will read, two possible solutions to this problem are suggested. First, the intervention procedure could be automated using computer software. Second, and more practical in the immediate sense, students can be taught to attend to and check pronoun antecedents as they are reading. If this second approach is used, teachers should model the strategy first and then watch students as they apply it and provide them with immediate feedback. For example, students could be taught to identify and highlight anaphora as a prereading strategy and then use those highlighted words as cues while reading.

After-Reading Strategies

The reading comprehension challenges of students with HFA/AS may be further complicated by their difficulties with understanding the emotions and feelings of characters. To help students in this area, emotional thermometers might be used (Westby, 2004). Gately (2008) suggests that using color (e.g., a shaded bar) and descriptive words to represent varying levels of emotional intensity (e.g., a little bit happy, very happy; see examples in Figure 5.4) provides a framework for understanding and describing the emotions of characters within a story. Doing so also can help students understand how a character's feelings affect the choices he or she makes or how they can change as events unfold in a story. This strategy also might be used to assist students in drawing conclusions and making inferences related to feelings and emotions of characters (e.g., why a particular character engaged in a specific action).
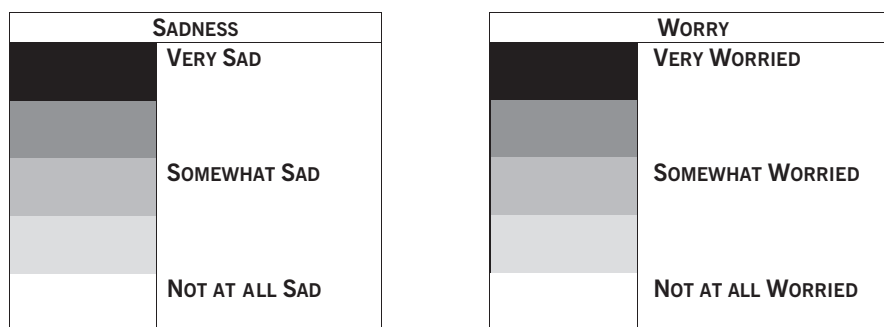
SADNESS		WORRY	
	VERY SAD		VERY WORRIED
	SOMEWHAT SAD		SOMEWHAT WORRIED
	NOT AT ALL SAD		NOT AT ALL WORRIED

FIGURE 5.4. Sample emotional thermometer.

Strategies during or after Reading

Visual supports for reading comprehension, such as semantic maps and graphic organizers, are useful not only for students who have difficulties answering questions about text, but also for students with HFA/AS. These tools present abstract or implicit information in a concrete manner to relate meaning to text. Semantic maps provide information in a brief, predictable, and systematic manner. They can include information using pictures and/or in written text. Tools such as semantic maps and graphic organizers are useful for students with HFA/AS because they present information in a concrete and consistent manner. The visual representation of information allows students more time to process information presented. Both semantic maps and graphic organizers also help students with HFA/AS analyze and synthesize information. Because these tools show how key concepts are related within an organized framework, they help students to organize and separate relevant from irrelevant information. These organizers can help students to identify unifying themes and/or common elements across pieces of information, which can be useful when teaching students to generalize. Both semantic maps and graphic organizers also can be used as a scaffold to help with story retell or recall of information from expository text.

