



# 5

## Selecting Teaching Strategies and Arranging Educational Environments

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### **5.01 Principles to Guide Instruction**

#### **Learning Outcome**

*Describe the principles that should guide the development and implementation of teaching plans.*

### **5.02 “Universal” Strategies That Are Effective with a Wide Range of Students**

#### **Learning Outcome**

*Describe the teaching strategies that are effective for most students in general education classes.*

### **5.03 Specialized Teaching Strategies That Are Effective with Students Who Have Severe Disabilities**

#### **Learning Outcome**

*Describe the teaching strategies that are effective for students with severe disabilities.*

**I**n this chapter, we explain and illustrate a glossary of evidence-based teaching strategies that educational teams may select from when designing teaching programs. Some strategies will directly influence instructional methods, while other strategies pertain more to the classroom environment and organization. Chapter 4 described complementary approaches for measuring student progress, and Chapter 6 will explain a team process for planning and implementing instructional programs.

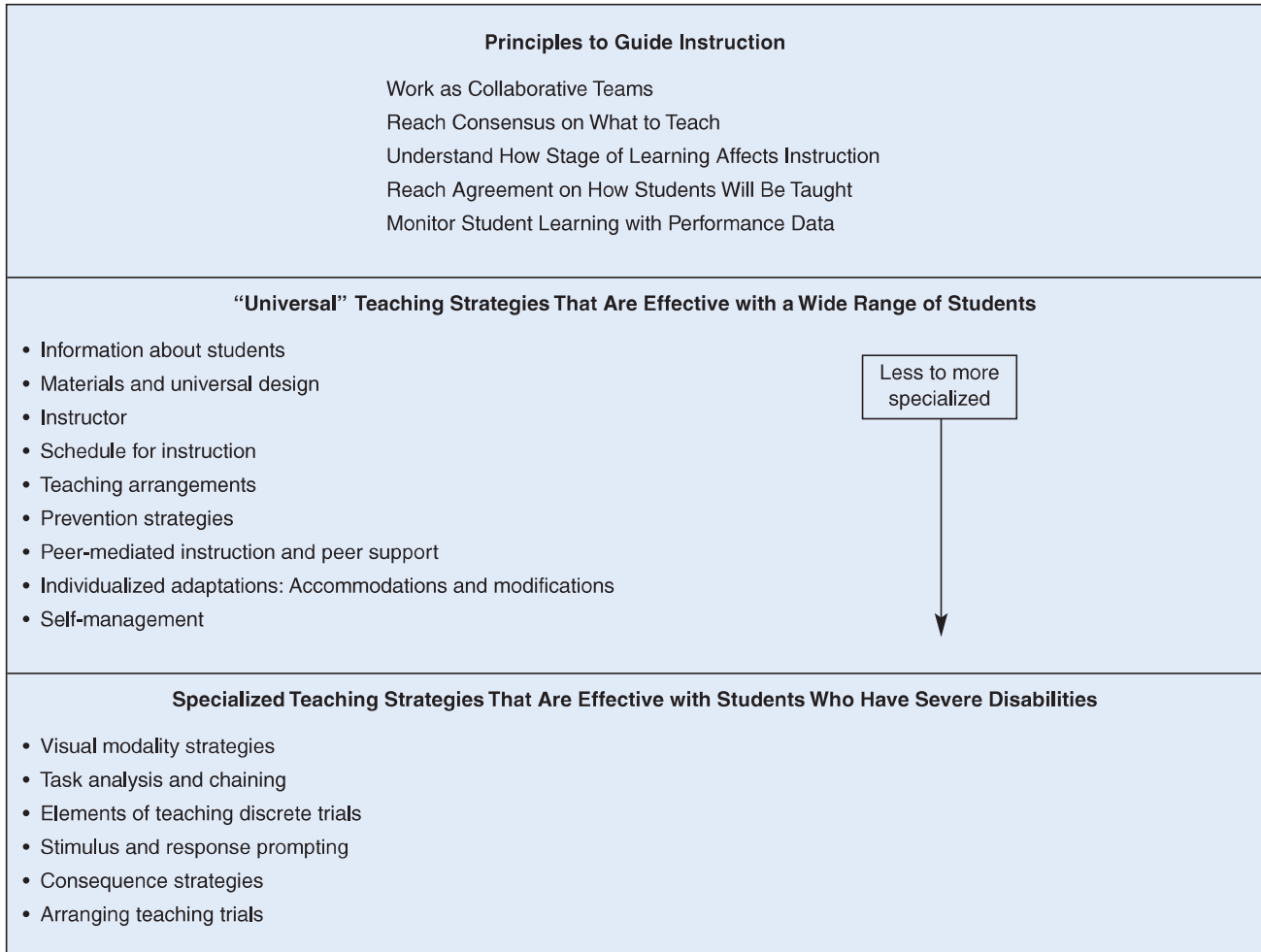
This chapter organizes teaching strategies in a manner recently suggested by Copeland and Cosbey (2008–2009), using the Response to Intervention (RtI) framework (Figure 5–1). In this model, less specialized teaching interventions are used before more specialized interventions are implemented to support student learning.

Using RtI logic means that educational teams follow several guidelines:

- Every student in a general education classroom gets the basic universal teaching interventions.

**FIGURE 5–1**

Teaching Methods That Are Effective with Students Who Have Extensive Support Needs



- Student performance data are used to judge the need for more specialized interventions.
- Intervention is additive so that when data indicate a need for more specialized interventions, the team selects additional methods, services, or supports.
- More specialized methods do not require a change in the teaching setting because location and methods are independent.
- The need for more specialized methods in one academic area does not necessarily indicate the need for more specialized methods in other academic areas; the selection of the teaching intervention relies on student performance data.

This chapter begins with five principles that influence teams as they plan instruction (see Figure 5–1); then we shift to describing *universal approaches* and *specialized approaches* to teaching.

## PRINCIPLES TO GUIDE INSTRUCTION

Educational programs for students with disabilities should be based on individualized instructional goals and supports, and tailored to their unique learning needs. Thus, the educational program for one student will look different than the program for

another student. The following five principles should guide teams as they develop individualized and effective educational programs for students.

### Work as Collaborative Teams

Designing educational programs to teach students needed skills requires that team members consider many factors to make decisions about the design of teaching programs. Decisions are made at numerous points, but only after team members share their different perspectives on the student, engage in relevant discussion and problem solving, and then reach consensus as a team (Friend & Cook, 2010). Members of the team draw on their separate areas of expertise as parents, special education teachers, general education teachers, speech and language pathologists (SLPs), occupational therapists (OTs), physical therapists (PTs), and, at times, school nurses, adaptive physical educators, mobility trainers, and consultants in deaf-blindness and autism to identify the goals and objectives that will be included in the student's Individualized Education Program (IEP) (see Chapter 3).

### Determine What to Teach

Teams start IEP planning by gathering assessment data on students using tools that less often are norm-referenced tests and more often are informal interviews and observations (see Chapter 3). These assessments are planned and carried out with the aim of identifying the student's unique needs and characteristics. The team studies these results and selects goals and objectives from three types of skills:

*Basic Skills:* These skills are behaviors that contribute to participation in inclusive environments, including toileting, eating, and dressing skills; mobility and getting around; reaching and grasping; communicating; making choices; following routines; classroom survival skills; working with classmates; and self-directed learning.

*Academic Skills:* These skills are knowledge and abilities that are drawn from the general education curriculum in reading, writing, math, science, and social studies and are adapted to suit the student's needs and learning traits.

*Functional Skills:* These skills pertain to everyday life, including domestic, recreational, community, and vocational skills, and may incorporate academic skills.

Team members then work together to identify the student's present level of academic and functional performance (PLAFP) in these targeted skill areas so that individualized goals and objectives can be written that are appropriate to the student. The IEP will (a) contain measurable annual goals that can be achieved in a year or less, (b) identify the intermediate, short-term objectives or benchmarks leading from the PLAFP to the goal level, and (c) specify the educational supports and services that address the student's needs.

### Understand How the Stage of Learning Affects Instruction

For *all* individuals, learning appears to move through different stages related to one's grasp of the target skill (Browder, 2001). These stages include acquisition, maintenance, fluency, and generalization. Thus, the ways we teach students who are just beginning to learn a skill will differ somewhat from the ways we teach students who are more experienced.

*Acquisition Stage:* Typically, skills in this stage are new skills, performed with accuracy varying from 0% to about 60% of the steps performed correctly (Farlow & Snell, 2005). The focus of early learning is usually on approximate performance of the core steps of a skill.

*When Marc was first learning to use a schedule in preschool, his teachers made a vertical set of shelves, one shelf for each major morning activity. On the shelves, they placed single objects that were used in the activity. Marc carried the object to the activity and placed it in a designated spot. Objects were changed for the afternoon so fewer objects were visible at a time. Later, picture symbol cards were added; finally, the objects were eliminated.*

However, for some students, the performance of the core steps of skills may not represent the initial priority; instead, their acquisition focus may be on extension or enrichment skills (Brown, Evans, Weed, & Owen, 1987). For example, a student like Christine, who has limited ways to participate in the motor aspects (core steps) of a skill, may more meaningfully begin with learning to initiate (e.g., selecting the hair-brush option on her speaking communication device to request that someone brush her hair) or choosing among several options (e.g., selecting a preferred snack from several options on her communication device to indicate her choice).

*Maintenance Stage:* During the maintenance stage, students are expected to use the skill for all of the routines or activities they complete. Skills in this stage, while still imperfect, are good enough to use with some level of independence. The adage “practice makes perfect” applies to this stage and reminds us of two things: (a) Forgetting is best remedied through regular and expected use; and (b) functional skills, because they are needed, offer extensive opportunities for practice. Maintenance is a stage that many teachers forget or at least find difficult to implement because it requires shifting from an active teaching role (e.g., prompting, praising) to a less active role by distancing themselves and giving intermittent attention. Researchers have found that when students cannot predict teachers’ supervision of their work on a task that they know fairly well, they attend better and complete more of the task (Dunlap & Johnson, 1985).

*Instead of only teaching Jacob to tell time during math instruction using an unplugged clock and flash cards (acquisition stage), his teachers also will have him use this skill at the end of every class activity, by asking him what time it is (maintenance phase).*

*Fluency or Proficiency Stage:* This stage uses the catchphrase “speed it up and perfect it.” Students may be taught to monitor the tempo (the rate and duration) of the task performed (e.g., Can I count out the money fast enough so that I don’t hold up the line of customers? Am I taking too long to empty the dishwasher?). Other students focus on improving the quality of task performance (e.g., Is the floor clean enough? Did I write my name at the top and staple the top left corner of my report?). Still other students work on both the tempo *and* quality of skills while also improving accuracy.

*Jacob is learning to look at the clock at the end of each activity, report the time quickly and accurately, and then identify the next activity on his pocket schedule.*

*Generalization Stage:* The goal of this stage is to learn to “use it anywhere and whenever it is needed.” In this stage, students are exposed to more variations in task materials and environments. They particularly need to learn problem solving because natural stimuli change and adaptations in their responses are required.

*Jacob will be taught to tell time using the variety of analog clocks that exist at home and school, including clocks with an incomplete array of numbers or numbers that are not Arabic numerals.*

## Reach Agreement on How Students Will Be Taught

Determining *how* to teach what is on the IEP is a team process. When selecting teaching methods, teams will consider students’ stages of learning with regard to the target skill and students’ preferences and dislikes. Also, teams will review their students’

learning history to assess what *has been* effective and what *might be* effective with particular students. To design educational programs, teams select and combine ideas that are not only practical and efficient, but also substantiated, logical, consistent with current knowledge, and likely to realize change in the desired directions.

The principle of parsimony (Etzel & LeBlanc, 1979) provides an uncomplicated rule for teams making decisions about how to teach their students: *Select the simplest but still effective approach*. First, the principle cautions educators against selecting questionable methods that are not founded on evidence. Second, when team members are faced with several potentially effective teaching approaches, the principle advises them to choose the least complicated approach. Often more than one adult fills the teacher role and sometimes peers do so as well. Thus, the methods must be acceptable to all and be uncomplicated enough to be consistently applied (*treatment fidelity*).

Furthermore, teams will follow the guiding principle of using methods that are “only as specialized as necessary,” thereby avoiding stigmatizing materials and approaches that are not age- or grade-appropriate or that draw unfavorable attention to the student. If it is necessary to make adaptations for some students, the adaptations should be designed to be as non-intrusive as possible for the student and as user-friendly as possible for the teaching team.

*Marc’s team adapted materials to simplify the demands of handwriting: He uses a stencil to help keep his letters in a smaller space and a small typing device to quickly spell out words that would take too long to print.*

*Jacob’s team adapted the expectations in spelling by selecting fewer spelling words from the class’s weekly list. For the class’s astronomy unit, the team identified just the core concepts that he would learn.*

*Because of her visual limitations, Christine’s team adapted the way that her job coach, teachers, and peer tutors presented new material to her or presented choices. They supplemented their verbal instructions with large images on a laptop or by giving demonstrations within her visual range. Thus, once at her library job, the job coach demonstrated the book scanner and her two switches; then they practiced this with the job coach role-playing a student checking out a book. When her peer tutor arrived for lunch, she began by showing Christine large images on her laptop of the campus grill lunch options while naming them.*

When needed adaptations follow the “only as specialized as necessary” rule, they will not emphasize the student’s differences, will mesh better with ongoing classroom instruction, and be easier for team members to use.

### Monitor Student Learning with Performance Data

The ongoing collection and analysis of student performance data allow teams to modify teaching approaches and strategies in order to maximize the effectiveness and efficiency of student learning. Chapter 4 describes the key principles, guidelines, and methods for collecting, summarizing, and analyzing student performance data to make changes to a student’s teaching programs. These data will allow teams to determine whether learning outcomes will be improved by changes in the instructional context, teaching methods, and/or the nature or form of the student’s response.

## “UNIVERSAL” STRATEGIES THAT ARE EFFECTIVE WITH A WIDE RANGE OF STUDENTS

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This section of the chapter will describe basic or universal strategies that have been successfully applied in general education settings with typical students *and* with students with disabilities. When well planned, a teaching program will involve strategies

that create a positive learning environment, make use of appropriate learning materials and supports, and involve teaching methods that are suited both to the student (the stage of learning and preferences) and to the target skill. Some approaches described are *antecedent strategies* in that they are planned before instruction actually occurs, and they dictate the organization, mechanics, procedures, and style of teaching, and thus concern the educational setting, materials, content, directions, teaching arrangement, and methods that teachers use to motivate student learning. Other strategies focus more on the *consequences* that teachers provide to students (reinforcement and error correction) or on some combination of antecedents and consequences. Teaching strategies range from simple to complex. Simpler antecedent methods include having a logical and consistent schedule of instruction or providing all team members with information on the student's preferences, learning challenges, accommodations, and goals for teaching. Ordinary and simple consequent strategies include giving students positive reinforcement for their improvements on target skills, providing opportunities to use their target skills, giving immediate corrective feedback, and offering a higher ratio of positive reinforcement to individual students than corrective feedback (e.g., the four-to-one rule) (Knoster, 2008).

Earlier we described “universal” approaches as methods that were demonstrated as being successful in general education settings with most students. These teaching strategies may include antecedent or consequent elements or both.

*For Jacob's team, the primary challenge was adapting fourth-grade reading, math, and content area lessons in ways that would maintain his engagement and participation for more than 10 minutes or so. The team decided to build on his preferences (video games, animals, and “anything on wheels”) while avoiding his dislikes (loud noises, crowds, and handwriting of any kind), which often triggered problem behavior. Using interesting content to teach academics was also appealing to many of his classmates, so a “Math on Wheels” group was started and “My Favorite Things” reading clubs were initiated. Jacob's fourth-grade teacher called on the school district's assistive technology consultant who introduced a wealth of academic video games to the fourth- and fifth-grade team and set up the school computers so that these games could be accessed. Jacob's team now had many strategies that would lengthen his learning engagement while also benefiting and appealing to his classmates.*

## Information About Students

Including students in general education often increases the number of adults who work with a student. Thus, it is important that all adults teaching a particular student understand a student's IEP goals and objectives, learning characteristics, needed accommodations and adaptations, key behavioral supports, and pertinent health information. Janney and Snell (2004) and Snell and Janney (2005) have suggested that (a) the Student Information Form and (b) the Program-at-a-Glance form can be useful in helping team members access this information (these forms will be discussed in more detail in Chapter 6). After the information on these two forms is shared at an initial face-to-face meeting, the completed forms are provided to relevant classroom teacher(s), specialty teachers, and paraprofessionals who work directly with the student.

## Materials and Universal Design

Materials must be suited to students and must facilitate learning. While this strategy seems to be obvious, suitable materials have great potential to enrich instruction and inappropriate materials can stifle learning and stigmatize students. Teaching materials (including school furniture, room arrangement, and school architecture) that possess several characteristics may promote learning and eliminate negative side effects. Most obvious among these characteristics are that the materials must be *matched to the learner's ability to use them*, including books adapted for meaningful use; work

activities that are linked to a student's understanding and ability to respond; and even desks and chairs that are the correct height and have any needed postural supports, as well as pencils that the student can grip and use.

A second characteristic concerns *age-appropriateness*, or whether teaching materials are linked to a certain age group that matches the age of the students being taught. Many typical students will reject materials that they perceive as being unsuitable for their age, and students who use age-inappropriate materials may be socially rejected by their peers who notice the mismatch. Sometimes teachers must make concerted efforts to either design or to locate materials that are suited to a student's ability and to his or her chronological age. Several other characteristics with regard to instructional materials are important: (a) the student's preference for materials and their general appeal to others, and (b) the variety and availability of suitable materials for teaching and for individual student manipulation (e.g., in science experiments and manipulatives for individual use in math).

When materials and curricula reflect a collective or common *universal design*, they are usable by more people. For example, curb cuts accommodate not only wheelchairs, but also bikes, strollers, and shopping carts. Telephones with larger and lighted numbers are easier for all to use. Reading material that is available digitally (instead of only in a textbook format) can be converted easily to other languages, made larger for viewing, printed in Braille, and read aloud by a screen reader (Center for Applied Special Technology, 2004). Programs such as IntelliTools<sup>®</sup> Classroom Suite (<http://aex.intellitools.com/home.php?ref=%2Fmain.php>), which provides a universally designed academic support program for math, social studies, science, and language arts, were created for use by all students, both with and without disabilities, and can be accessed by mouse, IntelliKeys<sup>®</sup> keyboard, or a switch.

The logic behind universal design is that materials and curricula should be created from the start to have alternative ways of being accessed so more individuals can participate successfully with fewer teacher modifications and prompts. Universal design was applied to redesign the high school science curriculum by Dymond and colleagues (2006) so that students with mild to severe disabilities could learn alongside their peers without disabilities. Changes were made in the instructional delivery, the organization of the classroom, the ways in which students participate, class materials, and assessment methods; both staff and all students gave positive evaluations of these changes. Universal design requires us to think differently—not just as teachers but also as publishers, architects, car manufacturers, computer programmers, and others. Because universal design increases accessibility, it can reduce the need for additional supports.

*After Mr. Evans, the middle school science teacher, met Jacob on his visit to the school at the beginning of his fifth-grade school year, he decided to go ahead with a universal design approach for the science lab. He had been inspired by his colleague Ms. Rayfield, who had had a student with limited vision in her geography class this year. She'd read about universal design and decided to rearrange her classroom so that every student had a direct line of vision to the chalkboard and the classroom maps. Using the same logic and some ideas that he learned from Jacob's teacher, Mr. Evans decided to create simple word/picture directions, which he knew that all of his students would benefit from. Using the Boardmaker<sup>®</sup> Plus! software program (Mayer-Johnson, Inc., <http://store.mayer-johnson.com/us/review/product/list/id/133/category/13/#customer-reviews>), Mr. Evans uploaded photos from the science lab to use in Boardmaker. With advice from the middle school reading consultant, Mr. Evans labeled the science equipment and work stations, took pictures of sequenced steps in planned experiments that students would carry out that fall, illustrated the directions for each experiment, and added pictures of all of the materials that students would need to gather before starting an experiment. Finally, he added simplified directions with photographic illustrations for cleanup and safety (e.g., wearing safety glasses, disposal of chemicals). When the new school year started, he introduced picture labels first to students, followed by teaching the word/picture directions.*

## The Instructor

Teaching plans are ultimately the responsibility of the special education teacher with input from other team members. The plan denotes what is taught, when, where, with which classmates, and by which adult, as well as how learning is evaluated. When the student is taught in the general education classroom or during scheduled activities like P.E., teaching programs must mesh with classroom schedules, planned activities, available staff, and feasible grouping arrangements to take advantage of the opportunities for learning with and around peers.