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Four examples of these visual tools are shown in Figures 5.5–5.8. Figure 5.5 demonstrates an example of a semantic map that provides a visual representation of the history of the automobile. Figure 5.6 shows a graphic organizer that could be used to help students understand the information in a lesson about methods of transportation. These types of visual tools can be used when a teacher is presenting in a lesson or when students are reading from a textbook or discussing in a small group. They can also be helpful for students when recalling information in preparation for a writing activity. Graphic organizers for cause-and-effect text structure and basic narrative story grammar are shown in Figures 5.7
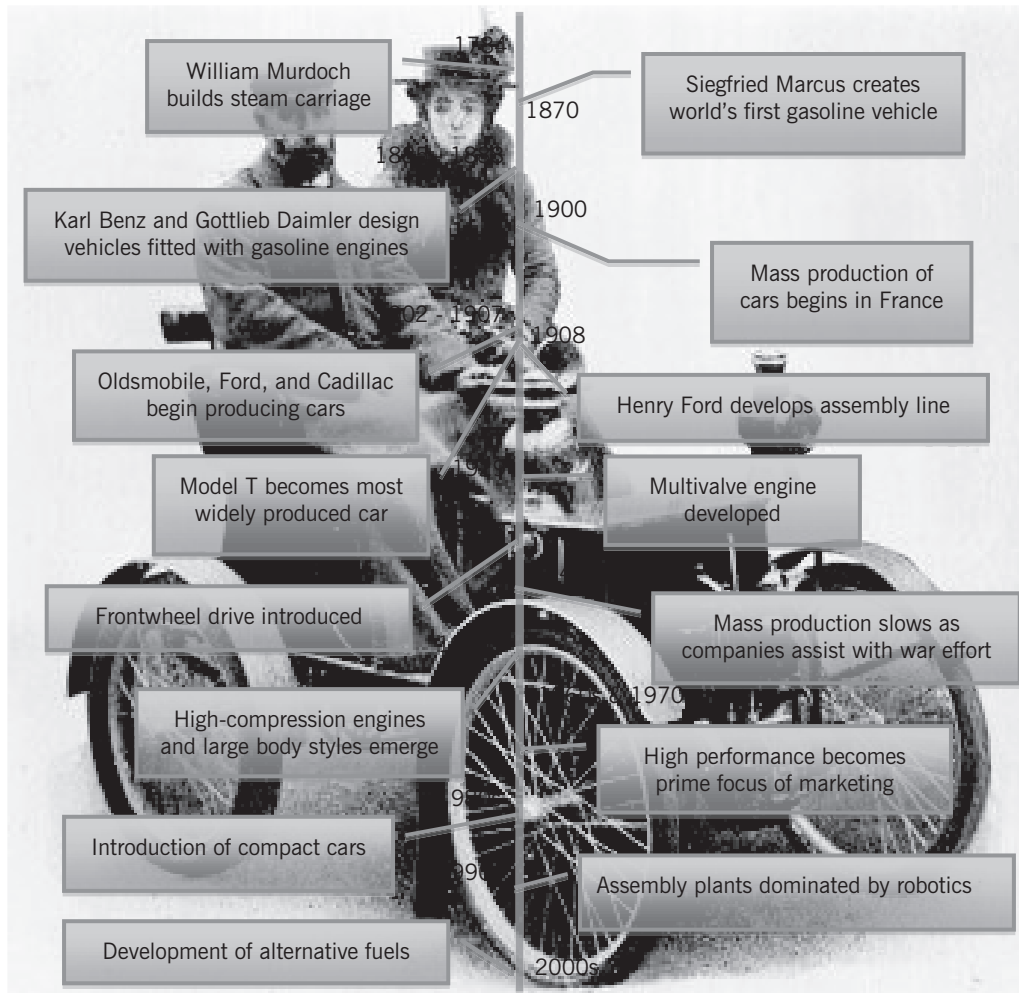
FIGURE 5.5. Semantic map example: History of the automobile.

	TRUCK	**TRAIN**
FEATURE #1	Heavy-duty tires to carry heavy loads	Moves along steel tracks
FEATURE #2	Large bed or trailer to carry loads of goods or materials	Connected series of cars that can carry loads or people
FEATURE #3	Powered by a diesel engine	Powered by a diesel engine or by steam

	BOAT	**PLANE**
FEATURE #1	Watercraft designed to float on water	Fixed wings that keep it in the sky
FEATURE #2	Open or closed compartment to carry loads or people	Closed compartment that carries loads or people
FEATURE #3	Powered by hand, wind, or engine	Powered by a jet engine