## Collaborative Teamwork

Teams have many options for determining who will teach: the general or special education teacher, a paraprofessional, related services staff, and peers. The more cohesive the team, the more likely it is that the teaching plans will fit into ongoing school activities and suit multiple instructors. If cooperative learning groups are used in classrooms, peers will help teach each other. In addition, older students (typical or with disabilities) in a cross-age tutoring program may be taught to serve as the tutor of younger students (typical or with disabilities). All adults who teach also need to be involved in team conversations about the student's progress so that any problems can be solved together. When instructors communicate as a team, having multiple instructors can be beneficial because it (a) encourages students to generalize their learning across people, (b) provides the team with broader experience in teaching the student, and (c) prevents over-involvement of instructors with students or their isolation from peers.

Several researchers have studied students in inclusive elementary classrooms and have found that the individual who taught (e.g., general or special educator, paraprofessional, another student) made little difference in the student's level of academic response (Hunt, Soto, Maier, Muller, & Goetz, 2002; Logan, Brakeman, & Keefe, 1997; McDonnell, Thorson, & McQuivey, 1998). What does seem to influence a student's academic response in these classrooms is a combination of factors: (a) whether there is team collaboration on students' objectives and educational supports; (b) the arrangement used: The rate of engagement is slightly higher when the number of students are fewer (cooperative group or small group or one-to-one instruction versus whole-class instruction); (c) whether instruction is directed toward the student (i.e., the student is given opportunities to respond, is given materials, and is given feedback), which seems to improve a student's rate of response; and (d) having individualized instruction: Academic responses increase when the teaching method is tailored to the student.

## Rethinking the One-to-One Assignment of Paraprofessionals

A practice often used by schools and IEP teams is to pair students who have more extensive support needs with paraprofessionals for much of the day. Dymond and Russell (2004) confirmed this practice; they found that students with severe disabilities in grades 3–5 spent less time included in general education than younger students and, when included, they were more likely to be supported by a paraprofessional than a special education teacher. When a single teaching assistant spends much of the school day with a single student, problems can result. Giangreco, Edelman, Luiselli, and MacFarland (1997) studied this staffing practice and identified eight undesirable patterns that may develop when teaching assistants are in the exclusive role of assisting a single student. Teaching assistants may do the following:

1. Obstruct the general educator's role by having complete control in implementing the student's program
2. Isolate the student from classmates by removing or distancing the student from other students and activities
3. Promote dependency on adults

4. Affect peer interactions negatively by their constant proximity and their sometimes protective approach
5. Use less-than-competent teaching
6. Encourage a loss of personal control by failing to promote choice making or peer interaction
7. Be insensitive to the student's gender, for example, by taking male students into female bathrooms
8. Distract classmates, for example, by involving the student in activities that differ from classmates

Schools and educational teams are advised to rethink their practices and policies concerning the use of paraprofessionals so that these problems are prevented. Experts who have written about pairing paraprofessionals with students who need support have made some suggestions about addressing these potential difficulties (Carter, Sisco, Melekoglu, Kurkowski, 2007; Doyle, 2008; Snell & Janney, 2005). We list seven of these suggestions:

1. It is important to broaden the responsibilities of general education classroom teachers so that they are centrally involved in the supervision of special education teaching assistants.
2. Classroom teachers and paraprofessionals should have basic training in systematic instruction, including ways to promote peer interaction.
3. Classroom teachers should feel ownership of the students with disabilities in their classrooms so that they are invested in their instruction and their learning.
4. Paraprofessionals need job descriptions that set forth their responsibilities and the line of supervision. When their responsibilities include participation on the student's planning team, paraprofessionals have input and can benefit from team thinking.
5. Students' schedules should be designed so that they are truly integrated into class activities and peer interactions, using adaptations as needed to promote meaningful involvement; *simply being present with an assistant does not constitute meaningful inclusion.*
6. Peer support interventions (described later in this section) offer a proven alternative to the use of one-to-one, adult-delivered support and redefine their role as supporters of a network of peers (Carter, Sisco, Melekoglu, & Kurkowski, 2007).
7. Finally, for students who need more personal assistance and the support of a paraprofessional, several practices may reduce the possibility of isolation: (a) Assign two assistants to a single student, each for part of the day, and let assistants rotate among other students; (b) assign assistants to classrooms instead of to students; (c) vary a student's support so it rotates among team members; and (d) design teaching arrangements so that team members reduce one-to-one instruction and increase instruction in pairs or small groups of students with mixed abilities.

*Christine receives support and instruction at a variety of locations both on campus and off. She has different teachers in these different settings: two paraprofessionals, a job coach, the drama teacher, and her special education teacher. Three peers lend informal support and friendship instead of formal instruction. Her physical and occupational therapists and her speech language pathologist all provide input on a consultative basis, teaching only to demonstrate to others. The special educator and the job coach also supervise all of those who teach.*

### Schedule for Instruction

Classrooms need to have planned and predictable schedules from the first day of school. The schedule for students with disabilities will reflect the schedule for the general education classroom(s) where they are members and any additional instruction at other locations. One way of addressing this need is through the use of a

program planning matrix of IEP objectives by scheduled general education activities that indicates when, where, and how often instruction takes place for a student (see Chapter 6).

*Marc, who has a diagnosis of autism, will be 6 years old in the spring of his kindergarten year. His preschool program was self-contained, but he is now included, with the needed supports, in his neighborhood elementary school and the kindergarten class. One of his IEP goals is to use pictures or words to express needs and make choices. By using a program planning matrix, his teacher is able to identify the activities in his kindergarten class (e.g., arrival, circle, small group) when he can receive instruction on this skill.*

Like their peers, students with severe disabilities learn both inside and outside the classroom: in hallways, other classrooms, and the cafeteria; outside the school on playgrounds; at the bus loading areas; and in the community. As these students grow older and their IEP objectives include skills or activities not targeted for typical students, their instruction will expand into alternative settings beyond the general education classroom. As a general rule, some alternate teaching settings away from the general education classroom but in the school (with or apart from peers) are necessary during the later elementary and middle school years.

*Instead of participating in the afternoon kindergarten activities, Marc receives one-to-one instruction in the resource room on grade-level academics and self-care skills, and in learning school routines more independently (e.g., lunch, library, fire drills). The goal for next year is for Marc to spend most of the day with his first-grade class.*

*Jacob spends more than half of his day with his fourth-grade class, but receives short daily instructional sessions, one-to-one, in the resource room on handwriting and language arts. These are two areas where he has particular difficulties in the fourth-grade curriculum. The success of his positive behavior support plan has meant that Jacob's time in general education is fairly free from the tantrums that he often had from kindergarten through last year.*

During the middle school, high school, and post-high school years, as the instructional focus for students with severe disabilities shifts to include more functional academic, community, and job-related skills, the alternative teaching settings expand to include stores, offices, libraries and other public buildings, streets and sidewalks, restaurants, and work settings in the nearby community. Teams still must plan for general education classes or school activities that maximize students' continued contact with peers.

*Christine spends the bulk of her school week learning vocational skills in community settings, but she participates in the Best Buddies Chapter on the university campus, where her post-high school class is located. With the support of a teaching assistant and several of her classmates, she is active in the university drama club.*

## Teaching Arrangements

Most students with severe disabilities, much like their typical peers, can acquire the ability to learn in groups and can also benefit from observing others learn. While there is clear research support for teaching students with severe disabilities in various-sized, homogeneous groups (from two to five) in special education settings, there has been far less research conducted on teaching these same students along side their peers without disabilities (e.g., Collins, 2007; Wolery, Ault, & Doyle, 1992). Likewise, little research exists on the effects of varying instructional arrangements and instructors in general education classrooms on learning for students with severe disabilities. One exception is a study by Carter and his colleagues (Carter, Sisco, Brown, Brickham, & Al-Khabbaz, 2008). They found that in inclusive secondary classrooms teacher proximity had two predictable effects on students. When teachers were close to

students with disabilities, students interacted far less often with peers than when teachers were at a distance; however, students' academic engagement increased when teachers were close.

The task of teaching is more complicated whenever instruction is differentiated to suit a mix of ability levels. However, it also is true that most small groups of students, with or without disabilities, reflect a range of ability and that differential instruction can only improve what the group members will learn. Teaching arrangements (one to one, student pairs, small groups, or large groups) should be chosen carefully to suit the student, the skill objective, and the setting. When students experience difficulties in remaining with a small group, or in attending or learning, the team must identify the difficulties and build the skills.

### One-to-One Instruction

On a practical level, one-to-one instruction has *not* proven to be as beneficial to students with severe disabilities as many educators have thought (Carter, Sisco, Melekoğlu, & Kurkowski, 2007; Giangreco, Halvorsen, Doyle, & Broer, 2004). Historically, the rationale for one-to-one instruction has been to minimize distractions and thus enable stimulus control (Rotholz, 1987). Some confuse the notion of *individualized* instruction for students with *individual* instruction, but they are not synonymous. Individualized instruction is teaching designed to suit a specific student and can be delivered in a variety of teaching arrangements, while individual instruction usually means that one adult teaches one student.

One disadvantage of one-to-one instruction is the increased probability of failure to generalize. Skills mastered by students with autism and other severe disabilities in one-to-one arrangements do not automatically generalize to larger groups of students (Koegel & Rincover, 1974) or to people other than the original teacher (Rincover & Koegel, 1975). Another disadvantage is that the student is excluded from being with other pupils, which means that the student does not learn how to participate in a group and loses many opportunities for peer-to-peer teaching, peer reinforcement, social interaction, and learning by observing peers (Farmer, Gast, Wolery, & Winterling, 1991; Stinson, Gast, Wolery, & Collins, 1991). In contrast, small group instruction allows opportunities to experience taking turns, waiting, and imitating others—skills that have practical value in everyday life. Finally, one-to-one instruction is not cost effective in terms of teacher time. It results in increased downtime (i.e., non-instructional time) for students. Thus, one-to-one instruction should be reserved for teaching tasks in which (a) privacy is required, (b) other students cannot easily be included (e.g., job training), (c) an older student (or a peer) teaches a student in a supervised tutoring program, and (d) short-term intensive instruction is needed during part of the day for a specific skill.

If a student cannot work in a group, there should be IEP objectives directed toward that goal. Teams will want to consider several old but proven strategies that build these skills by varying the teaching arrangement, including tandem instruction, sequential instruction, concurrent instruction, and combination instruction (see Table 5-1).

### Small Group Instruction

Having the ability to learn in a group of two or more students is important for several reasons (Collins, Gast, Ault, & Wolery, 1991; Wolery, Ault, & Doyle, 1992): (a) Most teaching in general education happens in groups, both small and whole class; (b) teaching in groups is more efficient for teachers and creates less non-instructional time for students; (c) group instruction, when conducted skillfully, provides opportunities for students to learn by observing others; and (d) group instruction allows students to interact with peers and creates occasions for teaching peer interactions skills. General education and special education teachers must make several decisions when

TABLE 5-1

## Methods to Build Group Participation Skills

**Tandem Instruction**

Instruction begins with a one-to-one arrangement, and then other students are added gradually, one at a time, until there is a group. With students who appear to have difficulties, use simple requests or visuals to “sit quietly,” “put your hands down,” or “look at this.” Gradually fade continuous reinforcement for staying with the group and participating. Koegel and Rincover (1974) found that while slowly increasing the group size from one to eight students, attending skills were shaped along with students’ ability to tolerate less reinforcement. However, the same attending skills can be shaped in the context of the group itself. Thus, tandem instruction can be used part of the day while the same student participates in some groups for short periods at other times of the day—a strategy that reduces the disadvantages of gradually fading out one-to-one teaching (Rincover & Koegel, 1975). This approach is good for students with little experience working in groups (Collins, Gast, Ault, & Wolery, 1991; Wolery, Ault, & Doyle, 1992).

**Sequential Instruction**

Students are taught in a sequential manner (each student gets one turn, while others wait their turn) (Brown, Holvoet, Guess, & Mulligan, 1980). Reinforcing group members who are engaged and attend to others as they take a turn increases the possibility for observational learning (e.g., Fickel, Schuster, & Collins, 1998). Alternatively, the waiting time can be replaced with another activity for students who are less skilled at waiting, although these students will have less opportunity to learn by observing others. When sequential instruction is used, it is better to give turns contingent on being ready or contingent on being prompted to be ready instead of simply giving turns in sequence and risking giving turns to students who are inattentive or misbehaving. Thus, turns should not be given in strict sequential order.

**Concurrent Instruction**

Direct instruction is provided to an entire group, with individuals responding or with the group responding in unison (Reid & Favell, 1984). When the diversity of a group is increased, teachers must adjust their presentation of content so that all students can understand (e.g., use words, signs, and concrete objects to describe the task or concept being taught) and allow a variety of response levels and modes so that all students can participate.

**Combination Groups**

In many classrooms, it is not unusual to address a concept within the whole group, give instructions for an activity that applies the concept, and then divide into smaller groups of mixed or similar ability levels to carry out the activity. Ideally, groups will have cooperative activities geared to individual abilities and goals. The teacher also may provide instruction to one group at a time or teach each group using turn taking (sequential). Students who have difficulty working in a group may be faded gradually into a group (tandem model) from a one-to-one teaching arrangement with peers or special educators in the same classroom as Koegel and Rincover (1974) did with students who have autism. Likewise, students first may be taught to work independently for brief periods on an academic task related to the grade curriculum (e.g., cutting out 10 words and matching them to 10 pictures), after which they join a small group where individualized instruction is continued during turn taking (Rincover & Koegel, 1975). The latter example is a combination of tandem and sequential models.

planning small group instruction. Is the goal academic learning, social interaction among group members, or both? What will the composition of the group be (e.g., ability levels, group size)? What skills will be taught and what materials are needed to teach those skills? What will be the actual physical arrangement? When students with severe disabilities are included in a small group with typical peers, the team must differentiate instruction so that all members can understand the task, perform, and learn. The specific objectives taught will differ across group members, but it is beneficial when the academic content (e.g., math, language arts) or teaching focus (e.g., learning volleyball in the gym) is the same for all students. When the academic content is the same (e.g., adding and counting amounts), *multilevel instruction* will need to be planned so that each student is learning at a level that is commensurate with his or her current skills. With the learning task adjusted to suit students in the group, the teaching materials also may differ across students. (The teaming process to plan multilevel instruction and adaptations is described in detail in Chapter 6.)

There are two variations for teaching groups of students described in the literature (Brown, Holvoet, Guess, & Mulligan, 1980; Wolery, Ault, & Doyle, 1992). The *intrasequential* arrangement involves the teacher presenting teaching trials to each student one at a time, but not programming any student-to-student interaction within the group. In the *intersequential* arrangement, the teacher makes use of observation learning and prompts students to attend to each other during instruction, to provide assistance as needed, and to praise each other. Both approaches require that the teacher be situated within reach of the students to present materials, to prompt, and

to provide corrective feedback. The intersequential approach requires that students be able to see each other, thus suggesting a circular arrangement, either seated in chairs or on the floor, or standing, depending on the task. Research presented next (enhanced group instruction and observation learning) lends support to the intersequential approach. Table 5–1 describes several other variations for building students' skills to learn in small groups: tandem, sequential, concurrent, and combination.

By studying the amount of peer interaction and academic engagement of middle and high school students with intellectual disabilities, Carter and his colleagues (2008) made some discoveries that are important to this discussion. When in small groups without direct special education support versus other arrangements (whole group arrangements or independent work), students with disabilities interacted two to three times more often with their typical peers. But when a general or special educator was nearby, there was considerably less social interaction. However, students with disabilities showed substantially more *academic engagement* (e.g., attending to instruction and materials, responding on task) when these same teachers were in close proximity during small group arrangements or one-to-one teaching. They concluded that teaching students with severe disabilities in small groups alongside their typical peers was still the best intervention for promoting peer interaction and learning. Furthermore, drawing on other research, they recommended that the goal of increasing meaningful social interactions might best be achieved through peer support interventions. When peers are equipped to support their classmates with disabilities both socially and academically, reliance on paraprofessionals can be reduced and substantial improvements in social interactions can occur (Carter, Sisco, Melekoglu, & Kurkowski, 2007).

### Enhanced Group Instruction

Enhanced group instruction (EGI) (Kamps, Dugan, Leonard, & Daoust, 1994; Kamps, Leonard, Dugan, Boland, & Greenwood, 1991), which uses an intersequential approach, has been found to be effective in promoting responding and learning in small groups of students with intellectual disabilities and autism. Teachers working with groups of three to five students made tasks interesting and promoted learning by (a) requesting frequent student-to-student responses, (b) using fast-paced and random trials, (c) rotating materials and concepts taught, (d) using multiple examples of each concept taught (a minimum of three sets per concept), and (e) using individualized sets of materials for each student. These strategies meant that students were handling learning materials and actively and repeatedly responding to the teacher and to classmates on task concepts. As a result, they focused on the target stimuli, participated in the target response, and were reported as being interested in the group activity. While all of the students in these studies had disabilities, many of these group strategies for making instruction interesting and focused are often used in heterogeneous groups in general education classrooms and appear to have the same effects with a diverse array of students (Hunt, Staub, Alwell, & Goetz, 1994; Snell & Janney, 2000; Tomlinson, 2001). To the extent that enhanced group instruction makes teaching more effective for *all* learners, it has the features of a *universal design* in that it benefits most, if not all, students.

### Observation Learning

It is not surprising that students with severe disabilities can learn by watching others. Researchers have shown positive learning effects from intersequential arrangements where one student observing another student acquires academic skills (e.g., spelling one's name, adding, using a calculator, identifying community signs) and non-academic skills (e.g., sharpening a pencil) (Brown & Holvoet, 1982; Doyle, Gast, Wolery, Ault, & Farmer, 1990; Singleton, Schuster, & Ault, 1995). In these studies, which involved only pairs or small groups of students with disabilities, students not only learned the

skills that they were taught directly, but also acquired some of their classmates' skills that they had only observed or that had been presented to them incidentally. Learning through observation in small groups works well when group members have the same type of task (e.g., identifying over-the-counter medications) but are taught with different materials (e.g., each student learns two different medications) instead of all having the same materials.

*Christine's teacher, Ms. Rowyer, places two other students together with Christine when teaching them to identify community words. They look at videos that have been taken of familiar locations in the community—locations that all of the students are learning to use more independently (e.g., several grocery stores and fast-food restaurants, two discount stores, and the video store). The videos show close-ups of frequently encountered words that are also target sight words that they are learning to locate, read, and act upon. When starting a new set of words, Ms. Rowyer shows and also gives them each a different word card (Christine's words are written in large font), names the words, and states their meanings. They review these responses and then watch the video segment where the three words are naturally displayed. Ms. Rowyer uses time-delay prompts to teach them to match the words to her identical card, name the words, and state their meanings. Then they switch words and repeat the process.*

Learning through observation in small groups also works well when typical classmates model functional tasks for students with severe disabilities while stating each step that they perform (e.g., spelling their name with letter tiles, using a calculator) (Werts, Caldwell, & Wolery, 1996).

*During kindergarten, Marc's teacher often groups Marc with two peers to help teach him routines such as putting things in his cubby and getting ready for snack time. Jacob and Meredith are good models; they make sure that Marc is watching and then perform one small step at a time as they tell him with words and gestures what they are doing.*

### Cooperative Learning Groups

Strategies to promote cooperation among students working toward a group goal have had widespread application in regular education programs (Johnson & Johnson, 1997). Many of the strategies for successful group instruction are evident in cooperative learning groups, with the added advantage that students learn to cooperate with others while shifting competition with others to competition with oneself (Snell & Janney, 2000). Slavin (1991) defines cooperative learning methods as "instructional techniques in which students work in heterogeneous learning teams to help one another learn academic material" (p. 177). In contrast to the group arrangements just described, cooperative learning groups work more independently from the teacher. However, cooperative learning groups receive instructions on the purpose of the activity, have ongoing supervision, interact with the teacher, and require a great deal of teacher planning.

*Marc's kindergarten teacher makes frequent use of cooperative groupings. The cooperative activities are changed daily and involve art (making a mural together), music and dance, building with blocks or other materials, science, cooking, or games. The small groups are balanced so that children who need extra assistance and those who are more independent are spread out among the groups. Group membership changes several times over the school year. Following simple directions given by Ms. Kwan, the kindergarten teacher, the students move with their group to the activity, get settled, receive instructions, participate together, finish the activity, and clean up. After instructions or a demonstration of the activity, Ms. Wharton, the special education teacher, and Ms. Kwan rotate among the groups and help group members decide who will do what to contribute to the activity. For example, Marc, who likes to put things in their places, is often given responsibility for putting materials away for his group.*

*Marion and Charles, each with delayed language, are in different groups; they enjoy passing out items to group members and benefit from naming group members, so they are often given such tasks.*

Several examples of cooperative learning groups have involved students with severe disabilities in general education classrooms. Dugan and colleagues demonstrated that fourth graders with autism could learn skills such as word recognition, peer interaction, and academic engagement alongside their peers in social studies cooperative groups (Dugan, Kamps, Leonard, Watkins, Rheinberger, & Stackhaus, 1995). Hunt et al. (1994) taught second graders to use positive feedback and prompts to assist classmates with movement, cognitive, and communication disabilities to respond in cooperative groups. The students with disabilities rotated to new cooperative groups in the classroom every 8 to 10 weeks. Not only did peers achieve their academic objectives even when serving as mediators, but target students also learned motor and communication objectives that were embedded within the cooperative activity and generalized these skills to new groups, peers, and activities. While the typical students focused on learning geometry from shapes and money skills, their classmates with disabilities worked on communication and motor IEP objectives because the group activity allowed many opportunities for requesting turns and moving task materials. Both studies support the use of cooperative learning groups as a means for promoting meaningful inclusion of students with severe disabilities in general education classrooms.

### Group Instruction Guidelines

Group instruction has many benefits over one-to-one instruction but may be challenging to some students. Several simple methods can maximize student motivation for working in groups:

1. Individualize instruction so that all group members actively participate. This means that the same concept will be taught at varying levels of complexity suited to individual students, while also allowing for different response modes and using modified materials if needed.
2. Keep the group instruction interesting by (a) keeping turns short, (b) giving everyone turns, (c) making turns contingent on student attending, (d) giving demonstrations, and (e) using a variety of task materials that can be handled by the students.
3. Encourage students to listen and watch other group members as they take their turns and praise them when they do so. Actively involve students in the process of praising and prompting others.
4. Attend to students during instruction and provide task-specific praise that students can understand and individualized reinforcement. Also, use group reinforcement contingencies so that the group is reinforced on the basis of all members' combined performance.
5. Allow students to participate in demonstrations and handle materials related to the skill/concept being taught.
6. Keep waiting time to a minimum by controlling group size, teacher talk, and the length of each student's turn.
7. Prompt cooperation and discourage competition among group members.

### Peer-Mediated Instruction and Peer Support

There is a long history in special education of engaging peers of all ages to intervene and assist with the teaching of skills to their classmates with disabilities. Phil Strain (Strain & Odom, 1986) is one of the early researchers on peer-mediated instruction with preschoolers; the focus that he and his colleagues addressed was social interactions, teaching peers to initiate interactions during play and then monitoring their

efforts and the target child's responses. Since then, many researchers have applied this basic concept of involving peers to support their classmates with disabilities. Recent work demonstrates the effectiveness of peer support arrangements as an alternative to relying completely on support and instruction from adults (Carter, Sisco, Melekoglu, & Kurkowski, 2007; Hughes, Rung, Wehmeyer, Agran, Copeland, & Hwang, 2000).

### Peer Tutoring

Students without disabilities have been found to be effective instructors and social supports for their peers with severe disabilities in both one-to-one and two-to-one arrangements (two peers with one student with disabilities) (Carter & Kennedy, 2006). Not surprisingly, students with severe disabilities were found to have significantly more interactions when working with peers than when working with paraprofessionals or special educators (Carter, Sisco, Melekoglu, & Kurkowski, 2007). Peer support has also been shown to be a vehicle for students with disabilities to access the general education curriculum (Carter, Cushing, Clark, & Kennedy, 2005; McDonnell, Mathot-Buckner, Thorson, & Fister, 2001). For example, when peer tutors learned to use enhanced group instruction (Kamps, Walker, Locke, Delquadri, & Hall, 1990) to teach word reading, their tutees made as much progress as they did when taught one-to-one or in small groups by teachers or paraprofessionals. Other researchers demonstrated that adolescents who were underachievers could learn to be as effective as special educators in getting their tutees to engage in class tasks while also improving their own engagement (Shukla, Kennedy, & Cushing, 1998).

Many effective peer tutoring programs have been reported from preschool to high school in which peers have been taught to tutor classmates with disabilities on communication, social skills, physical education, and academic skills (Carter & Kennedy, 2006; Carter, Sisco, Melekoglu, & Kurkowski, 2007; Collins, Branson, Hall, & Rankin, 2001; Gilberts, Agran, Hughes, & Wehmeyer, 2001; Hughes, Rung, Wehmeyer, Agran, Copeland, & Hwang, 2000; McDonnell, Johnson, & McQuivey, 2008; Ward & Ayzazo, 2006). Peer tutoring programs become more acceptable when they are balanced with efforts to promote friendships and non-helping reciprocal relationships between classmates and peers with disabilities and when they are unobtrusively supervised and supported by adults (Carter, Cushing, & Kennedy, 2009; Janney & Snell, 2006).

Developing peer tutoring programs that promote equal relationships among students can be a challenge. Strategies that can help avoid the problem of one-way teaching among peers include classwide or reciprocal peer tutoring and peer assistance with cooperative groups, in which dyads or groups of three students take turns teaching each other (one student may have a disability) (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986; Dugan, Kamps, Leonard, Watkins, Rheinberger, & Stackhaus, 1995; McDonnell, Mathot-Buckner, Thorson, & Fister, 2001). Another way to avoid having *peers* be teachers is to pair older students, one or more grades older, as the tutors of younger students; with this arrangement, one-way teaching is less of an issue because there is no peer relationship between the tutor and the tutee, but instead there is a mentoring relationship.

*Twice a week, Jacob looks forward to sessions with his seventh-grade tutor, Steve. After checking in at the tutoring office and getting the lesson plan and Jacob's record book, Steve takes Jacob to a tutoring station in the library. There they review what Jacob has done over the past few days in his classes: getting around the school, carrying out tasks without being distracted, and using picture or word guides to remember task steps. Then Jacob reads the task for that day from his schedule (return old class books and pick up new class books from the library), reviews the steps, gets the materials, and completes the task with reminders as needed from Steve. Afterward, Jacob self-evaluates with Steve's input. Before returning to the middle school next door, Steve shows the tutoring supervisor Jacob's record; once a month, Steve is observed by the tutoring supervisor.*

With the goal of increasing the amount of meaningful time spent in general education classrooms for students with disabilities, McDonnell and his colleagues (2001) demonstrated the success of an intervention package that involved reciprocal peer tutoring and multielement curricula with accommodations. Six middle school students (three with moderate/severe disabilities, three without) were involved, along with the rest of the middle school classes, in prealgebra, physical education, and history. Classes were organized into reciprocal peer tutoring teams that included three students, each at different skill levels (above average, average, and below average); some teams included a student with a moderate or severe intellectual disability. All team members were taught to serve in tutor, tutee, and observer roles. Thus, each member of the tutoring teams learned to present instructional cues, to praise, and to correct errors. The multielement curricula involved special and general education teachers who were developing objectives for students with disabilities within the general education curriculum (prealgebra, physical education, and history) and also were identifying needed accommodations so that these students could learn related content alongside their peers. Examples of accommodations included a reduced number of problems, allowing the student to dribble a basketball with the right hand instead of alternating between the right and left hands, and pointing to indicate the answer instead of speaking or writing. The researchers measured students' weekly test scores and coded their academic response and competitive behaviors (e.g., aggression, disruption, talking off task, inattention, non-compliance, self-abuse). The combined intervention (multilevel curriculum, accommodations, and reciprocal peer tutoring) appeared to lead to improved rates of academic response and reduced rates of competitive behavior in all three students. The peers without disabilities demonstrated benefits from the peer tutoring program as shown by their test scores.

### Peer Support Programs

In contrast to peer tutoring, peer support is less formal and more broadly directed toward social interaction and friendship, but also may focus on improving classroom engagement and task focus (e.g., looking at the teacher, asking questions about assignments, making comments in class). Recent less formal versions of peer support tested by Carter and his colleagues (2005, 2007) in secondary schools have been demonstrated to increase positive interactions between students with disabilities and their peers in general education settings and to improve academic engagement. In fact, interactions and engagement have been shown to be higher with support from peers than from adults (Carter, Sisco, Melekoglu, & Kurkowski, 2007). Also, the use of two peers to support one student was shown to yield even more improvements in academic involvement and social interaction than did the use of a single peer to support a student (Carter, Cushing, Clark, & Kennedy, 2005).

Several steps are involved in creating peer support programs in secondary school settings. First, peers and the students whom they support are carefully recruited with team input. Second, peer supports are trained and put into place in the general education classroom. Finally, peer supports are monitored by adults for the quality of support with retraining given as needed (Carter & Kennedy, 2006). Peer support may include a variety of activities carried out during class time, small group instruction, transitions, and breaks. Peers are taught to lend support for a partner's social IEP goals (e.g., taking conversational turns, initiating interaction), to promote their participation in class activities (e.g., cuing them to get needed materials, asking partners to work together on assignments, explaining assignments), to give partners a lot of positive reinforcement for participating and corrective feedback as needed, and to encourage their partners to interact with them and with other classmates. (These strategies are described in more depth in Chapter 11.)

## Individualized Adaptations: Accommodations and Modifications

A crucial approach that is used by both general and special educators involves adapting instruction for individual students so that they achieve their expected educational goals. For students with high support needs, team members must work together to find adaptations that can resolve learning problems:

*Because handwriting was slow and tedious for Marc and often resulted in tantrums, the team wanted to simplify the task. The occupational therapist suggested using a slant board to position materials and a hard plastic template with 1/2- by 1-inch openings for him to write the letters in. He also was taught to use a small keyboard printer to quickly produce words and phrases instead of writing them by hand.*

*Adaptations* is a broad term that encompasses both accommodations and modifications. Adaptations occur informally whenever teachers (a) adjust their method of delivery because they see that one or more students seem to be lost (e.g., they move closer to a student while repeating the directions), (b) change their expectations of how students respond (e.g., “First tell me and then write it.”) in order to improve students’ participation, or (c) examine and modify the academic goals or performance criteria for students on the basis of their performance. *Accommodations* are adjustments that the IEP team makes to a student’s school program that do not significantly change the curriculum level or performance criteria; instead, accommodations enable a student to access curriculum content or to demonstrate learning without changing curriculum goals (e.g., Jacob’s extra time on his tests, Christine’s adapted computer mouse and moving her desk close to the board). In contrast, *modifications* alter curriculum goals and performance criteria.

*Jacob’s team modified his fourth-grade curriculum goals and performance criteria for science: Jacob will show understanding of several primary concepts from the science unit on weather by matching pictures with simplified terms and definitions. Jacob’s classmates are expected to explain all of the concepts using unit terminology.*

Students with severe disabilities typically will have many IEP accommodations and modifications that support their learning. For these students with more extensive support needs, it is best to have a more organized approach for teachers to work together to identify and implement needed individualized adaptations (see Chapter 6).

## Self-Management

Self-management procedures and student-directed learning strategies have many variations and are highly flexible and can be individualized to suit different students, behaviors, and settings. The common purpose of these approaches is “to enable students to modify and regulate their own behavior” (Agran, King-Sears, Wehmeyer, & Copeland, 2003, pp. 3–4). These approaches teach students to take a more active role in their own learning. Variations of self-management strategies include the following:

*Antecedent Cue Regulation and Picture Cues:* Students learn to use visual, tactile, or auditory guides to remind them of the steps in a task, such as a work sequence, or to improve engagement in the classroom (Mechling, 2007).

*For her job as a greeter at Walmart, Christine’s job coach created a small photo guide that would be displayed on a plasticized sheet placed on her lap tray and also displayed on her DynaVox™ communication device. Initially, the 12 photos were large and were used one at a time to prompt each step of her role as a greeter at Walmart (e.g., job preparation, the ride to the store, check-in). Now she uses the photo grid by herself to remind her of each job step.*

*Self-instruction:* Students learn to give themselves verbal cues as they are carrying out a targeted task in order to complete each step in the task at work or school (e.g., Agran & Moore, 1994).

*Because Jacob had become highly dependent on prompting in two routines, his teachers designed a self-instruction task analysis of the steps involved in arriving at school and getting ready to go home. They used a “did-next-now” procedure to teach both routines. He learned to do each step as he verbalized in a did-next-now format: “I did put my backpack in my locker; I need to give my check-in sheet to Ms. Bowers; I’m going to give my check-in sheet to Ms. Bowers.” Now he uses this approach to cue himself through the steps of both routines.*

*Self-monitoring:* Students who self-monitor have learned to (a) observe their own behavior, (b) judge whether or not they have performed a targeted behavior, and (c) determine whether their performance met agreed-upon criteria (e.g., learning to discriminate following teachers’ directions in general education classrooms) (Agran, Sinclair, Alper, Calvin, Wehmeyer, & Hughes, 2005).

*Jacob’s team thought that he could learn several necessary classroom behaviors better by using a self-monitoring system instead of being instructed by Ms. Connors, the fourth-grade teaching assistant. The behaviors (taking his binder from his backpack, greeting Ms. Bowers as the other students did, and being in his seat when the bell rang) were ones that two of his classmates also needed to learn, so all three boys were involved in the project. Ms. Bowers met with Jacob and his classmates to discuss and design the simple recording form that they set up like a race car track. The students learned to pick a race car and move it forward whenever they performed the classroom skills and checked the box. Each student learned to record accurately and liked earning a favorite activity like computer time or time to read race car magazines that they had brought from home.*

Self-Monitoring Device



Photo: Martha Snell

Jacob’s car moves				
	Get my binder <input type="checkbox"/>	Say hi to Ms. Bowers <input type="checkbox"/>	Get in my seat fast <input type="checkbox"/>	<b>Computer time</b>
Ted’s car moves				
	Get my binder <input type="checkbox"/>	Say hi to Ms. Bowers <input type="checkbox"/>	Get in my seat fast <input type="checkbox"/>	<b>Computer time</b>
Mitch’s car moves				
	Get my binder <input type="checkbox"/>	Say hi to Ms. Bowers <input type="checkbox"/>	Get in my seat fast <input type="checkbox"/>	<b>Magazine time</b>

*Self-evaluation:* Students learn to compare their own performance of a behavior to a desired level of performance (e.g., self-evaluating social responses) (Koegel, Koegel, Hurley, & Frea, 1992).

*Marc was slow eating his lunch. Ms. Wharton, his special education teacher, timed him and his classmates over several days to see how long they took. Marc took 45 minutes and his classmates took 20 to 30 minutes. Marc's team set his goal at 30 minutes, but established successive time goals of 44, 41, 38, 35, 32, and 30 minutes. Ms. Wharton showed Marc a small visual timer and challenged him to eat faster before the red on the timer disappeared. Before lunch, Marc selected a desired activity to put on his schedule, and if he "beat the clock," he could participate in that activity.*

*Self-reinforcement:* Students learn to compare their own performance of a targeted behavior to an agreed-upon level and administer a reinforcing consequence if they met the criterion. The reinforcement can be as simple as self-praise ("I finished my work!") (Moore, Agran, & Fodor-Davis, 1989).

*As part of the fourth-grade classroom behavior self-monitoring program, Jacob and his two classmates learned to take their checklists to Ms. Bowers at lunchtime and say "I got my binder, said bello, and got in my seat on time!"*

Koegel and Koegel and their colleagues have applied self-management instruction to individuals with autism as a means for reducing problem behavior and increasing appropriate replacement behaviors (Koegel, Koegel, Boettcher, Harrower, & Openden, 2006). They suggest using a series of steps to design self-management programs and to involve students *at every step* as a means for encouraging commitment to a shared goal of positive behavior change (Koegel, Koegel, & Carter, 1999):

- Define the target behavior.
- Identify functional reinforcers that the student will work toward earning.
- Design a self-monitoring method or device that is appealing and can be learned by the student (e.g., placing a check mark next to a picture that represents a target behavior, using a wrist counter).
- Teach the student to use the method until he or she does so accurately (identify opportunities, set up opportunities, teach using prompts, fade prompts).
- Determine whether the student's use of self-management results in the desired behavior change; if not, problem solve and improve the procedures.
- Validate whether the student is using the device in natural environments.

Sometimes the variations in the self-management methods applied are not very distinct or may be intentionally combined (e.g., antecedent cues, self-evaluation, and/or self-reinforcement). For example, Agran and his colleagues (2005) taught middle school students with moderate to severe disabilities in general education classrooms to self-monitor their following of teachers' directions. Students first learned to discriminate directions from non-directions, then they learned to self-record their direction through the use of modeling and guided practice, and, finally, they learned to self-monitor through role-play (Agran, Sinclair, Alper, Cavin, Wehmeyer, & Hughes, 2005). As a result of the intervention, all of the students made rapid improvements in following teachers' directions in class and educators agreed that their progress was significant and valuable. In another secondary school example, Hughes and her colleagues (2002) applied an antecedent cue regulation approach to teach high school students with intellectual disabilities to use a stimulus like money placed in their hands or a picture prompt card to direct themselves to carry out a relevant behavior (e.g., thanking the cashier, keeping the head upright, completing assignments, and initiating a conversation) (Hughes, Copeland, Agran, Wehmeyer, Rodi, & Presley, 2002). Teaching sessions started with hearing a rationale for learning the behavior and then involved modeling, direct instruction, guided practice, and corrective feedback; after two or three teaching sessions, the students mastered self-management.

Finally, middle school students, taught by peer tutors, learned to self-monitor their performance of teacher-selected classroom survival skills (e.g., be in the classroom and seated when the bell rings, bring appropriate materials, greet teachers and peers, ask and answer questions) (Gilberts, Agran, Hughes, & Wehmeyer, 2001). Whenever they performed the classroom skills in their general education classroom, students learned to place check marks by survival skill words and pictures on a simple recording form; once they became accurate in self-recording, their performance of these survival skills greatly improved. When students are taught to self-manage their own behavior, they are less dependent on others and may have mastered improved engagement, better work completion, and appropriate social behavior.

## SPECIALIZED TEACHING STRATEGIES THAT ARE EFFECTIVE WITH STUDENTS WHO HAVE SEVERE DISABILITIES

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This section of the chapter will describe specialized teaching approaches that have been shown to be successful with students who have severe disabilities. Some examples of specialized strategies include visual supports, embedded instruction, chaining methods, and low error prompting procedures. These approaches, as a group, tend to have stronger research support with learners who have extensive disabilities than do the universal approaches. Many of these approaches rely on the use of discrete teaching trials whose elements we will explain in detail. While the research supporting most of these strategies has been conducted in special education classrooms or even separate school settings, most of these strategies are “portable” and all have been applied successfully to support students who are included in general education settings.

While both universal and specialized strategies range from the simpler to the more complex, specialized strategies, as a group, are often quite dissimilar from the methods used with typical students, and not all of these approaches may fit well in the general education setting without some adaptation. These specialized approaches often depend on direct and systematic instruction and require an understanding of the discrete teaching trial and its elements: (a) giving a task request, (b) waiting for a response, (c) giving assistance as needed, (d) reinforcing correct responses, and (e) providing feedback with regard to errors.