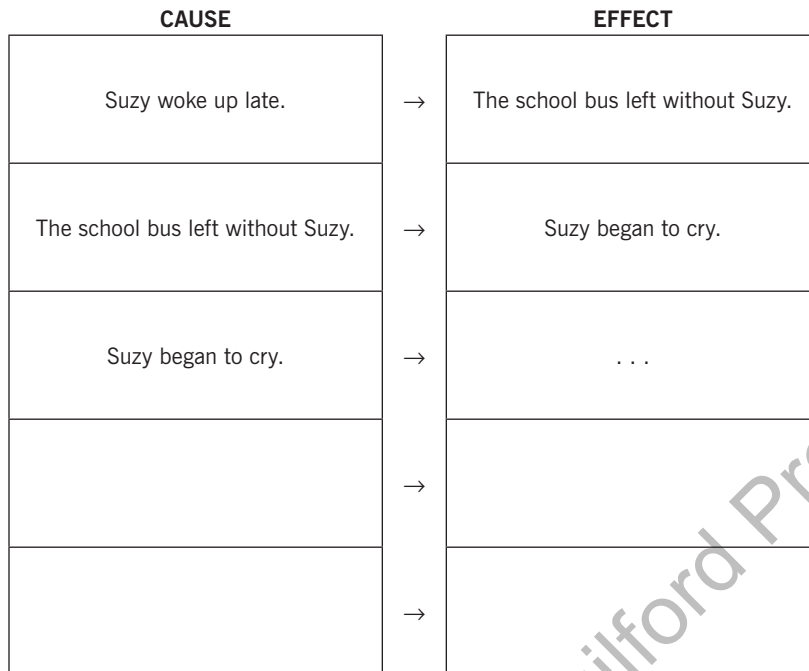**FIGURE 5.6.** Graphic organizer example: Features of modes of transportation.

CAUSE		EFFECT
Suzy woke up late.	→	The school bus left without Suzy.
The school bus left without Suzy.	→	Suzy began to cry.
Suzy began to cry.	→	. . .
	→	
	→	

FIGURE 5.7. Graphic organizer example: Cause and effect.