Specialized approaches often look different, may require more teacher effort, and may not blend easily with general education teaching procedures. Educators, therefore, must be cautious when planning to use specialized approaches with specific students in inclusive settings. The *only-as-specialized-as-necessary* criterion (discussed more in Chapter 6) emphasizes the need to keep teaching strategies and adaptations both *non-intrusive for the student* and *user-friendly for the teaching team*. The goal for applying this criterion is to acknowledge that (a) students do not want to be singled out for extra assistance or adapted treatment all of the time and (b) students who need specialized interventions can still participate in typical activities and ordinary relationships. Thus, when teams apply the strategies described in this section in general education settings, they will use the teaching strategy with a student only when it is needed and when less intrusive approaches have not been successful, taking care that the strategy does not stigmatize the student and is not overburdening for team members to use, and keeping data on its use to judge its effectiveness. A second guide for selecting specialized teaching strategies, mentioned earlier, is the principle of parsimony (Etzel & LeBlanc, 1979)—*select the simplest but still effective approach*—which reminds us that teaching strategies should be based on prior evidence.

### Visual Modality Strategies

With the increased interest in effective teaching methods for students with autism and students with limited verbal skills, researchers have begun to study the use of visual supports to replace or supplement teachers’ verbal cues. More recently, the use of

several types of video models have been reported and have been found to be effective antecedent strategies that may accompany other teaching approaches.

### Visual Supports

There are many different applications for using symbols to support students' understanding of their school day and activities outside of school. Visual symbols, such as objects and pictures have the characteristic of being concrete and permanent, instead of fleeting, like verbal requests or signs and gestures. Object and picture symbols have been demonstrated to be highly effective, especially for students whose verbal understanding or expression is limited. (The use of visual symbols for communication is discussed in more detail in Chapter 12.)

**Visual Schedules.** Among the most prevalent forms of visual support are *schedules* that use real objects, tangible symbols, picture symbols, or words to represent regularly scheduled events during a student's school day. Mirenda and her colleagues differentiate between schedules that represent the activities in a day or a partial day (called *between-task schedules*) and schedules that represent the steps or subactivities within a single activity (called *within-task schedules*) (Mirenda, MacGregor, & Kelly-Keough, 2002). Both between- and within-task schedules are constructed following similar guidelines. Many give credit to Stillman and Battle (1984), as well as to Eric Schopler and his colleagues in the TEACCH program, for setting forth the use of visual schedules to structure routines for individuals with autism (e.g., Schopler, Brehm, Kinsbourne, & Reichler, 1971). The TEACCH checklist for individualizing visual schedules that is shown in Table 5-2 provides teachers with six key elements for creating visual schedules and teaching their use; items within each element are ordered from simple to more complex (Mesibov, Shea, & Schopler, 2004). Teams must identify the method for representing activities on a schedule in ways that students can understand (e.g., matching the actual object used in the activity to words naming the activity). (Figure 5-2 shows a student using his symbolic object schedule and then learning to make activity choices using symbolic objects.) The schedule length can be a single activity or can contain representations of activities that last an entire day. The schedule items (objects, icons, etc.) must be arranged in some way and designed so that they can be manipulated by the student. The teacher may give schedules directly to beginning students, but students will need to learn either to go to a set location in the classroom to find their schedule or to use a portable schedule. Finally, learning to initiate schedule use can range from teachers prompting students to use their schedule to students spontaneously checking their schedules. (Figure 5-2 shows a student using his schedule spontaneously.)

In the TEACCH system, visual schedules are coordinated with a *structured work/activity system* for helping students understand the beginning, the end, and the content of a task. The structure uses visual symbols (or objects) to help students grasp answers to questions such as the following:

- What task(s) will I do? (Symbols represent the tasks in a teaching session.)
- How much work is required? (The number of symbols indicate the number of work tasks.)
- How can I monitor my progress? (The symbols are removed in order once completed.)
- When am I done? (When all symbols are removed from the activity board, the task is done.)
- What happens next? (Students may refer to a final break activity symbol, or to their between-task schedule, for the next task.) (Figure 5-4 illustrates a structured activity system used by an occupational therapist.)

**Activity Boards, Rule Scripts.** There are numerous variations on the theme of supporting students using visuals (Beukelman & Mirenda, 2005; Downing, 2005).

**TABLE 5–2**  
TEACCH Checklist for Individualization of Visual Schedules

**Form of Representation**

Object that will be used in an activity  
Object that is symbolic of an activity/area  
Photograph  
Icon  
Picture/word combination  
Single word  
Phrases or sentences

**Length of Schedule**

One item at a time, signifying transition  
Two items, signifying a first–then sequence  
Three or four items, up to an hour  
2 hours  
 $\frac{1}{2}$  day  
Full day

**Presentation Format**

One item at a time  
Left to right sequence  
Top to bottom sequence  
Multiple rows

**Ways to Manipulate the Schedule**

Carry object to be used.  
Carry visual cue to be matched (in basket, box, pocket, on VELCRO®).  
Turn over visual cue on schedule as completed.  
Mark off visual cue on schedule as completed.

**Location of the Schedule**

Teacher takes schedule information to student.  
Stationary schedule in central, neutral location on table  
Stationary schedule in central, neutral location on shelf or wall  
Portable schedule: “pull-off” segment of schedule  
Portable schedule: on clipboard  
Portable schedule: in notebook

**Initiation of the Use of the Schedule**

Teacher takes schedule information to student.  
Student goes to schedule with transition symbol: from same room, schedule within view  
Student goes to schedule with transition symbol: from a variety of locations  
Student travels to schedule using verbal cue: from same room, schedule within view  
Student travels to schedule using verbal cue: from a variety of locations  
Student spontaneously checks schedule.

(Based on TEACCH® Autism Program; for more information: <http://www.teacch.com>)

*Activity boards* contain a small number of symbols related to a specific activity and thus supply the visual vocabulary needed for a student to communicate and for adults and peers to augment their verbal input when they communicate with the student. *Augmented input* means that communication partners augment or couple their spoken word communication with the communication forms that the student uses (e.g., tangible symbols, picture symbols, signing, touching symbols on a speaking communication device). Augmented input helps reinforce the meaning of the student’s communication forms or symbols (for more on this, see Chapter 12).

Mirenda and her colleagues (2002) describe several useful approaches that can help prevent problem behavior just before and during an activity. For example, a *within-task symbol script* might be created to represent the required steps in a non-preferred or difficult task, such as having one’s hair washed during bath time (see Figure 5–5). *Rule scripts*, another visual support strategy, may be designed to clarify

**FIGURE 5-2**

**Student Using a Symbolic Object Schedule**

Toby has learned to use a picture schedule. From the top box, he selects a small ball that is a symbol for a combined communication and physical therapy session in the gym. The second box has an object that symbolizes art class with his peers, while the third represents toileting. Once in the gym, Toby works with his SLP to make an activity choice as he learns to associate objects that are symbolic of an activity with the activity itself (choosing from the swing or the roller).



Photos: Martha Snell

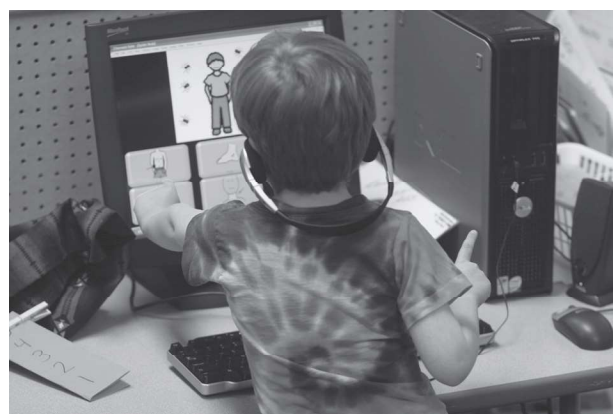
the rules related to how an activity is conducted instead of the activity's sequence of steps (e.g., rules for eating properly, rules for walking in the hallway during transitions). Figure 5–6 shows the approach Mirenda and her colleagues (2002) used to teach a child during a trip to a museum whether or not she could touch various exhibits.

**Social Narratives.** *Social narratives* are short accounts of activities that may cause difficulty for students. Social narratives usually consist of pictures and simple words that state what to do, instead of focusing on what not to do, and that are written in first person to take the student's perspective. Typically, social narratives are read to students as a means of rehearsing what they should do in that activity. Social narratives are more flexible versions of Social Stories™ (Gray & Garand, 1993), but take a similar approach. The evidence behind this general approach is supportive even when the guidelines for writing Social Stories are not systematically followed or when additional cuing elements are added (e.g., Delano & Snell, 2006; Kuoch & Mirenda, 2003; Lorimer, Simpson, Myles, & Ganz, 2002; Thiemann & Goldstein, 2001).

**FIGURE 5–3**

**Student Using a Picture Schedule Spontaneously**

Kyle uses a picture schedule to guide his morning, icons and pictures arranged from top to bottom. Kyle has completed a work session and now goes to the computer for five minutes; after the computer, he will join his kindergarten class. While at the computer, his teacher uses a “count-down” visual to help him understand how much time he has left on the computer.



*Marc's teachers designed a five-page narrative to help him learn what he needed to do at circle time in kindergarten. The pages read as follows:*

*Page 1: My name is Marc [his picture]. I am in kindergarten. I go to two classes—Ms. Rachel's and Ms. Kwan's.*

*Page 2: I sit on the rainbow rug in Ms. Kwan's room [picture of rainbow rug with Marc and classmates sitting on it].*

*Page 3: Everyone is quiet on the rainbow rug [picture symbol of quiet]. Everyone sits criss-cross-apple-sauce on the rainbow rug [picture symbol of sitting criss-cross].*

**FIGURE 5–4**

**Structured Activity System**

An occupational therapist, Ms. Helene, works with Valerie to assess her sensitivity to fine-motor tasks. She uses a structured activity system to organize the assessment. They start by reviewing symbols for the four tasks, and then Valerie will take the first symbol and match it to the first task. When she is finished, she puts that symbol in a “Finished” pocket on the back of the card. This approach helps Valerie know what tasks will be performed, how much work is required, how to monitor her progress, when she is finished, and what happens next.

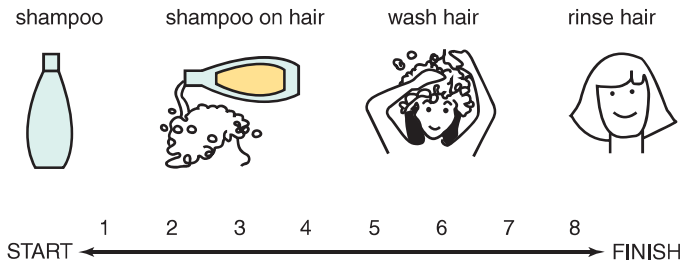


Photos: Martha Snell

**FIGURE 5-5**

**Kelti's Within-Task Symbol Script**

When hair washing caused severe tantrums, a within-task symbol script was devised to teach Kelti the sequence for washing hair: what came first, second, and third, and when it was finished. Initially, her parents used the script with role-play before bath time and omitted hair washing; later they used the script before bath time to help Kelti complete the hair-washing routine without tantrums.

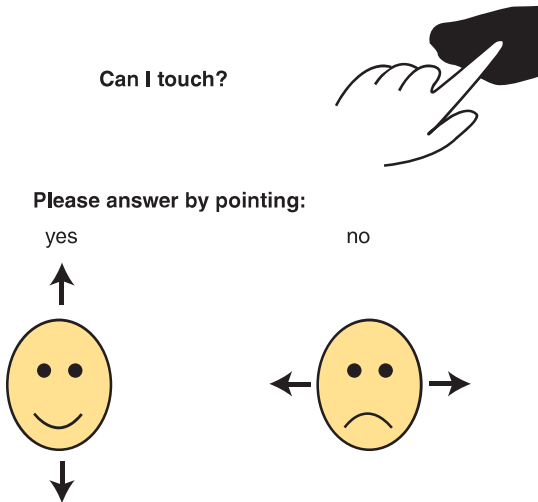


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**FIGURE 5-6**

**Haley's "Can I Touch?" Rule Script**

This rule script was used to clarify the rules concerning whether or not Haley could touch various items in stores and at other community locations. She practiced the script at various community locations and then used it in a museum to determine whether she could touch an exhibit. The script helped Haley learn that she could sometimes touch things, but not always, which meant that she had more control and did not run away when someone told her "no".



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(Figures 5.5 and 5.6 The Picture Communication Symbols ©1981–2010 by Mayer-Johnson LLC. All Rights Reserved Worldwide. Used with permission. Boardmaker™ is a trademark of Mayer-Johnson LLC.)

*Page 4: I will try to be quiet on the rainbow rug. I will try to sit criss-cross-apple-sauce on the rainbow rug [picture].*

*Page 5: My teachers will be very happy if I do not talk when I am sitting on the rainbow rug. I will talk in Ms. Joan's room. I will talk in Ms. Kwan's room when I am not sitting on the rainbow rug.*

There are several teaching considerations for using visually cued instruction and visual supports such as schedules, activity boards, symbol-structured activity systems, rule scripts, social narratives, and so forth:

- Use objects or symbols that the student associates with familiar routines or activities or can readily learn to associate.
- Use vocabulary that matches the student's comprehension skills or that may be understood when coupled with familiar routines.
- Rely primarily on the objects or symbols to represent the concept instead of using a lot of spoken words.
- Augment your spoken words by pointing to the symbols that match your words (augmented input).
- Provide feedback when symbols within the visual support are used correctly, stating the key word(s) ("Right, P.E.'s finished.").

**Video Modeling**

Capitalizing on the strength of observational learning, video modeling is an intervention in which brief videos are used to teach specific skills. There is evidence of their effectiveness for teaching students with disabilities of all ages a variety of skills, including play, social communication, academics like spelling and reading, self-care (grooming, brushing teeth), and functional routines (ordering fast food, cooking) (Delano, 2007). Video modeling may be used alone or in combination with other teaching methods. This strategy has been shown to be particularly helpful in teaching students with autism, perhaps because of the emphasis on visual modeling over verbal instruction and because instruction involves less adult control (Charlop-Christy, Le, & Freeman, 2000). There is emerging evidence that video modeling promotes generalization and enables children with autism to acquire skills faster than *in vivo* (live) modeling, when teachers use model prompts with students (Charlop-Christy et al., 2000). Videos can be created in several different ways: basic video modeling, video self-modeling, point-of-view video modeling, and video prompting (Cox, Delano, Sturgill, Franzone, & Collet-Klingenberg, 2009).

**Basic Video Modeling.** The most common form, basic video modeling, simply requires that a peer or adult be taped as they perform a target skill. Usually these videos are short and do not have narration, thus making them easy to create and use. When the video is loaded onto a classroom computer, students can easily watch the video prior to the teaching session. After watching the video, the student is prompted to perform the target skill. Most of the video-modeling research with students on the autism spectrum has used this basic approach (e.g., D'Ateno, Mangiapanello, & Taylor, 2003; Nikopoulous & Keenan, 2003, 2004). Advantages of video modeling over live modeling are its efficiency, the replay feature, and that steps, which a student found to be difficult during baseline testing, can be video-taped more slowly, with a closer view. Charlop-Christy et al. (2000) used these latter features when teaching elementary school-aged students with autism cooperative play, emotion labels, greetings, brushing their teeth, and face washing.

**Video Self-modeling.** The videos used in self-modeling show the student him or herself performing the target skill. While such tapes may be very motivating to students, making the tapes requires careful editing so that any assistance given to the student is not apparent in the videotape. (Chapter 10 describes these approaches in more detail.) What is important for teachers to know is that there may be little or no difference in effectiveness between basic video modeling and video self-modeling. Sherer and colleagues compared video self-modeling with basic video modeling in which a peer served as a model (Sherer, Pierce, Paredes, Kisacky, Ingersoll, & Schreibman, 2001). Their results suggest that students learned the task at similar rates regardless of which video-modeling approach was used. While more research would be helpful to confirm these findings, teachers should proceed as if the two methods are similar in effectiveness, thus saving time by not needing to prepare video self-modeling tapes.

**Other Video-Modeling Approaches.** Two additional types of videos have been used successfully in video-modeling instruction. *Point-of-view video modeling* (Hine & Wolery, 2006) shows the performance that a learner sees when successfully carrying out the task. Thus, during taping, the camera is held just behind a pair of hands performing the task. Point-of-view taping avoids the issue of whether the performer is the student or someone else because the performer is not seen. With *video prompting*, the task and the taping are broken down into steps as a sequence of short video clips. Instruction involves having the student watch the first video clip of the first task step and then perform that behavior, moving through each video clip/task step in order. Researchers have used this approach to teach elementary school-aged students with disabilities to zip jackets, clean glasses, and put on a watch (Kamlesh, 2008) and to teach adults daily living skills (Cannella-Malone, Sigafos, O'Reilly, de la Cruz, Edrisinha, & Lancioni, 2006). In the latter study (Cannella-Malone et al., 2006), researchers compared the effectiveness of video prompting with video modeling to teach six adults with developmental disabilities to set a table and put groceries away. While video prompting consisted of 10 separate video clips, one for each step of the task analysis, shot from the perspective of the performer (like point-of-view video modeling), the video-modeling tape showed *all* of the steps of the task analysis in one film that was taped from the perspective of the spectator. The findings showed that video prompting led to rapid acquisition, but video modeling was not effective. Because the video perspective was confounded with the type of video, it may be that the perspective from which the videos are filmed also contributes to the effectiveness of the intervention. More research will help isolate the value of video perspective apart from video-modeling type.

Our experience has been that teachers are comfortable with creating simple video-modeling sequences, that these videos may be created and played back on handheld devices such as video iPods™ (Cihak, Fahrenkrog, Ayres, & Smith, 2010), that their students enjoy watching them, and that the low-effort approach seems to contribute to student learning.

## Task Analysis and Chaining

### Chained and Discrete Response Skills

The types of behaviors that students are taught can be divided roughly into two groups: discrete behaviors and multiple-step, or chained, behaviors. Target skills that involve a single, isolated response with an obvious beginning and end are called *discrete behaviors*; these behaviors are individually distinctive and can stand alone (e.g., naming familiar people, making numeral/quantity matches, reading words, identifying pictures). Target skills that consist of many behaviors chained together in sequence (e.g., sweeping the floor, playing UNO<sup>®</sup>, eating at a fast-food restaurant, brushing one's teeth, operating a CD player, counting out combinations of coins to pay for a product) are viewed as being *multiple-stepped responses* or *chained behaviors*. When chained behaviors are targeted for instruction, teams will need to complete a task analysis of the responses that are performed to complete the activity.

*Examine Marc's goals and decide whether they are discrete or contain multiple steps:*

*Following the use of the toilet, Marc will wash his hands by completing 8 of the 10 task steps independently.*

*During lunchtime at school, Marc will complete 10 of the 12 steps independently: Get in line, go to the cafeteria, move through the cafeteria line, get utensils, select three of the five food options, put them on his tray, enter his payment code using a match cue, carry his tray to the table, eat, empty his trash, get in line, and return to the classroom.*

*When asked to circle a word (e.g., nap, mop, map) that matches a picture (e.g., of a mop) on a worksheet, Marc will correctly circle the word on 75% of the worksheet for two probes in a row.*

*When given a slant board to hold his papers and a template to limit the range of writing, Marc will print all of the letters of the alphabet from a model 100% of the time on two probes in a row.*

If you identified the first two goals as multiple-stepped behaviors and the last two as discrete behaviors, you are correct. His team members will write task analyses for the first two skills that will guide both assessment and teaching. His teachers might teach all of the task steps in order (total task chaining) or they may “chunk” the steps and teach them as clusters of steps. Alternately, they could teach just one step in the sequence at a time in a forward or backward order (forward and backward chaining, respectively). Typically, the last response is followed by reinforcement, either natural (e.g., completing a task and enjoying the outcome, such as making popcorn, getting the help that was requested) or artificial (e.g., teacher praise, participation in a preferred activity), or both.

*Discrete behaviors* may be taught separately from the task in which they are used (e.g., reading prices) or taught as a step within a larger chain of functionally related behaviors (e.g., reading prices during the task of getting a snack from a vending machine). The distinction between discrete and multiple-stepped behaviors is not always clear. Many discrete behaviors can be divided into steps. For example, reading words involves a sequence of behaviors: Look at the word, make the initial letter sound, and blend the initial letter sound with the medial and final sounds to say the word. How teams decide to view a target behavior depends on the behavior and the student, and this view influences instruction and measurement.

While the discrete behaviors do not require a task analysis, the team needs to agree on the skill and any prerequisites skills (often called a *skill sequence*).

*Before Christine was taught to read new functional words that she would encounter often, she learned to match targeted words and then to match the new words to pictures of that word. Then she was taught to read the words. Her teachers used a sequence of discrete behaviors: Match identical words, match words to pictures, read the words.*

**TABLE 5–3**  
Skill Sequence for Using Coins to Make Purchases

1. Identification of pennies and stating their value (discrete responses)
2. Counting pennies by ones (chained response) and identifying the total amount (discrete response)
3. Identification of nickels and stating their value (discrete responses)
4. Identification and stating the values of nickels and pennies in a mixed order (discrete responses)
5. Counting nickels by fives (chained response) and identifying the total amount (discrete response)
6. Counting combinations of pennies and nickels (counting by fives and then continuing to count by ones) (chained response) and stating the total amount (discrete response)
7. Counting combinations of pennies and nickels to yield a written or stated price (chained response, as in making purchases)
8. Identification of dimes and stating their value (discrete responses)
9. Identification and stating the values of dimes, nickels, and pennies in a mixed order (discrete responses)
10. Counting dimes by 10s (chained response) and identifying the total amount (discrete response)
11. Counting combinations of pennies, nickels, and dimes (counting by 10s and then continuing to count by fives and then ones) (chained response) and stating the total amount (discrete response)
12. Counting combinations of pennies, nickels, and dimes to match a written or stated price (chained response, as in making purchases)
13. Identification of quarters and stating their value (discrete responses)
14. Identification and stating the values of quarters, dimes, nickels and pennies in a mixed order (discrete responses)
15. Counting quarters by 25s (chained response) and identifying the total amount (discrete response)

Discrete behaviors are likely to be taught in a ladder fashion, gradually making the task expectations harder. Students advance from simpler objectives to more difficult or complex objectives, progressing toward their goal. Academic discrete behaviors like naming and counting often are taught in this manner using skill sequences—a listing of related skills arranged from simple to more difficult that are taught *separately*, in order, over a predetermined period. Table 5–3 sets forth a longer skill sequence that starts with the kindergarten-level focus and spans several grade levels, including Jacob’s current IEP objectives for counting out combinations of coins to match prices. Many of the skills are discrete, while some may be taught more logically as a chain of responses.

*After several years of money instruction, Jacob has mastered steps 1 through 12; he is now working on counting quarters and soon will learn to count combinations of all coins. His teachers schedule regular application of these skills in school, where he makes small purchases. For example, skills 7 and 12 require Jacob to count out a given amount of money, which is required for paying library fines (5 cents per day), buying his school lunch (\$1.00) or milk (20 cents), and buying pencils (25 to 35 cents) and paper (2 to 5 cents) in the school store.*

### Task Analysis

Analyzing a task and breaking it down into teachable steps for a student is not a trivial process. Consider how Marc’s teachers planned for his active participation in the morning arrival routine.

*Before teaching Marc the morning arrival routine, Ms. Wharton, the special education teacher, worked with the school’s autism specialist. They watched other children perform the task and then analyzed the steps. They identified both the responses that they wanted Marc to learn and the relevant stimulus that Marc needed to learn to attend to (see Table 5–4). Ms. Wharton also asked Marc’s kindergarten teacher, Ms. Kwan, to use the preliminary task analysis and to observe students upon their arrival to double-check the steps. Ms. Wharton piloted the task analysis for Marc to be sure that the steps made sense for him. When she found that some of the steps were too hard for him to do alone (e.g., Step 2: Open the door to the building), she modified those steps by adding adult/*

TABLE 5-4

Initial Task Analysis of the Sequence of Stimuli and Responses Involved in Marc's Arrival Routine

Stimulus	Response
<ul style="list-style-type: none"> <li>• Bus stops, driver opens door, kids get up.</li> <li>• See school door.</li> <li>• See lobby and hallway to the left.</li> <li>• See blue classroom door on the right.</li> <li>• See teacher (hear/see greeting).</li> <li>• See coat rack and other students removing their backpacks and jackets.</li> <li>• See other students putting backpack into cubby.</li> <li>• See other students hanging up their jackets.</li> <li>• Jacket and backpack are put away (smiles and praise from teacher).</li> <li>• See activity cards arranged vertically.</li> <li>• Teacher rings start bell.</li> <li>• See activity cards arranged vertically.</li> <li>• See rainbow rug, peers, and Ms. Kwan.</li> </ul>	<ul style="list-style-type: none"> <li>Get out of bus.</li> <li>Open and walk through door.</li> <li>Walk through lobby and down hallway.</li> <li>Open door and go in.</li> <li>Greet teacher by waving.</li> <li>Find empty space, take off backpack.</li> <li>Place backpack in cubby.</li> <li>Remove jacket, hang on empty hook.</li> <li>Go to schedule.</li> <li>Take top card for centers, match to activity.</li> <li>Go to schedule.</li> <li>Take top card for circle, match to activity.</li> <li>Sit on rug.</li> </ul>

*peer assistance or by dividing one step into two steps: (a) Take off jacket, and (b) hang jacket on the hook. Marc's mother, who was familiar with the arrival routine, then looked at the task analysis and added her own ideas. Because Marc could perform very little of the task during the initial pilot, the two teachers anticipated that Marc would be in the acquisition stage of learning and thus left the main focus of the task analysis on the core steps of the task. The SLP suggested the enrichment skill of communicating a greeting.*

Figure 5-7 shows the final task analysis of Marc's arrival routine with 17 steps that reflect the validation process. The team decided to extend the task to include the two morning activities in kindergarten. The form allows team members to record teaching and testing data and note anecdotal comments to explain Marc's performance.

Teams will be more successful if task analyses are carefully developed through a process:

1. Select a needed skill by using ecological inventory results to identify a functional and age-appropriate skill that is an important target for a particular student (see Chapter 3).
2. Define the target skill simply, including a description of the settings and materials most suited to the natural performance of the task.
3. Perform the task and observe peers performing the task, using the chosen materials in the natural settings while noting the steps involved.
4. Adapt the steps to suit the student's disabilities and skill strengths; employ as needed the principle of partial participation, the only-as-specialized-as-necessary rule, and component analysis to design a task analysis that is both age appropriate and functional.
5. Validate the task analysis by having the student perform the task, but provide assistance on steps that are unknown so that performance of all of the steps can be viewed.
6. Revise the task analysis so that it works; explore adding simple, non-stigmatizing adaptations to steps that appear to be unreasonable in an unadapted form.
7. Write the task analysis on a data collection form so that steps (a) are stated in terms of observable behavior; (b) result in a visible change in the product or process; (c) are ordered in a logical sequence; (d) are written in second-person singular so that they could serve as verbal prompts (if used); and (e) use language that is not confusing to the student, with the performance details that are essential to assessing performance enclosed in parentheses.

**FIGURE 5-7**  
The Team's Task Analysis Data Collection Form for Marc's Morning Arrival Routine

<b>Teachers:</b> Walton, Kwan		<b>Instructional cue:</b> Arrival at school by school bus; bus stops, kids stand up	
<b>Student:</b> Marc		<b>Settings:</b> Bus arrival area, sidewalk, lobby, hallway, classroom	
<b>Day(s):</b> Daily at arrival		<b>Target:</b> Morning arrival routine	
<b>Probe schedule:</b> First Tuesday of each month		<b>Teaching method:</b> Constant time delay (0, 4 seconds)	
		<b>Stage of learning:</b> Acquisition	
		<b>Baseline/Probe method:</b> Multiple opportunity task analytic assessment (4-sec. latency)	

Dates	→																									
	9/21	9/22	9/23	9/24	9/27	9/28	9/30	10/1	10/4	10/5																
Delayed prompt			0	0	4	4	4	4	4																	
Task Steps ↓																										
1. Get off bus.	-	-	√	√	√	√	√	√	+	+																
2. Open and walk through door (help OK).	-	-	√	√	√	√	√	√	√	-																
3. Walk down the hallway (through lobby to left).	+	-	√	√	√	√	√	√	√	-																
4. Open Ms. Kwan's door, go in.	-	-	√	√	√	√	√	√	√	-																
5. Wave to Ms. Kwan*.	-	-	√	√	√	√	√	+	+	+																
6. Find empty cubby, take off backpack.	-	-	√	√	+	+	+	+	+	+	<table border="1"> <thead> <tr> <th>Date</th><th>Teacher</th><th>Anecdotal Comments</th></tr> </thead> <tbody> <tr> <td>9/23</td><td>JW</td><td>Waited for help most steps</td></tr> <tr> <td>9/25</td><td>JW</td><td>Sleepy, ear infection meds</td></tr> <tr> <td>10/4</td><td>LK</td><td>He's more sure</td></tr> <tr> <td>10/5</td><td>LK</td><td>Great probe!</td></tr> </tbody> </table> <p>[Located on back of task analysis]</p>	Date	Teacher	Anecdotal Comments	9/23	JW	Waited for help most steps	9/25	JW	Sleepy, ear infection meds	10/4	LK	He's more sure	10/5	LK	Great probe!
Date	Teacher	Anecdotal Comments																								
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9/25	JW	Sleepy, ear infection meds																								
10/4	LK	He's more sure																								
10/5	LK	Great probe!																								
7. Put backpack inside cubby (on floor).	+	-	√	√	√	+	+	+	+	+																
8. Take off jacket.	-	-	√	√	√	√	√	+	-																	
9. Hang it up (empty hook).	-	-	√	√	√	√	+	√	+	-																
10. Go to your schedule, get card (first card).	+	+	√	√	√	+	+	+	+	+																
11. Go to _____ and get started (first card).	-	-	√	√	√	√	√	√	√	-																
12. Go to schedule, get rainbow rug card (when teacher rings bell).	-	-	√	√	√	√	√	√	√	-																
13. Go sit on rainbow rug (criss-cross).	-	+	√	√	√	√	+	+	+	+																
14. Listen and do _____ (use circle schedule).	-	-	√	√	√	√	√	√	√	√																
15. Go to schedule, get Ms. Wharton's room card (when circle done).	-	-	√	√	√	√	+	+	+	+																
16. Find Ms. Kwan, say good-bye*.	-	-	√	√	√	√	√	√	+	+																
17. Go to Ms. Wharton's room.	-		√	√	√	+	√	+	√	-																
<b>Total independent</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>7</b>	<b>10</b>	<b>8</b>																
<b>Baseline/Teach/Probe</b>	<b>B</b>	<b>B</b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>P</b>																

<b>Materials:</b> Arrival schedule, backpack, jacket	<b>Recording Key:</b> Test: + correct, - incorrect; Teach: + unprompted correct, √ prompted correct (gestural/partial physical prompt), - unprompted/prompted error; NR no response
<b>Latency Period:</b> 0 sec., 4 sec.	*Social enrichment steps
<b>Criterion:</b> 10 of 15 steps correct (67%) for 3 of 5 teaching days	

### Approaches for Teaching Chained Tasks

Chaining refers to learning to perform a sequence of functionally related responses in an approximate or exact order to complete a more complex routine or task (e.g., clearing a table of dirty dishes, making a sandwich, brushing one's teeth, printing one's name, or completing an addition problem). Many of the skills that we perform and that we teach students to perform consist of a chain of small component responses linked together. Learning the sequence of responses involves performing each discrete behavior of the chain in sequence and in close temporal succession. When responses in the chain are learned, each response becomes the discriminative stimulus for the next response in the chain. Reinforcement is provided by others or by the act of completing the steps or the task itself, particularly if a preferred activity follows task completion.

*When she first started teaching Marc to zip his jacket, Marc's occupational therapist would connect the zipper plackets, put Marc's fingers on the zipper pull, start the*

*movement, and then encourage Marc to pull the zipper up an inch. When he did, he was enthusiastically praised. Over several weeks, a few more steps earlier in the chain were added so that he now grasps the zipper pull by himself right after the therapist connects the zipper.*

Each component of the chain becomes a conditioned reinforcer for the previous response and a discriminative stimulus for the next response in the chain.

*By December, when Jacob would count out a mixed pile of coins, he sometimes stopped, started over, or just paused and self-corrected, but he usually finished with the total amount, saying, for example, "That's 85 cents!"*

To teach behavior chains, the cluster of responses is first divided into an ordered list, or task analysis, of separate teachable behaviors. The number of steps into which a chain is divided varies for different students and skills. Because chaining may proceed forward (like Jacob's coin counting) or backward (like Marc's zipping task) across the sequence of behaviors, or may involve instruction across all steps concurrently, a team must select the manner in which it will teach the task components (i.e., *forward or backward chaining*, or *total task*). The chaining approach selected and the teaching procedures used depend on how fast the student learns under various teaching conditions, the length and complexity of the chain, the opportunity to perform the chain, and the component responses already known. (Refer to Chapter 4 for more examples of task analytic assessment and measurement.) The three basic chaining strategies (i.e., total task, forward, and backward) that teams choose from when planning teaching programs are described in Figure 5–8.

### Elements of Discrete Teaching Trials

A *discrete teaching trial* "consists of a concise and consistent instruction or question, the child's response, and a specific consequence, the nature of which is determined by the child's response" (Schreibman, 2000, p. 374). Learning trials form the basis of all systematic instruction, regardless of the type of student or the skill taught. "Teaching is a process of organizing student experience so that target behaviors come under the control of new and different stimulus conditions"; this is a process that involves establishing and transferring stimulus control over repeated learning trials (Wolery, Ault, & Doyle, 1992, p. 202). A discrete teaching trial can be represented as follows:



When teaching trials are presented back to back, a pause is provided at the end of one trial and before the next trial to make each trial discrete from the next; this pause is called an *intertrial interval*. As we discuss in a later section, trials can be clustered together, or *massed* (also called *repeated practice*), so that many trials are presented on the same target skill (e.g., as in teaching Jacob to read vocabulary words) or can be *distributed* so that single trials are presented at a time when they are more natural to performing the task (e.g., teaching Marc to wash his hands after using the toilet and to change his socks after gym). *Contextualized* teaching means teaching at a time that is natural to the task, while *non-contextualized* teaching takes place apart from the natural application of the skill (e.g., pull-out speech sessions, in which the student is removed from the general education classroom to a therapy setting and follows instructions on making purchases at a table in the classroom rather than in a real store).

Learning is most likely to occur (a) when the target behavior is reinforced in the presence of the desired stimulus, and (b) when the target behavior is performed but

**FIGURE 5–8**  
Chaining Approaches

Description	Examples	Considerations for Use
<b>Response Chaining: Total Task</b>		
<ul style="list-style-type: none"> <li>• Task-analyze steps and measure baseline performance.</li> <li>• Instruction begins by starting with the first step in the chain and teaching each successive step in order until the chain of responses is completed.</li> <li>• All steps that need instruction are taught in order and concurrently during each performance of the chained routine.</li> <li>• Reinforcement is given quickly (e.g., praise) after each response for corrections and improved performances, and again at the end of the chain (e.g., a short leisure break).</li> </ul>	<ul style="list-style-type: none"> <li>• Has been used successfully with all sorts of chained tasks: self-care; mobility; daily living; community, vocational, and social interactions; and some multiple-step academic routines</li> </ul>	<ul style="list-style-type: none"> <li>• Works best if the chain is not too long (chained tasks can be subdivided) or a single training trial can be too lengthy</li> <li>• Main advantage are that all teaching opportunities are used (each step is taught each time) and that the task is completed.</li> <li>• May produce faster learning than other chaining methods. May be combined with repeated training just on difficult step(s) of a routine, although this is usually rather unnatural.</li> <li>• This seems to be a more natural approach than the other options.</li> </ul>
<b>Response Chaining: Forward Chaining</b>		
<ul style="list-style-type: none"> <li>• Task-analyze steps and measure baseline performance.</li> <li>• Begin instruction by starting with the student performing any learned steps in order up to the first unmastered response, at which point instruction occurs. Reinforcement is given quickly after the training step, while more extensive reinforcement may be given after the last step in the chain is completed.</li> <li>• The remainder of the chain may be either completed by the teacher or by the student with assistance, but the routine should be finished before another training opportunity occurs.</li> <li>• Once this segment of the chain is mastered, through additional trials, instruction shifts to the next unmastered step, while prior learned steps are performed in sequence but without assistance.</li> </ul>	<ul style="list-style-type: none"> <li>• Useful with many self-care routines (grooming tasks, dressing, using the toilet)</li> <li>• May suit many home management and vocational tasks. Appropriate for some chained academic tasks (e.g., use of number line, telephone dialing, calculator use). (Not as useful in school or community setting when assistance through the unlearned part of the task is more obvious and may be stigmatizing.)</li> </ul>	<ul style="list-style-type: none"> <li>• Usually combined with prompting to teach the target step, as well as shaping across the entire chain</li> <li>• May work better than the total task for some learners who have multiple disabilities or for longer tasks. Initial mastery of single responses in the chain may be faster but slower overall.</li> <li>• Replace with backward chaining when task has an especially reinforcing end.</li> <li>• Replace with total task if chain is performed less often; may want to switch to total task after half of the steps are learned.</li> <li>• May need to create more training opportunities or learning will be slow</li> <li>• Involves a lot of teacher effort to complete unlearned portion of task</li> </ul>
<b>Response Chaining: Backward Chaining</b>		
<ul style="list-style-type: none"> <li>• Task-analyze steps and measure baseline performance.</li> <li>• Instruction begins by either completing or helping the student perform the entire chain of behavior up until the last step of the chain, at which point instruction occurs.</li> <li>• After additional opportunities and when the student has mastered the last step, teaching shifts to the next-to-last step of the chain, but the student is expected to perform the last step(s) unassisted.</li> <li>• Reinforcement is given quickly after the training step, while more extensive reinforcement occurs only after the last step in the chain is completed. As the remaining steps are taught, learned, and added in a backward order, the entire chain is performed, and the learner is reinforced.</li> </ul>	<ul style="list-style-type: none"> <li>• Useful with many self-care routines (grooming tasks, dressing, using the toilet).</li> <li>• May suit many home management and vocational tasks. Appropriate for some chained academic tasks (e.g., use of number line, telephone dialing, calculator use). (Not as useful in school or community setting when assistance through the unlearned part of the task is more obvious and may be stigmatizing.)</li> </ul>	<ul style="list-style-type: none"> <li>• Similar to forward chaining. The main advantages over forward chaining and total task are that the student is being assisted through the task, completes the task quickly, and gets reinforcement early in learning.</li> <li>• Usually combined with prompting to teach the target step, as well as shaping across the entire chain</li> <li>• May work better than total task for some learners who have multiple disabilities or for longer tasks. Initial mastery of single responses in chain may be faster but slower overall.</li> <li>• Replace with total task if chain is performed less often; may want to switch to total task after half of the steps are learned.</li> <li>• May need to create more training opportunities or learning will be slow</li> <li>• Involves a lot of teacher effort to complete unlearned portion of task</li> </ul>

not reinforced whenever the desired stimulus is not present. For example, as drivers, we have learned that driving (the target behavior) through green traffic lights (the desired stimulus) is legal, but driving (the target behavior) through red traffic lights (the incorrect stimulus) is not within the law and might result in an injury or a fine. In this case, the green light is the discriminative stimulus for driving through the intersection. This type of *discrimination training* is how we learned the names of our relatives (e.g., “Mama” and “Daddy”); to identify numbers, colors, and feelings; and to carry out complex behaviors like playing Monopoly® or tennis, reading books, and conducting titration experiments in chemistry class.

When students with high support needs are taught, in contrast to students *without* disabilities, teachers must attend closely to the elements of the teaching trial because it is important to keep student errors to a minimum. Making errors during initial instruction has been shown to slow learning, even with an error correction procedure (Ault, Wolery, Doyle, & Gast, 1989). Planning teaching trials so that students learn new responses fairly quickly without making many errors requires an awareness of the elements and the selection of strategies that support learning. Teachers might modify the expected student response so that it is a simpler version of the goal and then shape performance over time. Educators also need to be aware of the number of teaching trials provided (whether repeated or distributed), knowing that a higher frequency of correct responses to the desired stimuli facilitates learning. Attention is always paid to the consequences so that reinforcement is made contingent on successive approximations to the goal response—that is, students are reinforced for improvements in the target skill over time, even if they are only slight improvements. Learning is best when reinforcement is provided immediately and often during early learning; the frequency of reinforcement is faded in the later learning stages and the goal is to shift to natural forms of reinforcement. Often, some type of assistance or prompt that is understood by the student (e.g., point cue, model, and physical assist) is inserted between the discriminative stimulus and the student response; this often increases the likelihood that the student will make the correct response.