BEGINNING OF STORY

↓

MIDDLE OF STORY
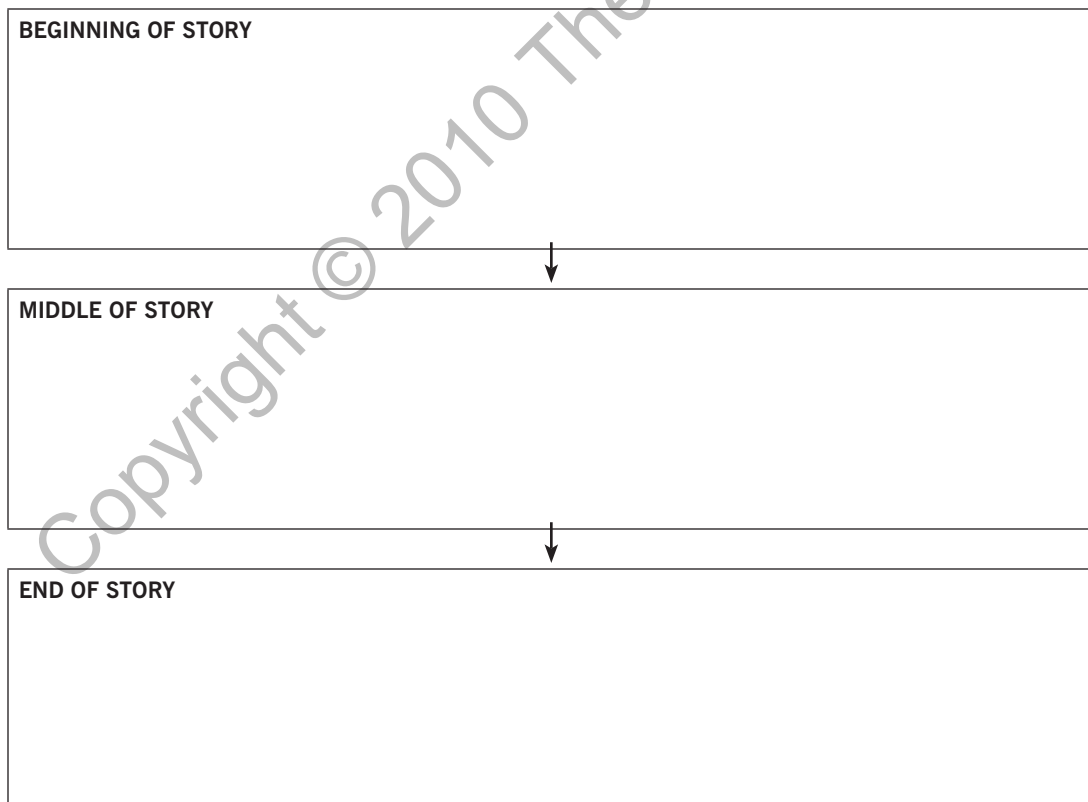

↓

END OF STORY

FIGURE 5.8. Graphic organizer example: Basic narrative story structure.

and 5.8, respectively. Teaching students about story grammar and text structure can provide them with a framework for making sense of what they read, as well as a permanent product from which to study expository material. When teaching students about text structure, it is useful to teach them to look for and highlight key words in the text that indicate a particular text structure (see Table 5.1 for a sampling of words associated with common types of text structure). There are too many examples of graphic organizers to display here; however, myriad graphic organizers are available for download at *www.educationoasis.com*.

Reading Instruction Process

The use of many of these strategies can be taught within the framework of a direct instruction or a model–lead–test teaching procedure. In particular, direct instruction should be provided in the following areas: drawing conclusions, generalizing, and distinguishing fact from fiction. When providing direct instruction, first provide a rationale by explaining to the student (1) why the information is useful, (2) how the student can use the information, and (3) where it fits in with the knowledge the student already possesses. During the teacher presentation stage, the teacher describes and demonstrates the goals of the content and explicitly indicates exactly what the student needs to learn. Information should be broken down into component parts and presented through both visual and auditory stimuli.

TABLE 5.1. Sample Key Words Associated with Types of Text Structure

Text structure	Sample key word(s)
Cause and effect	*As a result . . .*
	Because . . .
	Consequently . . .
	Due to . . .
	Nevertheless . . .
	Therefore . . .
Compare and contrast	*However . . .*
	Although . . .
	Compared with . . .
	In contrast . . .
	Like/similar to . . .
	On the other hand . . .
	Unlike . . .
Descriptive	*Also . . .*
	Another . . .
	Finally . . .
	For instance/example . . .
	Including . . .
	Such as . . .

Instruction should be active with the teacher presenting information, asking questions, and providing corrective feedback.

The process follows a model–lead–test format. When modeling the skills, the teacher must first be sure to obtain the student's attention and then move to showing the student what he or she is supposed to do. At the "lead" or "we do" step, the teacher and the student do the task together, with the teacher providing prompts and support as needed. This step may need to be repeated multiple times before going on to the next step. The final step is the test or evaluation step. At this point, the student is given the opportunity to do the task or skill without teacher support. Throughout the lesson, but in particular at this step, student understanding and use of the skill is assessed. Students may also be encouraged to use self-evaluation strategies at this step.

Remember that students with HFA/AS may know what to do but may not understand what the requirements are for how to do it (i.e., lack of awareness of how to arrive at the correct answer). Thus being provided with explicit instruction and teacher modeling during the initial teaching phase, as well as plentiful opportunities with the "we do" or "lead" stage, is crucial. The goal is for the student to attempt the skill on his or her own with few or no errors. When errors do occur, corrective feedback is provided immediately, along with another opportunity to demonstrate correct application of the strategy with support first if needed. Importantly, explicit instruction should lower the probability of students' practicing mistakes.

Writing Support

Students with HFA/AS may need support with writing tasks. At times, students with HFA/AS may produce writing samples that are brief and less complex than those of typical peers (Myles et al., 2003). Part of what may be contributing to these outcomes is that students with HFA/AS may have poor fine-motor skills. Likewise, students with HFA/AS often experience problems with visual–motor speed, in particular when using a pen or pencil (Silverman & Weinfeld, 2007). Both of these issues make the physical task of writing more difficult. They also may render written products illegible to the teacher. Process issues (e.g., topic drift, poor organization) and difficulties with pragmatic language also can affect content and quality of the written product. For example, students with HFA/AS often have difficulty internalizing a future context on which to plan and organize their actions (Silverman & Weinfeld, 2007). Thus students with HFA/AS may need support for both the mechanics of writing tasks and for the content-related aspects of writing tasks.

Dealing with Handwriting Mechanics

Students with HFA/AS may need explicit instruction in how to hold a pencil or pen with an appropriate grip in addition to instruction in the formation of letters (Silverman & Weinfeld, 2007). *Handwriting Without Tears*, created by Jan Olsen, takes a developmental approach to handwriting and includes basic exercises in top-to-bottom and left-to-right sequencing, as well as figure–ground discrimination (see *www.hwtears.com* for description and usage).

Other tools and supports that might help with the mechanics of handwriting include paper with raised lines, pencil grips, mechanical pencils, and markers that require minimal pressure (Silverman & Weinfeld, 2007). Consulting with an occupational therapist to find out about access to and use of materials to support the student in this domain of functioning can pay large dividends in the long run.

In addition to these instructional elements and support tools, it is useful to consider whether or not handwriting is really necessary or required to accomplish the goals of the lesson. If handwriting is not crucial to the goals of the lesson, then teachers might consider alternative means to achieve the same functional outcome. For example, can the student provide verbal responses instead of written ones? Alternatively, simple accommodations can be used to help minimize the physical demands of writing, such as (1) allowing students to write using the writing style that is easier for them (i.e., print vs. cursive); (2) allowing students to use a computer, typewriter, or other assistive technology; and (3) having an aide or volunteer write for the student (i.e., through the process of dictation). Using tests with multiple-choice response formats rather than short answers is another option. Finally, consider alternatives that might be used for student projects other than written work (e.g., posters, charts, models, and minipresentations).

> **Simple accommodations can be used to help minimize the physical demands of writing, such as (1) allowing students to write using the writing style that is easier for them (i.e., print vs. cursive); (2) allowing students to use a computer, typewriter, or other assistive technology; and (3) having an aide or volunteer write for the student (i.e., through the process of dictation).**

Writing Process and Content

With respect to formulating content for writing activities, individuals with HFA/AS often have difficulty formulating their thoughts spontaneously or have difficulties accessing memory. As a result, simple story starters may not be enough for a student with HFA/AS to produce an adequate written product. The student likely will need extra preparation in order to write a sufficient written product from a prompt. This extra preparation might include providing a story outline that the student can follow or using priming activities prior to engaging in the writing assignment (see earlier discussion of priming). Using visual organizers such as semantic maps also may help. Finally, the use of self-management strategies for editing will help to produce better writing. Examples include mnemonic strategies and checklists to ensure correct spelling, grammar, and punctuation. A sample checklist for writing tasks is shown in Figure 5.9.

> **The use of self-management strategies for editing will help to produce better writing. Examples include mnemonic strategies and checklists to ensure correct spelling, grammar, and punctuation.**

One specific intervention that incorporates the use of self-management and has recent research to support its use with students with HFA/AS is self-regulated strategy development (SRSD) instruction (Graham, Harris, MacArthur, & Schwartz, 1991; Graham & Harris, 2005). This intervention focuses on teaching specific writing strategies (e.g., plan-

ELEMENTS OF GOOD WRITING	MAKE A CHECK (✓) IF PRESENT/ COMPLETE
Topic sentence provided.	
Supporting information provided.	
All sentences relate to topic.	
All sentences make sense.	
Sentences sequenced appropriately.	
Conclusion provided.	
Punctuation checked and is correct.	
Spelling checked and is correct.	