### Discriminative Stimuli

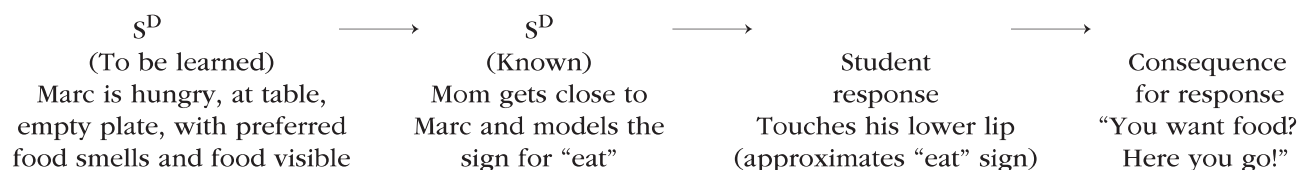
Learning is the process of understanding how to behave (student response) in the presence of specific and changing signals or stimuli (discriminative stimuli) in the environment.

*When Marc was three years old, he learned that at lunchtime in the presence of food at the kitchen table (discriminative stimuli), if he made the “eat” or “drink” sign (student response), his mom quickly gave him food. When Marc was given food he did not like, he also learned that making a pouting face and giving a negative vocalization meant that his mom would often take the food away.*

Marc’s use of certain responses in the presence of food and drink have been reinforced for so long that he has learned which responses lead to food. A discriminative stimulus (also referred to as an  $S^D$ ) is a relevant aspect of a task or situation in the presence of which a particular behavior is frequently reinforced. As shown below, discriminative stimuli can include aspects of a task setting, teacher requests, materials, the time of day, the student’s physical state, and other relevant contextual stimuli.

Discriminative Stimuli	Examples
Task setting	Sink in the bathroom Sand table Swings at the playground
Teacher requests	“Everyone line up in front of the room.” “It’s time to take out your workbooks.” “Who can tell me whether it’s sunny or rainy?”
Materials	Picture schedule Workbook Spoon
Time of day	Students lining up in front of class at dismissal Bell signaling the end of math class Clock says 1:10—time to go to the resource room
Student’s physical state	Empty stomach Full bladder Headache
Other relevant contextual stimuli	Fire alarm Overheated classroom Non-working hearing aide

Initially, a parent’s or teacher’s reminders and assistive prompts are the stimuli that control a student’s response. But once the task-discriminated stimuli are learned, they come to control the student’s response and, therefore, prompts from others are not needed. For example, when Marc was two years old, his teachers and parents created opportunities to teach him to use several functional signs; he was initially given prompts ( $S^D$ s) to teach him to associate signing with eating:



Teaching involves shifting the control from teacher-supplied stimuli (request and prompts or known stimuli) to natural task stimuli (to be learned). For most students, the goal is to respond to the presence of natural cues instead of teacher-applied stimuli, such as requests and prompts.

*One of Marc’s kindergarten goals was independent hand washing. Initially, teachers and parents asked him to wash his hands at the appropriate times and then prompted him through the steps. His team expected that, over time, with repeated opportunities, he would learn (a) to discriminate the stimuli of dirt, food, or art supplies on his hands and respond by heading to a sink to wash them, and (b) to complete the task without prompts. Because the goal was for natural task stimuli to control his behavior, his teachers incorporated them into the teaching plan.*

*In February, Christine started sampling a job at an elementary school library close to campus. The job was checking out books. Initially, she did not understand what to do when someone asked her to check out a book or placed a book on the counter. After instruction from her job coach, she became alert to critical stimuli, which “told” her that it was time to press the book scanning switch. Signals that indicated that a book was ready to be checked out included a child asking to check out a book, followed by the thud of the book against the metal end of the slanted book holder. She learned to activate the scanner switch and listen for the beep indicating that the book was scanned; however, if there was no beep, the book had not been put in the holder correctly (with the bar code positioned up and under the scanner). The absence of a beep was a*

*different stimulus, which she learned to respond to by pushing her communication device to say, "Oops! Can you put the book in the right way?"*

### Instructional Cues

Teaching in natural settings and at natural times promotes the use of environmental cues as the  $S^D$ . Initially, for most tasks in the acquisition stage of learning, an *instructional cue* or *request* is needed to signal the beginning of instruction and the target behavior. Instructional cues are not meant to be verbal prompts, but are used simply to initiate instruction in situations where the relevant contextual stimuli may not be initially discriminated by the student. Instructional requests need to be carefully planned:

1. State requests so that the student easily understands them (e.g., show visual symbol and say "Wash your hands.>").
2. Phrase them as requests ("Read this," "Tie your shoes,"), not questions ("Can you read this?" "Do you want to tie your shoes?").
3. Provide requests only when the student is attending.
4. Give requests only once at the beginning of the task instead of repeating requests over and over.
5. Pair the request with relevant, natural task stimuli: times of day, materials, and settings.
6. Fade instructional requests when the student starts to notice relevant task stimuli or once the student reaches the advanced stages of learning (i.e., maintenance, fluency, and generalization).

### Stimulus and Response Prompting

Prompting is an important antecedent strategy used to "get responses going" and to prevent errors. The behavior must occur before it can be shaped to a criterion level through instruction. Various types of assistance given just prior to the response in an instructional trial increase the likelihood that the learner will perform the desired behavior or will perform a better approximation. Thus, prompts can make learning more efficient because teachers need not wait for the target behavior to occur so that it can be reinforced. However, the behavior is not considered to have been learned until all prompts are eliminated or faded out. Initially, prompts are given to obtain a student response, but then are faded to shift control of the student's response from the prompt stimuli to the natural or relevant stimuli. There are two general classes of prompt procedures: Prompts that are associated primarily with the task stimuli (materials) are called *stimulus prompts* or *stimulus modification procedures*, while prompts associated with the response are called *response prompts*.

### Stimulus Prompts

Stimulus prompts, or stimulus modification procedures, involve manipulating the relevant and irrelevant task stimuli and gradually changing the teaching stimuli from simpler to more challenging levels. Stimulus modification procedures are used by teachers to increase the chance of a correct response. A classic example of this approach are the stimulus-fading procedures used by Gold (1972) involving color coding of several key parts of bicycle brake pieces to make the assembly task easier for workers with disabilities. Given color-coded parts, the workers simply matched the colors of the parts to be joined. Eventually, the color coding was faded or eliminated.

While stimulus prompts are more time consuming to prepare and use than response prompts, they have the advantage of being used by students independently, without the need to have a staff member present. Prompting students to be successful during instruction by modifying the curriculum, class materials, and work directions are

important strategies for teaching in the general education classroom. When making modifications in class materials, they must be slowly faded from simple to more difficult discriminations. The change in the stimulus must be so gradual that the new step will likely be achievable for the student.

*Marc's letter-writing worksheets started out with dotted letters. The dotted letters were then gradually lightened and eliminated so that Marc was writing more and more of the letters on his own.*

While, most examples of these methods reduce errors to a minimum and have excellent research support, they also require that the student have accurate vision to be effective and may demand extensive preparation of teaching materials (Wolery, Ault, & Doyle, 1992). Computer-assisted versions of stimulus modification procedures may be an efficient option to teacher-made materials and have been applied to reading instruction for students with severe disabilities (Browder, Wakeman, Spooner, Ahlgrim-Dezell, & Algozzine, 2006).

Two commonly used stimulus modification procedures include stimulus fading and stimulus superimposition. *Stimulus fading* involves the pairing of an irrelevant stimulus (e.g., color or size) with a relevant stimulus (e.g., the word on the red card matches the picture shown, the big object matches the picture shown), and the gradual fading of the irrelevant stimulus (e.g., background color, object size). *Stimulus superimposition* involves the placement of a known stimulus (e.g., a picture) over another that is not known (e.g., the word for the picture) in a manner that both the known stimulus (the picture) and the stimulus to be learned (the word) can be viewed. Slowly, the intensity, clarity, or salience of the known stimulus (the picture) is modified until it is not visible, leaving only the originally unknown stimulus (the word) visible. This is exemplified by learning to read flash cards that are prepared in four sets: Set 1 has cards with a picture superimposed over the word, sets 2 and 3 have cards with the pictures faded out to different degrees, and set 4 has cards with only words. Both stimulus fading and stimulus superimposition are used to teach an association between two stimuli, one known or familiar but irrelevant to the target skill (location, color, picture) and the other unknown but relevant (word, number). A simple application of stimulus modification procedures can be used to teach with a variety of task materials, allowing the student to become accustomed to changes in the irrelevant stimulus dimensions.

### Response Prompts

Response prompts are actions taken by the teacher before a student responds (or after an error) to increase the probability of a correct response. Response prompts are “portable” in that they are readily available whenever the teacher is present and they do not require extensive materials as do stimulus prompts. Most response prompts used during the early stages of learning require a teacher to perform them close to the student or on the student, but there are many options for “teacher-free” response prompts when students learn to use picture guides to task steps, audio- or videotaped instructions, or computer-generated response prompts (refer back to the sections on visual supports and video modeling). Teacher-free response prompts such as these seem to be more successful in the later stages of learning, but this is not a hard-and-fast rule.

Typical response prompts that teachers provide directly to students include verbal instructions, gestures or pointing movements, models (stating the answer, showing a picture symbol), and physical assists. Unlike cues added to permanently remind students (e.g., Christine's use of picture cues to self-manage her memory of her Walmart job steps), response prompts are faded. All response prompts given by teachers need to be faded as students learn to respond to stimuli from the natural task context, to stimuli caused by their own task performance, or to other relevant internal stimuli

(Wolery, Ault, & Doyle, 1992; Wolery & Gast, 1984). To do this, teachers must draw students' attention to natural stimuli by doing the following:

- Match verbal prompts with the actual words used in the setting where the skill ultimately will be performed:

*At her library job, Christine's teachers use the words "scanner" and "beep" because that's what the library staff and the students say.*

- Emphasize the type of prompt most prevalent in the natural setting:

*When Jacob missed the teacher's directions, his peer support classmate tells him to watch what he and the others seated nearby are getting and to just do the same thing.*

- When a student skips an important task step, call attention (with gestures, words, and positioning) to the step that occurred just before the missed step so that the student attends to the relevant natural stimuli:

*Marc pulled up his pants, flushed the toilet, and then started to leave the bathroom when the teacher called him back, positioned him facing the sink, and said, "What's next?"*

- Use natural prompts and correction procedures whenever possible during maintenance, fluency, and generalization:

*Christine has learned to listen for the scanner beep after she activates the switch in order to judge whether the library book was placed in the book holder correctly.*

- Teach students performing in the later learning stages to ask for assistance when prompts are faded:

*While learning to return the classroom's books to the library, Jacob performs well enough that his instructors assist only if there is a possibility of danger. Jacob has learned that if he needs help, he must ask for it.*

## Types of Instructional Prompts

Prompts come in many forms (e.g., words, visual demonstrations, physical movement) and are often combined. Prompts differ in the amount of assistance that they provide, the student skills required, and their intrusiveness. Teams should choose single prompts or combinations of prompts that suit the skill and setting, and the student's preferences, abilities, and stage of learning. The prompts in Figure 5-9 are arranged roughly in order from difficult to easy, with prompts that require more student skill to be effective first and prompts that require less student skill to be effective last.

## Response Latency

In terms of giving instructional prompts, *response latency* can be defined as the period allowed for a student to respond without assistance or to respond before being given a prompt. Without the opportunity to self-initiate, students may become prompt dependent and fail to learn the target response. The length of the response latency period depends primarily on the student; the student's stage of learning; and, in part, the response, or task step. For many students without significant movement difficulties and for many tasks, a latency of three to five seconds is a suitable expectation during the acquisition stage of learning. For many prompting procedures, the full latency is provided before any assistance is given to allow the student time to perform on their own. If a student does not respond during the latency period, the teacher gives a prompt and waits for the latency period again to allow the student time to respond to the prompt. If the student makes an error before the latency period is over, it is important to immediately and gently interrupt the error with a prompt (if

**FIGURE 5–9**  
Definitions, Examples, and Pros and Cons of Common Response Prompts

Definition and Examples	Pros and Cons
<b>Spoken or Signed Prompts</b>	
<ul style="list-style-type: none"> <li>• Words or manual signs that tell the student how to respond (“Spray the mirror”); not the same as instructional cues (e.g., “Clean the bathroom”) or directions</li> <li>• Match to fit student’s comprehension of words/signs and the amount of prompt needed (e.g., non-specific prompts like “What’s next?” may be good later in learning but provide little information)</li> </ul>	<p><b>Pros:</b> Can be given to a group and used from a distance Do not require visual attention; involve no physical contact</p> <p><b>Cons:</b> Must be heard and understood by student and followed Level of complexity varies considerably. May be hard to fade</p>
<b>Pictorial or Written Prompts</b>	
<ul style="list-style-type: none"> <li>• Pictures or line drawings that tell the student how to perform a behavior; pictures may show the completed task or one or more steps in the task; words may accompany pictures if student can read</li> <li>• May be used as permanent prompts that are not faded</li> <li>• Level of abstraction needs to fit student (e.g., photos, drawings, line drawings, letters, numbers, words).</li> </ul>	<p><b>Pros:</b> Can be used unobtrusively; do not require reading Can promote independence even when used as permanent prompts Standard symbols may help maintain consistency.</p> <p><b>Cons:</b> Pictures may be poorly drawn or taken; if lost, pictures may not be replaceable. Some actions are difficult to illustrate. Must be seen and understood by student and followed Level of abstraction varies.</p>
<b>Gestural Prompts</b>	
<ul style="list-style-type: none"> <li>• Movements made to direct a person’s attention to something relevant to a response</li> <li>• Pointing toward the desired direction; tapping next to the material needed</li> </ul>	<p><b>Pros:</b> These are unobtrusive, more natural cues. Can be given to a group and used from a distance; requires no physical contact</p> <p><b>Cons:</b> -Must be seen and understood by student and followed</p>
<b>Model Prompts</b>	
<ul style="list-style-type: none"> <li>• Demonstrations of the target behavior that students are expected to imitate</li> <li>• Models often involve movement (showing a step in shoe tying) but may involve no movement, as in showing a finished task (show one place set at a table and match to sample) or be verbal (“Sign ‘want ball’”)</li> <li>• Models may be complete (show entire step) or partial (show part of the step); if the model is done on a second set of materials, it need not be undone.</li> <li>• Model prompts usually match task steps.</li> </ul>	<p><b>Pros:</b> No physical contact with person is needed; can be used with a group and given from a distance. Versatile: Models suit many target behaviors. Complexity of the model can be adjusted to suit student’s level of performance. Others can be effective models on a planned or incidental basis; modeling can be unobtrusive.</p> <p><b>Cons:</b> Require students to attend (see, feel, or hear the model) and to imitate If model is too long or complex, imitation will be difficult.</p>
<b>Partial Physical Prompts</b>	
<ul style="list-style-type: none"> <li>• Brief touching, tapping, nudging, or lightly pulling or pushing a student’s hand, arm, leg, trunk, jaw, etc.</li> <li>• Used to help a student initiate a response or a sequence of responses</li> <li>• Follow the rule: “As little as necessary”</li> </ul>	<p><b>Pros:</b> Give some control over student responding with little physical contact. Useful when vision is limited.</p> <p><b>Cons:</b> Can be intrusive; some students do not like to be touched; can’t be used at a distance. Care must be taken not to injure or throw student off balance.</p>
<b>Full Physical Prompts</b>	
<ul style="list-style-type: none"> <li>• Full guidance through a behavior, often involving hand-over-hand assistance (as in using a spoon or smoothing a bedspread) or movement of the trunk and legs (as in assisting crawling or walking forward)</li> <li>• Physical prompts should match task steps.</li> <li>• Follow the rule “as little as necessary” while being sensitive to any student movement and easing physical control; does not involve force</li> </ul>	<p><b>Pros:</b> Allows total control over response, thereby reducing errors These are useful when vision is limited.</p> <p><b>Cons:</b> Highly intrusive, unnatural, and stigmatizing in public; some students do not like to be touched; can’t be used at a distance Care must be taken not to injure through tight holding, to force compliance with a movement, or to throw student off balance.</p>

(Wolery, Ault, Doyle, *Teaching students with moderate to severe disabilities*, 1st Ed., © 1992, pp. 38–41. Reprinted and electronically reproduced by permission of Pearson Education, Inc., Upper Saddle River, New Jersey.)

none had been given yet) or with a prompt that provides more assistance if a prompt had been given but was not successful.

*When Marc is standing by the coat hooks, Ms. Kwan watches and waits about five seconds to see whether he will take off his jacket. When he does not do so or starts to, but then stops, she gets close to him, directs his attention to a peer nearby, and uses point cues to indicate that his jacket should be taken off and hung on a hook. If he does not initiate the action after about five seconds, she uses a combined gestural and physical prompt (she points to his peer and the hook, then tugs gently at his jacket) and then waits about five more seconds for him to initiate the action before giving a full physical prompt.*

S <sup>D</sup> (To be learned)	Latency →	S <sup>D</sup> (Known)	→	Student Response	→	Consequence for response
Marc has his jacket on and is standing by the coat hooks among the other students who are just arriving.	Ms. Kwan waits five seconds for Marc to begin taking off his jacket.	Ms. Kwan kneels close and directs his attention to a peer in his line of vision who is removing and hanging his jacket. She then points to Marc's jacket and to the empty hook and tugs gently on his jacket.	→	Marc removes his jacket and hangs it on a hook, but not securely.	→	"Great! You hung up your jacket, Marc!" Ms. Kwan rearranges the jacket.

If a student seems to require more time to initiate a response, the teacher must determine the student's natural response latency by timing the student as he or she performs a known task involving similar movements. The time that it takes for the student to "get the response going" on those known tasks should be roughly the latency period used in teaching.

*Because of her cerebral palsy, Christine is aware of the need to move before she can actually make a required move. Her teachers use response latencies longer than five seconds for responses that involve her hands and arms.*

### Prompt Fading

Fading is the gradual changing of the prompt stimuli that control a student's performance, to less intrusive and more natural prompt stimuli, and finally, to only natural task stimuli. Prompt fading may also be conducted by inserting time between the stimulus to be learned and the controlling stimulus (prompt) so that students learn to perform in the presence of natural task stimuli and prior to being prompted by the teacher. Regardless of the fading approach, the goal is to fade prompts without noticeably increasing student errors or depressing student performance. Fading of prompts is not an exact science (Demchak, 1990). Often, teams must observe a student's performance and adjust their methods so that fading is not too fast (thus keeping errors low) and not too slow (thus keeping motivation for the task high).

Prompts are faded in many ways. First, the number of different prompts provided can be gradually reduced in several phases: (a) model and verbal prompts, (b) only verbal prompts, and (c) all prompts eliminated. Most fading approaches involve decreasing the amount of information provided by a prompt: (a) pointing to materials with a complete verbal reminder of a step, (b) only pointing to the materials, (c) saying "What's next?" and (d) giving no prompt. Additionally, the amount of physical control can be reduced over successive teaching opportunities: (a) full hand-over-hand assistance, (b) three-finger assistance, (c) one finger assistance, and (d) no physical assistance. Although it is important to transfer behavior control from training prompts to natural cues quickly, removal of prompts too quickly is certain to hamper successful transition. Fading is most successful when it is planned and completed systematically. Making observations of students performing without any prompts (i.e., by *probing* their performance) is the best way to judge whether students can carry out

the task without assistance. Once all prompts have been faded and the student continues to make the correct response, learning or independent performance has been demonstrated.