FIGURE 5.9. Sample checklist for writing activities.

ning, monitoring, making revisions) using an explicit instructional procedure, along with scaffolding, to support students' use of the strategies. Part of this explicitness means that the instruction ensures that the student has the background knowledge to use the strategy. Thus, during the beginning stages of instruction on any particular strategy, the student is taught the necessary background knowledge to apply the strategy. For example, if the strategy is to use descriptive words, then initial instruction would focus on what descriptive words are and how they are used when writing. During this beginning stage, the rationale for the strategy is explained to the student. Modeling the use of the strategy, including the use of self-talk, is incorporated as well. Students are taught self-reinforcement and positive self-talk as a means of replacing negative statements about their writing skills. Practice with immediate feedback is provided prior to independent use of the strategy.

Two recent studies have evaluated the use of SRSD for students with HFA/AS. One study (Delano, 2007a) showed positive effects of this intervention as part of a broader video-delivered intervention package. Another study by Delano (2007b) using SRSD alone further demonstrated the efficacy of this strategy for a 12-year-old student with AS. In this implementation of SRSD, picture prompts designed around the student's special interest were used. Using a single-subject multiple-baseline design, Delano (2007b) demonstrated improvement in the student's use of three specific strategies; using action words, using descriptive words, and making revisions. Improvements were maintained in a 2-week follow-up as well. Finally, the overall quality of the student's writing improved. Therefore, it appears that SRSD is an effective writing intervention that incorporates many strategies discussed thus far (e.g., direct instruction, visual cues).

Math Support

Most students with HFA/AS have average math skills compared with typical peers (Chiang & Lin, 2007). In a practical sense this means that, in most cases, instruction in math can proceed as it does for typical students. Nevertheless, suggestions for supporting students

with HFA/AS are offered here based on what is known about the overall learning support needs of these students, as well as the difficulties they are likely to encounter with word problems.

Math Task Presentation

Because students with HFA/AS often learn best with visual supports, access to manipulatives provides a visual and tactile means of learning math facts. Having students complete computation problems on graph paper can help keep numbers in the correct place value column when completing math problems; turning lined paper on its side can provide a similar form of support. Both of these options allow the student greater independence in completing math problems. Sometimes, difficulties in math occur because the number of problems presented on a worksheet is overwhelming to the student. To avoid this problem, worksheets can be divided into sections, and the student can be given one section to complete at a time. Figure 5.10 shows an example of a math worksheet divided into three sections. At the end of each section there is a visual prompt for the student to seek feedback from the teacher. Alternatively, the print on the worksheet may be enlarged and copied onto several pages. These multiple enlarged sheets are not presented all at once. Rather, the student completes one and then turns it in to the teacher in exchange for the next one. Not only does this format chunk the task into more manageable pieces, but it also allows the student to encounter more frequent feedback and positive reinforcement for work completion from the teacher.

> **Sometimes, difficulties in math occur because the number of problems presented on a worksheet is overwhelming to the student. To avoid this problem, worksheets can be divided into sections, and the student can be given one section to complete at a time.**

Navigating Word Problems

> **Word problems can be challenging for students with HFA/AS because of their abstract nature. Efforts should be made to teach students with HFA/AS the types of word problems they will encounter, as well as explicitly teaching the algorithm or steps needed to solve them.**

Word problems can be challenging for students with HFA/AS because of their abstract nature. Efforts should be made to teach students with HFA/AS the types of word problems they will encounter, as well as explicitly teaching the algorithm or steps needed to solve them. Teach the student to learn strategies, such as how to follow a problem-solving routine or algorithm, but also teach him or her some variations in those routines in order to allow flexible responding when needed.