### Prompting Systems

Prompts may be used singularly, in combination, or as part of a specific prompting system. Some prompt systems employ a hierarchy; in other words, prompts are arranged either in order from most to least intrusive, called *most-to-least prompting* (e.g., physical–model–verbal), or in order from least to most intrusive, often called a *system of least prompts* or *least-to-most prompting* (e.g., verbal–model–physical). Several other prompt systems (time delay, graduated guidance, and simultaneous prompts) have also been shown to be highly successful for teaching to students who have severe disabilities a variety of self-care, play, vocational, academic, and daily living skills during the acquisition stage of learning. These prompt systems have specific rules for their use and work differently to shift stimulus control from the prompt stimuli to the relevant task stimuli.

Figure 5–10 sets forth a description of prompt systems ordered roughly from the easiest to use and potentially the least intrusive to the most difficult to use and the most intrusive. Still, *no prompt system is easy to use*; each requires practice for teachers to become fluent users. One of the main advantages of these systems, if used correctly, is that students generally learn with few errors. The prompt systems we describe have varying histories of published research success with students who have moderate to high support needs. The reader is referred to several other general sources for more detail on these methods and their use with students (Ault, Wolery, Doyle, & Gast, 1989; Collins, 2007; Schuster, Morse, Ault, Doyle, Crawford, & Wolery, 1998; Wolery, Ault, & Doyle, 1992) and to specific reviews of research using time delay (Browder, Ahlgrim-Dezell, Spooner, Mims, & Baker, 2009; Dogoe & Banda, 2009) or simultaneous prompting (Morse & Schuster, 2004).

The prompt system, the prompts, and the response latency that a team selects for teaching a student should be chosen to suit that student's skills. For example, teams will need to consider how long a student can wait for assistance, how well the student follows spoken or signed requests, whether the student imitates models or responds to pointing, whether the student tolerates physical touch, and also the student's preferences and dislikes for assistance (Demchak, 1990). Perhaps the most efficient approaches for learners in the acquisition stage are simultaneous prompting, constant time delay, and *prescriptive* increasing of assistance, or the system of least prompts with individualized prompts (see Figure 5–10).

In later stages of learning (i.e., maintenance, fluency/proficiency, and generalization), these same prompt systems can also be used if the prompt intensity is lessened. Thus, a teacher might use indirect verbal prompts (such as "What's next?" or the confirmation "That's right," or the command "Keep going" if a student pauses too long) on time delay or as part of a hierarchy of two or three prompts (the least intrusive prompt system). More extensive prompts used during acquisition might be replaced by unobtrusive cues or gestures that the student understands (e.g., the teacher looks in the direction of the correct choice or the next step, nods toward materials needed in the missed step, gives hand motions to go faster).

Researchers have found that constant time delay is one of the most effective and efficient prompting methods and also is versatile across a range of academic, communication, and practical skills that involve either discrete behaviors or a chain of behaviors (Browder, Ahlgrim-Dezell, Spooner, Mims, & Baker, 2009; Dogoe & Banda, 2009; Wolery, Ault, & Doyle, 1992). For example, time delay yielded fewer errors and less disruptive behavior than did the system of least prompts when young children with autism were taught academic tasks (e.g., matching pictures to objects, receptive identification of objects, numeral identification, word reading) (Heckman, Alber, Hooper,

**FIGURE 5–10**  
Commonly Used Response Prompt Systems and Considerations for Use

Description of Prompt System	Supportive Research and Considerations for Use
<b>Constant Time Delay</b>	
<ul style="list-style-type: none"> <li>• Select prompt that controls the response and determine how many trials will be given at 0-second delay.</li> <li>• During initial requests to respond, the prompt is given at the same time as the request (0-second delay), making early trials look like simultaneous prompting.</li> <li>• After a trial, several trials, or session(s), the delay between the task request and the prompt is lengthened to four seconds (or longer). If the student does not respond correctly in four seconds, the prompt is given.</li> <li>• Initially reinforce prompted correct responses, later differentially reinforce.</li> <li>• Always reinforce unprompted correct responses.</li> <li>• Continue giving delayed prompts until learning occurs (responds correctly without the prompt over several trials).</li> <li>• If errors occur, interrupt with the prompt; after several consecutive errors, reintroduce 0-second delay for one trial or more.</li> <li>• Response fading is part of the procedure as students learn that anticipating the delayed prompt enables faster reinforcement and/or completion of the task.</li> </ul>	<p><i>Supportive Research:</i> There is strong evidence of success for both chained responses (Dogoe &amp; Banda, 2009) and discrete responses, including a range of academic skills (Browder, Ahlgrim-Delsell, Spooner, Mims, &amp; Baker, 2009) and functional tasks (Dogoe &amp; Banda, 2009).</p> <p><i>Considerations:</i> Initially, student does not have to wait for assistance. Easier to use than progressive delay or prompt hierarchy. Only one prompt or two combined prompts (verbal 1 model) are used; prompt(s) must work for student. Requires practice in using; need to count off the delay silently. Responses made before four seconds (correct anticipations) should receive more reinforcement than prompted responses. If an error is repeated, use progressive delay, change program, or simplify task. When teaching chained tasks, delay can be used with forward or backward chaining or when a total task format is used.</p> <p><i>Recommended Use:</i> Use during early to late acquisition as well as other phases, but change to a less intrusive prompt. Good with chained or discrete tasks; equally effective but easier to use than progressive delay and more efficient than increasing assistance system. Peers have been successful using delay to teach chained tasks to students with moderate and severe disabilities (Godsey, Schuster, Lingo, Collins, &amp; Kleinert, 2008).</p>
<b>Simultaneous Prompting</b>	
<ul style="list-style-type: none"> <li>• Request that student perform the target behavior while prompting at the same time. Model prompts are often used.</li> <li>• Reinforce both prompted correct and independent correct responses.</li> <li>• Before every training session, give an opportunity to perform without prompting (probes) (or following a set number of trials) to determine when to fade prompts.</li> <li>• Fading of prompts occurs when probes alert teacher to stop prompting, prompting is stopped, and student continues to respond correctly.</li> </ul>	<p><i>Supportive Research:</i> There is broad support with wide range of students with/without disabilities and tasks (Morse &amp; Schuster, 2004). Successful with discrete behaviors (reading aisle headers) (Parker &amp; Schuster, 2002) and chained tasks (hand washing and dressing for young students) (Sewell, Collins, Hemmeter, &amp; Schuster, 1998).</p> <p><i>Considerations:</i> Student does not have to wait for a prompt. Procedure is relatively easy to use. Must use probes to determine when to fade prompt.</p> <p><i>Recommended Use:</i> Use during early to late acquisition phase. Seems to work well when student cannot use less intrusive prompts. Good evidence that learned skill is maintained and generalized (Morse &amp; Schuster, 2004).</p>
<b>System of Least-to-Most Prompting (Increasing Assistance)</b>	
<ul style="list-style-type: none"> <li>• Select a response latency and two to four different prompts that suit the student and the task; arrange prompts in an order from least assistance to most assistance (e.g., verbal, verbal 1 model, verbal 1 physical).</li> <li>• Student is asked to perform the task and allowed the latency period to respond.</li> <li>• Whenever a correct response (or a prompted correct) is made, reinforcement is given and the next training step/trial provided.</li> <li>• If student makes an error or gives no response, the first prompt in the hierarchy is given and the latency period is allowed. If the student again makes an error or gives no response, the next prompt is given and the latency period is allowed, and so on through the last level of prompt.</li> <li>• Errors are interrupted with the next prompt.</li> <li>• The last prompt should be adequate to produce the response.</li> <li>• Prompt fading generally occurs as students learn to respond to less intrusive prompts and then become independent.</li> </ul> <p>Simply put, the method involves telling student what to do, showing student what to do, and finally helping student do the task.</p>	<p><i>Supportive Research:</i> There is extensive support with both discrete and chained responses; less support with students who have multiple, severe disabilities and with basic self-care tasks. In comparison with delay, outcomes are the same or less efficient (errors, time to criterion, etc.). It is more efficient to use a prescriptive (individually suited) set of prompts than the traditional three (verbal–model–physical), but may be more difficult for staff (Wolery, Ault, &amp; Doyle, 1992).</p> <p><i>Considerations:</i> While hierarchies of verbal–model–physical prompts are most prevalent, many options for simpler hierarchies exist (gestural, gestural 1 partial physical, gestural 1 full physical). Requires a lot of practice to use consistently but versatile across tasks. May be intrusive and stigmatizing. Some question the amount of time between task stimuli and response, and the change of response modalities across different prompts. Can be used with forward or backward chaining or when a total task format is used.</p> <p><i>Recommended Use:</i> If learning is in the acquisition stage, avoid more than two levels of prompt. If learning is in the fluency stage, this is more efficient than decreasing assistance. Reduce intrusiveness of prompts for use in later learning phases.</p>

(continued)

**FIGURE 5–10**  
Commonly Used Response Prompt Systems and Considerations for Use (*continued*)

Description of Prompt System	Supportive Research and Considerations for Use
<b>Progressive Time Delay</b>	
<ul style="list-style-type: none"> <li>• This is similar to constant delay, except that delay interval is gradually increased from zero to eight or more seconds.</li> <li>• Determine delay levels and how many trials will be given at each level; plan error approach.</li> <li>• During initial requests to respond, the prompt is given at the same time as the request (0-second delay), making early trials look like simultaneous prompting.</li> <li>• After a trial, several trials, or session(s), the delay between the task request and the prompt is lengthened by 1- to 2-second increments up to 8 (or more) seconds, where delay remains until student learns.</li> <li>• Errors and corrections are handled as in constant delay, except delay may be reduced partially or completely when the student makes errors and then increased gradually or quickly when the student responds without errors. .</li> <li>• Response fading is part of the procedure as students learn that anticipating the delayed prompt enables faster reinforcement and/or completion of the task.</li> </ul>	<p><i>Supportive Research:</i> There is extensive history of support for discrete behaviors; good for chained responses across a range of students with disabilities and tasks (Wolery, Ault, &amp; Doyle, 1992).</p> <p><i>Considerations:</i> Same as for constant delay. Progressive time delay is more difficult to use, particularly with chained tasks. Reducing and then increasing the delay for repeated errors is also complex. Produces fast learning with few errors. Better than constant delay for students who have difficulty waiting because the delay is gradually increased and the ability to wait is shaped. Can be used with forward or backward chaining or when a total task format is used.</p> <p><i>Recommended Use:</i> Use during the early to late acquisition stages; good with chained or discrete tasks; equally effective with constant delay but less easy to use and less efficient (requires more trials to achieve criterion). More efficient than increasing the assistance system.</p>
<b>System of Most-to-Least Prompting (Decreasing Assistance)</b>	
<ul style="list-style-type: none"> <li>• Select a response latency and two to four different prompts that suit the student and the task; arrange prompts in an order from most to least assistance (e.g., verbal 1 physical, verbal 1 model, verbal).</li> <li>• The first prompt should be adequate to produce the response.</li> <li>• Determine the criterion for progressing to a less intrusive prompt (e.g., so many minutes of training at each level, a certain number of corrections in a row).</li> <li>• Student is asked to perform the task and allowed the latency period to respond. Whenever a correct response (or a prompted correct) is made, reinforcement is given, and the next training step/trial is provided.</li> <li>• Prompt fading generally occurs when teachers substitute less intrusive prompts for more intrusive ones and students learn to respond to less intrusive prompts and then become independent.</li> </ul>	<p><i>Supportive Research:</i> There is convincing support for use with students who have severe disabilities and a range of skills (self-care, mobility, following directions).</p> <p><i>Considerations:</i> Teachers must plan how to fade prompts and implement these plans, or students may become prompt dependent. Can be used with forward or backward chaining or when a total task format is used.</p> <p><i>Recommended Use:</i> It may be better for teaching basic skills to some students in the acquisition stage than is a least-to-most prompting system. Works well when student cannot use less intrusive prompts (e.g., cannot follow verbal direction or imitate, or does not wait for prompts) and makes many errors. Helps teach students to wait longer latency periods, after which constant time delay or a system of least prompts may be used (Collins, 2007). Good when target task is chained and requires fluent movement. Less useful in later stages of learning.</p>
<b>Graduated Guidance</b>	
<ul style="list-style-type: none"> <li>• Select a general procedure to use:             <ol style="list-style-type: none"> <li>a. Gradually lighten physical assistance from full hand over hand, to partial, to light touch, to shadowing. Shadowing means that the teacher's hands are close to the student's involved body part (hand, arm) but not in contact, ready to assist.</li> <li>b. Hand-to-shoulder fading, which uses a full physical prompt, is applied at the hand and then faded to the wrist, forearm, elbow, upper arm, shoulder, and then to shadowing; hand-to-shoulder fading has been accompanied by ongoing verbal praise and tactile reinforcement, with concrete reinforcers given at the end of a task chain.</li> <li>c. Reduce the amount of pressure from initial full hand-over-hand assistance, to two-finger assistance, to one-finger guiding, and then to shadowing.</li> </ol> </li> <li>• Prompts are delivered simultaneously with the task request so that the student's movements through the task are continuous.</li> <li>• Begin fading when there is evidence that the student can perform with less assistance: (a) sensing the student's assistance with the response through tactile cues, (b) improved performance (less help or no help) during probe trials, (c) student initiates the task, or (d) after what seems like an adequate amount of training.</li> </ul>	<p><i>Supportive Research:</i> This is supported by mostly older research in institutional groups and self-care tasks with intensive training methods. There are several more recent school applications (Collins, Gast, Wolery, Holcombe, &amp; Leatherby, 1991; Denny, Marchand-Martella, Martella, Reilly, Reilly, &amp; Cleanthous, 2000; Reese &amp; Snell, 1990).</p> <p><i>Considerations:</i> This is typically used with chained tasks, a total task format, no latency period, and intensive training, but can be used without intensive training. A latency period may be used to help judge when fading is appropriate (Reese &amp; Snell, 1990). While the procedure is not complex (physical prompt only and then fading), it requires many teacher judgments about when to fade prompts; may not be systematic. Prompts may be faded too quickly, causing errors. Can be highly intrusive because only physical prompts are used.</p> <p><i>Recommended Use:</i> Use during early to later acquisition stages only and after other, less intrusive systems have not worked. It is a fairly easy but physically intrusive prompting method that should only be used when other less intrusive procedures have not been successful (Collins, 2007).</p>

& Heward, 1998). Clearly, teams must select prompt procedures to suit individual students and then monitor each student's progress as instruction progresses.

***Applications of Prompt Systems: Constant Time Delay.*** Using time delay with discrete behavior skills is perhaps easier than with chained responses. Many discrete academic skills (e.g., social responses, reading, and math) have been taught using constant time delay; a review by Browder et al. (2009) suggests that the use of time delay to teach literacy to students with severe disabilities qualifies as an evidence-based practice.

*Marc's team identified telling time to the hour as an expected kindergarten skill that also was functional for him to learn. After conferring with Ms. Kwan, his kindergarten teacher, Ms. Wharton, his special education teacher, created materials to teach him to match clock picture times to numbers and words (3 o'clock) and vice versa. As with many of his other skills, the team used a three-step progression: It started acquisition instruction using one-to-one teaching in the resource room using time delay, progressed to maintenance or independent use of the skill, and finally taught Marc to generalize the skill to kindergarten lessons on telling time. When Ms. Wharton used time delay, it looked like this:*

#### ***Zero Time Delay***

**TEACHER:** [She places two clock face cards showing different times (12:00 and 2:00) on the table in front of Marc and then shows him the number/word time card: 12 o'clock.] "Match 12 o'clock." [She immediately points to the matching clock using a touch cue at a 0-second delay.]

**MARC:** Picks up the number/word time card and places it below the correct matching clock face card.

**TEACHER:** "Right, 12 o'clock. Good!" [Teacher repositions the two face clocks and repeats for a second trial, again using a touch cue at a 0-second delay.]

**MARC:** Picks up the number/word time card and places it below the correct matching clock face card.

**TEACHER:** "Right, 12 o'clock. Good!" [Teacher conducts another trial but shows Marc the 1 o'clock number/word time card and places two clock face cards, one showing 1:00, on the table.]

#### ***Four-Second Delay***

After several successful zero-delay trials on 12 o'clock and 1 o'clock, the teacher pauses four seconds before giving the touch cue, hoping that Marc would try to answer before her cue:

**TEACHER:** [She places two clock face cards showing different times (12:00 and 4:00) on table in front of Marc and then shows him the number/word time card: 12 o'clock.] "Match 12 o'clock." [She waits four seconds to see whether Mark will give the correct response; he does not and so she gives him a touch cue.]

**MARC:** Picks up the number/word time card and places it below the matching clock face card.

**TEACHER:** "Right, 12 o'clock."

**TEACHER:** [Teacher repositions the two face clocks and repeats the trial.] "Match 12 o'clock." [She again waits four seconds before giving a touch cue if needed.]

**MARC:** Marc responds by matching the number/word time card to the clock before the touch cue prompt is given.

**TEACHER:** "That's right, 12 o'clock!"

The teacher continued trials at a 4-second delay until Marc was able to match the first two number/word time cards independently and then started two additional times at a 0-second delay, while intermittently reviewing the learned times at a

4-second delay. She lengthened the delay for the second set of number/word time cards to four seconds until they were mastered, after which she added a third set, while continuing to intermix and review the times that had been learned. If Marc missed matching a known time, she would repeat the trial at zero delay and then follow with a 4-second delay trial. Each day, they started by reviewing the known number/word time cards at a 4-second delay, but after weekends and vacations, review was set back to a 0-second delay. Eventually, Marc was able to match all time cards to clock pictures; at this point he worked on this task independently and his one-to-one learning focused on matching single pictures of a clock with an on-the-hour time to a choice of three time cards (e.g., 12 o'clock, 4 o'clock, and 9 o'clock).

Time delay is also effective in teaching chained responses, but it may seem a bit more complicated. For example, Jacob's team agreed that it was important for Jacob to follow regular school routines. The team wrote an IEP goal with objectives that focused first on the morning classroom routine, then on departure, and last on preparation for lunch. His first objective was "Jacob will accurately complete the morning routine within 10 minutes on two consecutive weekly probes." After watching his peers perform the same routine over several days, the team task-analyzed the routine into 10 steps:

1. Respond to peer's greeting.
2. Place backpack on desk; unpack agenda and homework folder.
3. Find locker; hang up backpack.
4. Take off outerwear and hang in locker.
5. Return to desk.
6. Take out homework, put in wire basket.
7. Make lunch choice.
8. Sharpen two pencils, if needed.
9. Fill in day and date on schedule and agenda.
10. Begin morning work.

*Because Jacob had responded well to constant time delay with other tasks, the team selected that method and used it for all 10 steps, teaching each step of the task in order every morning (a total-task approach). Teaching occurred several days each week during natural opportunities, with probes conducted once a week either by his special education teacher, Ms. Fuentes, or a teaching assistant, Ms. Connors. They used gestural prompts (point to or manipulate materials, point to picture symbols) or quiet verbal prompts to watch peer models ("Look at what Ty is doing. You do it, too."). They did not use any other verbal prompts for two reasons: Jacob was less attentive to verbal prompts and verbal prompts called attention to the fact that Jacob was being taught. For the first two days, they used zero time delay. During zero-delay trials, instruction moved quickly as the teacher prompted the first step as soon as Jacob was in the classroom among peers, then reinforced his greeting with a smile or a thumbs-up gesture, and immediately prompted the next step by gesturing to his backback and showing a symbol for "agenda." Teaching was fast paced and Jacob responded to each prompt. After two days of zero-delay trials, Ms. Fuentes delayed her prompt for four seconds for the first step and waited for four seconds after Jacob completed each step before giving a prompt. After long weekends and vacations, teachers used zero delay for a single day (assuming that he may have forgotten the routine); if he made four or more step errors in one session, they again used zero delay. The team's goal was to increase his unprompted correct responses.*

Wolery et al. (1992) give helpful general rules about using zero-delay trials:

- When all students in a group are learning the same skill, fewer zero-delay trials are needed because they can learn from each other.
- When multiple behaviors are being taught (e.g., if Marc had to both match and state the time, and in chained tasks), more trials at zero delay are needed.

- Students with past success in learning by time delay may need fewer zero-delay trials.
- Younger students with less familiarity with direct instruction may need more zero-delay trials.

The goal is that teachers use as few zero-delay trials as they can, but that teachers not delay the prompt until the student consistently responds correctly for zero-delay trials (Wolery, Ault, & Doyle, 1992).