Students may need to be taught to look for key words or cues in the word problem that indicate the appropriate action steps. A list of sample key words related to various mathematical operations is found in Table 5.2. Sample problems, their associated key words, and the required operations are shown in Table 5.3. During a lesson focused on teaching a

258 − 245	218 − 177	57 + 51	452 − 282	29 − 28
80 − 24	339 − 13	235 + 197	403 + 65	164 − 133

Stop and check with the Teacher

357 − 110	457 − 377	224 + 145	43 + 41	473 + 266
241 + 28	334 + 12	143 + 127	460 − 97	91 − 79

Stop and check with the Teacher

242 − 204	419 − 364	243 − 202	255 − 240	148 + 125
132 + 75	239 − 19	103 + 58	315 + 107	97 − 25

Stop and check with the Teacher

FIGURE 5.10. Divided math worksheet with prompts to check in with the teacher.

problem-solving strategy using key words, the teacher could provide modeling using a chart like the one shown in Table 5.3 but with several word problems listed in the first column. On the first story problem, the second and third columns would be completed for the student as an example. The teacher can use this example to show the students how to highlight and then list key words and the required operation(s). Remaining problems listed on the chart can be used for teacher modeling and independent student practice. The number of problems used for modeling will depend on student success in identifying key words and the required operation(s). This strategy is similar to the reading comprehension strategy in which students are taught signal or key words to help them determine the text structure. Some other strategies to use with word problems are to draw a picture, make a chart, or use a table. These strategies capitalize on visual cues. Finally, word problems can be made more relevant or interesting to a student with HFA/AS by incorporating content that is related to the student's special area of interest.

TABLE 5.2. Sample Key Words Associated with Various Mathematical Operations

Mathematical operation	Key word(s)
Addition	*Increased by . . .* *More than . . .* *Combined together . . .* *Added to/together . . .* *Altogether . . .* *Sum . . .* *Find the total . . .* *How many . . .*
Subtraction	*Fewer/less than . . .* *Reduced by . . .* *Decreased by . . .* *What's the difference . . .* *Make a comparison . . .* *How many/much more . . .*
Multiplication	*Of . . .* *Times . . .* *Every . . .* *Multiplied by . . .* *Find the total . . .*
Division	*Per . . .* *Each . . .* *Out of . . .* *Ratio of . . .* *Percent . . .*

TABLE 5.3. Sample Story Problems, Key Words, and Required Operation(s)

Story problem	Key words	Operation(s)
Jeff rode his bicycle 5 miles to the skateboard park. He found a shortcut on the way home that was only 3 miles long. **How many** *miles did Jeff ride* **altogether**?	*How many . . .* *Altogether . . .*	Addition
Max wants to buy an iPod that costs $149. He has $25 saved. **How much more** *does he need to save? If he wants to save the remaining money needed in equal amounts over 4 weeks so he can buy the iPod in time to take it to summer camp, how much money must he save* **per** *week to buy the iPod?*	*How much more . . .* *Per . . .*	Subtraction Division

Use of Timed Tasks and Tests

Timed tests or activities often are a key component of math instruction. Unfortunately, students with HFA/AS may not understand timed tasks and the need to be efficient when completing them (Silverman & Weinfeld, 2007). In fact, these students "may not have the same sense of internal time monitoring or subjective time as other kids" (Silverman & Weinfeld, 2007, p. 61). To better prepare students for these kinds of tasks, teachers will want to ensure that students with HFA/AS fully understand the task requirements prior to using these timed tasks in the classroom. Thus, this may be yet another domain in which the use of priming might be helpful. In addition, the teacher may decide to mark where the student was at the end of the time limit to assess his or her fluency compared with that of classmates.

> **Timed tests or activities often are a key component of math instruction. … To better prepare students for these kinds of tasks, teachers will want to ensure that students with HFA/AS fully understand the task requirements prior to using these timed tasks in the classroom.**

CONCLUSION

A number of general and specific strategies for enhancing the academic success of students with HFA/AS were described in this chapter. The strategies described highlight the specific learning needs often encountered when teaching students with HFA/AS. Many of the strategies make use of visual cues, a high degree of structure, and explicit instruction. Although the specific strategies focus on the academic domains of reading, math, and written expression, they can be adapted for use in content areas such as science, social studies, and history. Teachers and other educators are encouraged to use and adapt these strategies based on data collected with their own students, with the goal of increasing positive school outcomes for students with HFA/AS.