***Applications of Prompt Systems: System of Least Prompts.***

*Marc's teachers are using a system of least prompts to teach him to use the bathroom in the resource room. They teach across all steps in the task, a technique known as a total-task approach. They start by giving him a 3-second latency period to respond after showing him the toilet symbol on his schedule. If he does not respond or if he makes an error, they use a gestural prompt (point to the item associated with the step) and wait three more seconds. If this does not work, they give a gestural and a physical prompt (point and gently assist him through the beginning of the step). Given the importance of selecting prompts that suit the student and the task, his teachers decided that these two levels of prompts suited him better than did verbal prompts or full physical prompts. Marc usually completed steps with partial physical prompts, but often resisted full physical prompts, so they wanted to make sure to avoid these. Marc's instruction on the first three teaching steps [1. Goes into the bathroom; 2. Opens the door, goes in (teacher closes the door); 3. Grabs his pants, pulls them down, and sits on the toilet] looked like this:*

Teacher shows Marc the toilet symbol on his schedule. [Instructional cue, waits a 3-second latency period]

Marc continues sitting. [Response: No response]

Teacher gets close to him and in his view, and points toward the bathroom. [Gestural prompt]

Marc looks in that direction but does not move. [Response: Prompted approximation, but incomplete]

Teacher tugs gently on his sleeve and points toward the bathroom. [Gestural and partial physical prompt]

Marc gets up and moves to the bathroom door. [Response: Prompted correct on first task step]

**TEACHER:** "Good job, Marc!"

Marc continues into bathroom and stops by the toilet. [Response: Unprompted correct on second task step]

**TEACHER:** "Good, you're by the toilet!"

Marc stands without taking further action for the entire latency. [No response]

Teacher points to his loose elastic waistband pants. [Gestural prompt]

Marc grabs his pants, pulls them down, and sits on the toilet. [Prompted correct on third step]

**TEACHER:** "Good pulling pants down, Marc!" [Pats him on the shoulder]

After he sits for two minutes (or less if he eliminates), instruction continues on each remaining task step.

While the prompt systems just described are effective and systematic ways to teach students with high support needs, they are not simple approaches and they often look different from teaching methods used in general education classes. These two

examples emphasize the importance of (a) determining whether such a specialized approach is needed, (b) selecting the specific prompt method and the prompts used to suit the student and the task, and (c) practicing the method until team members are consistent and comfortable in its use.

### General Guidelines for Using Structured Prompts and Cues

To effectively use prompts or prompt systems with students, team members should follow several guidelines:

1. Select the least intrusive prompt(s) that is effective for the student and the task.
2. Select a prompt(s) that suits the student; combine prompts if necessary.
3. Choose natural prompts that are related to the target behavior (e.g., responses that involve movement may be best prompted with a gesture or partial physical prompt; verbal responses may be prompted with verbal prompts).
4. Highlight natural prompts (e.g., call attention to the bell signaling the transition to the next class or to peers gathering their books and papers).
5. Generally wait a latency period (e.g., three seconds) before and after the prompt so that learners have a chance to respond without assistance. (Or, with systems like time delay and simultaneous prompting, shift to a delayed prompt or use a prompt-free probe so that the student has an opportunity to respond without assistance.)
6. Avoid repeating a prompt for the same response. Instead, if a prompt does not work, try more assistance.
7. Prompt only when the student is attending.
8. Devise a plan to fade prompts as soon as possible.
9. Do not introduce prompts unnecessarily.
10. Reinforce a student for responding correctly to a prompt during early acquisition; later, encourage learning through differential reinforcement.

### Consequence Strategies

We will discuss several general consequence strategies in this section, including (a) the presentation of *positive reinforcement* for an appropriate response, (b) planned ignoring (also known as *extinction*) when students do not respond in appropriate ways, and (c) the use of corrective feedback. What is considered *appropriate responding* changes depending on the teaching objective and the student's present level of performance or stage of learning for the targeted skill. In early learning, an appropriate response often includes approximate performance of target behaviors and improvements in being attentive to task stimuli. For students who have mastered some of the task and are in later stages of learning, we would expect correct performance more than half of the time, and would be teaching students to extend their performance to include, for example, initiating and terminating the task, assessing their own performance of the task, performing across settings and variations in materials, and performing at the appropriate speed. The rules or contingencies that we apply for providing planned consequences are adjusted to suit the goals for a student's learning.

We do not address consequence strategies that are punitive in this chapter. Technically, *punishment* includes anything that reduces the probability of a behavior occurring (e.g., presenting non-preferred comments or activities, or contingently removing positive reinforcers following a response); however, a broader non-technical definition of punishment extends to a variety of harmful categories that cause humiliation, fear, pain, temporary loss of ability, and prolonged loss of freedom or pleasure (Singer, Gert, & Koegel, 1999). Such aversive methods are not regarded as acceptable teaching or discipline strategies on both moral and educational grounds.

## Positive Reinforcement

Positive reinforcement occurs when preferred consequences (called *positive reinforcers*) are given contingent on a behavior *and*, as a result, there is an increase in the performance of that behavior over consecutive teaching opportunities. Thus, *to reinforce* means to strengthen behavior by increasing its frequency, duration, or intensity. Positive reinforcement is involved not only in shaping and chaining, but also in all the prompting methods discussed in the previous section. For example, shaping involves the reinforcement of successive approximations of a goal response. Instructors provide praise and other reinforcers for better and better performance over time. Shaping is a strategy inherent in most teaching methods that use positive reinforcement; systematic prompting procedures all involve shaping or a gradual increase in the teacher's expectations or criteria for reinforcement over repeated teaching opportunities. This practice acts to improve the student's response. This interdependent or contingent arrangement between behaviors and consequences (also involved in chaining and error correction) lets teachers build behaviors purposefully.

***Reinforcers Versus Preferences.*** What is reinforcing for one person will not necessarily be reinforcing for another, particularly with students who have more extensive disabilities; therefore, the activities and objects that an individual student finds reinforcing must be determined through informal assessment involving observation (see Chapter 3). The term *preference* is newer than the term *reinforcer*, but they are often, and inappropriately, used as synonyms. Preferences, like reinforcers, can be determined through direct observation. The distinction between the two terms seems to relate more to who is in control: the adult (e.g., teacher, therapist, and parent) who provides reinforcement, or the student who has a preference for something. Traditionally, reinforcement is manipulated by adults for the purpose of increasing the frequency or intensity of a target behavior. In contrast, the opportunity to experience a preferred event may be made available in the context of everyday routines through choice-making offered by an adult or peer (e.g., choice of activity, location, peers) or may be self-initiated by the student, as with self-reinforcement. When preferences are experienced in this way, they are more under the control of the individual student than the teacher. *Preference*, as a concept, is more consistent with fostering self-control or self-determination than is reinforcement. Opportunities to choose and indicate preferences encourage self-determined behavior, while the tight control of reinforcers by others may not.

***Types of Reinforcement.*** Although reinforcers—preferred activities and objects—have unlimited range and vary from tangible items and activities to abstract thoughts of self-approval, all reinforcers are either primary (unlearned or unconditioned) or secondary (learned or conditioned). The first category includes the universal or automatic reinforcers to which everyone responds (although not continuously) without instruction. Primary reinforcers for someone who is feeling hungry, thirsty, or cold include food, drink, and warmth, respectively. Primary reinforcers serve to return a person who is physically uncomfortable to a state of comfort. Secondary reinforcers develop reinforcing value through their association with primary reinforcers. Secondary reinforcers begin as neutral stimuli, but with repeated pairings with already existing reinforcers, they take on their own reinforcing value.

*Marc has learned to enjoy playing with blocks with his classmates because it involves putting things in order and creating large structures, which are activities that he already enjoys.*

*Christine began listening to rock music for pleasure because listening to music was something that her peers liked. Also, her paycheck from work is now a secondary reinforcer because she has learned that her money buys CDs and other enjoyable items.*

Secondary reinforcers commonly used in educational settings include attention, approval, favorite activities, check marks, stickers, and tokens. It is important to couple simple but specific praise with known reinforcers so that praise acquires reinforcing value for students. The goal is for students to not only enlarge their options for reinforcement, but also to replace artificial, primary, or age-inappropriate reinforcers for those that are naturally occurring and suited to their chronological age. Self-reinforcement, of course, is the ultimate goal.

**Reinforcement Schedules.** Schedules of reinforcement indicate the frequency and pattern with which a student's responses are reinforced. Reinforcement may be given according to the number of responses performed (*ratio schedules*) or the passage of time in relation to the performance (*interval schedules*). Reinforcement schedules may be founded on an absolute, predetermined number of responses (which are then called *fixed ratio (FR) schedules*) or an absolute, predetermined amount of time (which are then called *fixed interval (FI) schedules*). For example, an FR:5 schedule is a fixed pattern of reinforcement for every fifth correct response, an FR:2 schedule is a fixed pattern of reinforcement for every second correct response, and so forth. The presentation of one reinforcer for every occurrence of the target response is a *fixed ratio schedule* of 1, or FR:1. This is more commonly called *continuous reinforcement*. All other schedules may be generally referred to as *intermittent reinforcement*.

*Variable ratio schedules* produce a changing, non-fixed number of reinforcements, but offer reinforcement on a schedule that is an average of the reinforcement pattern selected. If a teacher specified a variable ratio schedule of reinforcement of VR:5, reinforcement will be delivered an *average* of every fifth correct response. This VR:5 pattern may consist of giving reinforcement after three, seven, two, and then eight occurrences of a target behavior. These numbers average out to reinforcement every fifth correct response. The variable schedules of reinforcement typical in classrooms are less predictable to students than are fixed schedules and thus produce more stable rates of behavior.

For *interval schedules*, the first target response is reinforced that occurs after a regular period of a *fixed* number of seconds or minutes (fixed interval, or FI) or a *variable* or average number of seconds or minutes (variable interval, or VI). In many classrooms, reinforcement schedules are time based (at the end of a class period) and teacher dispensed; feedback and social praise may be as meager as once every 10 minutes. In a classroom of 25 students, this converts to an even thinner reinforcement schedule. Classroom reinforcement schedules are more likely to be variable than fixed. Teachers may provide opportunities for students to choose a preferred activity when they judge the quality or quantity of work as "good enough" or after they judge that sufficient time has passed. Because "enough" and "sufficient" tend to change over time, a variable schedule results.

Because of the powerful influence of reinforcement schedules on behavior, teachers should apply several rules for scheduling reinforcement when planning instruction:

- During the acquisition stage of learning, more instances of behavior should be encouraged by the continuous provision of small amounts of contingent reinforcement (e.g., a smile and task-specific praise, fulfilling a request, sorting words read correctly into the "awesome" pile, a "high five" or a "Yes!") instead of larger amounts of reinforcement given less often.

*One of Marc's mathematics objectives was linked to the Kindergarten Standards of Learning and also had a functional focus: Recognize a penny, nickel, dime, and quarter and determine the value of a collection of pennies and/or nickels whose total is 10 cents or less. When Marc was first learning to count out amounts of pennies, his teaching assistants made a "big deal" of his performance by cheering each and every time that he was right (FR:1).*

- After a higher rate of more accurate behavior has been established (later in the acquisition stage), reinforcers should be faded slowly from a continuous to an intermittent schedule, which requires more behavior for each reinforcement. This strengthens the behavior as the student learns to tolerate periods of non-reinforcement instead of abruptly giving up and not responding when reinforcement is not forthcoming.

*After Marc was correctly counting out pennies on a frequent basis, his teachers still cheered him on, but not as much (e.g., FR:5).*

- Over time, fixed schedules of reinforcement may produce uneven patterns of behavior because the student can predict roughly how far away the next reinforcement is on the basis of the last instance. Behaviors on fixed schedules can extinguish quickly following reinforcement because the students recognize the absence of reinforcement.

*To increase her students' sense of responsibility for keeping their classroom neat, Ms. Bowers, Jacob's fourth-grade teacher, and the class instituted "Clean Teams"—groups of students who have assigned responsibilities for various parts of the classroom. Initially, Ms. Bowers conducted Friday "Clean Team" inspections and gave awards, which meant that the room was clean on Friday but not the rest of the week. She then realized she should not have such a predictable reward schedule.*

- Variable schedules generally produce more even patterns of behavior than do fixed schedules because the individual cannot predict the occasions for reinforcement. Behaviors that have been reinforced by variable reinforcement schedules are also more resistant to extinction, so they are more durable if reinforcement stops for a given length of time.

*Now, Ms. Bowers performs random spot checks and gives awards to "Clean Teams," and the room stays pretty neat.*

- Reinforcers must be reassessed periodically (Lohrmann-O'Rourke, Browder, & Brown, 2000; Mason, McGee, Farmer-Dougan, & Risley, 1989; Roane, Vollmer, Ringdahl, & Marcus, 1998) so that they continue to be reinforcing to the student. It is also wise to offer students the opportunity to choose their reinforcer from a group of preferred activities/items; this way, teachers can be more confident that an activity/item is actually reinforcing.

*For a while, Marc would almost always select Mr. Potato Head as a reinforcer. However, after a few weeks, he seemed to tire of this toy and all of the other selections that he was offered on the basis of his earlier reinforcer assessment. His teacher decided to conduct another reinforcer assessment to determine a wider selection of choices that he might like better at this time.*

- Reinforcers must be suited to the student's chronological age, the activity, and the learning situation. Aim for replacing less appropriate reinforcers with ones that have more availability in the natural environments encountered by the student.

*None of the team members wanted to use food to reinforce Marc, even though his mother reported that food reinforcers had been successful at home. They talked about what activities he liked, what the other five-year-old boys liked, and what he could easily do at school. They shared this list with his mother, then tried each activity out with Marc, giving him a "sample" first and then letting him choose. He showed clear preferences for Lego® toys, stories on CD-ROM, bouncing on the large plastic Hoppity Hop™ ball, and spinning in the net swing.*

- The more immediately a reinforcer is presented following the performance of the behavior, the greater will be its effect.

*Marc's teachers and his peers respond quickly when he uses his picture symbols or word approximations to initiate a request or interaction. As a result, he is using both forms more and more to communicate requests.*

- Satiation results from the overuse of a reinforcer, and its reinforcing effect may be reduced. To avoid satiation, teams should (a) explore new reinforcers with students; (b) preserve the special quality of objects or activities selected as reinforcers; (c) use intermittent reinforcement because it requires fewer reinforcers for more behavior and reflects more natural schedules; and (d) whenever possible, give students opportunities to choose preferred activities instead of selecting and presenting reinforcers to students.

*Because Marc responded positively to simple praise from his teachers, they decided to quietly say "Good!" after each step performed with or without assistance during early learning. Marc also chose a preferred activity to add to his schedule after each toileting/hand-washing trial, and he reviewed this selection before the teaching trial began.*

### Planned Ignoring

When teachers intentionally withhold reinforcement following a student's behavior they are using a practice called *extinction*. When teachers have good rapport with students, they can be more confident that the student enjoys their attention. In these cases, simply ignoring a student's behavior by withholding attention constitutes extinction and may have a reductive effect on the ignored behavior. However, because ignoring alone is less likely to teach the student what to do, it is usually coupled with reinforcement or some type of support or assistance for appropriate behavior. For example, errors made during skill instruction can be ignored while offering the student another opportunity to perform the behavior or skill step, perhaps with some assistance provided. As another example, a teacher may ignore a student for calling out during a group lesson and prompt the student to raise his hand when it is likely that he knows the correct answer. Many of the prompt procedures described earlier incorporate planned ignoring for errors along with immediate presentation of a prompt.

*Christine is learning to use her DynaVox™ communication device. This speaking device is really a computer that must be programmed with categories and vocabulary to suit her daily routines. Instruction is complicated because Christine's vision is poor so she must listen as each pictured option is named by the device through an earphone that she wears. When teaching her to go to the menu page and listen as the choices are scanned and named, Christine must select on the second cycle through the menu the item that matches her schedule for that day (e.g., Tuesday's schedule is morning instruction, library work site, lunch, drama club, Walmart work site, preparation for tomorrow, and home). When she clicks on the wrong menu item, Ms. Rowyer does not say anything, but instead stops the scanner so that it won't go to the wrong choice, repeats the request to click on "morning instruction," and restarts the scanner, ready to use a "listen" prompt right before the correct item is scanned and named. Ms. Rowyer has found that ignoring errors and repeating the trial with assistance makes instruction successful and less complicated for Christine.*

Problem behavior can also be subjected to the extinction strategy in an effort to reduce its occurrence. This is discussed more in Chapter 7. Using extinction as the only means for reducing problem behavior is often ineffective because (a) it must be consistently used even when students might increase their rate of problem behavior in response to being ignored, and (b) no models for appropriate behavior are provided. Thus, extinction is typically used in combination with intentional instruction of the correct response or the appropriate behavior.

## Response to Errors

To maintain a reinforcing environment for learning, it is important to minimize the potential for student errors. If there are many errors, instruction may need to be improved or the target behavior may need re-examination. When teachers provide repeated error correction, instruction may become aversive to students, as well as inefficient. While teachers plan instruction so that errors are minimized, when they do occur, the teacher may ignore them, provide specific feedback so that students are made aware of the errors, or gently interrupt and correct them in several ways. It is important to handle errors in a way that promotes learning.

**Types of Errors.** Errors include incorrect responses, problem behavior, and non-responses. Incorrect responses can be missed steps in a chained response (e.g., not getting silverware or milk when going through the lunch line, skipping several key steps when washing dishes), discrimination errors in a discrete behavior (e.g., signing “eat” instead of “help,” or reading “men” instead of “women”), or error responses that are not related to the target response (e.g., playing with the flash cards, looking away from the task, and attending to peers). In contrast, a *non-response* may simply consist of the student waiting longer than the response latency, stopping in the middle of a chained response, not trying the task at all, or looking away from the task because of distraction or boredom. What the teacher does to respond to errors depends on both the type of error (e.g., incorrect response, problem behavior, non-response) and the student’s skills (e.g., performance on the target task, ability to understand teacher feedback, and preferred ways of having mistakes dealt with).

Errors that involve problem behavior often are motivated by the student’s interest in escaping from the task for some reason or needing assistance because the task is too difficult. Teams need to study the situation, determine the cause, and improve the teaching plan. For example, the teaching session may be too long, may involve lots of error correction and little success, may provide no student choice, or may be boring. (Chapter 7 addresses this functional behavior assessment process.) In particular, when academic skills are involved, teams must have a process for making adaptations, which may include adjusting the method of delivery, changing how a student responds, or modifying the academic goals or performance criteria for a student on the basis of his or her performance. Students with severe disabilities typically will have many IEP accommodations and modifications that support their learning and thus improve the probability that they will respond successfully. (Chapter 6 describes and illustrates a model for making adaptations.)

The cause of errors that involve non-response, such as problem behavior errors, also needs to be analyzed. When some students are motivated to escape from a task that is too long, involves too much waiting, or is somehow boring to the student, they may do so by withdrawing, not attending, not responding, or being easily distracted. Other students are challenged by a tendency to be highly distracted even when teaching is carefully planned to be motivating. Usually, preventing errors by improving the motivation to participate is the best means for addressing non-response errors.

For errors that involve incorrect discrimination, teachers can use one or more strategies: (a) Ignore errors and not give any reinforcement (planned ignoring or extinction), (b) provide clear and immediate feedback to students (“No, that’s not right; try again”), (c) follow up errors with assistance, or (d) have students participate in correcting their own errors. The last two approaches are examples of error correction. Technically, error correction procedures are response-prompting procedures—teachers prompt students to make the correct response (Wolery, Ault, & Doyle, 1992). However, the timing differs in that error correction is conducted *after* the student responds and has made an error, while response prompting is provided *before* the student’s response. The example in the last section involved Christine’s teacher using two of these strategies to address her errors when learning to operate her DynaVox™

device: strategy (a) ignoring her error, and strategy (c) following up each error with assistance to complete the missed response.

Most prompt systems that we discussed earlier in this chapter have built-in methods for preventing and for handling errors; however, teams still need to decide what approach works best with a given student and task.

*When adults use words to correct Marc’s errors, he does not attend or react. He is often resistant when physical corrections are attempted. But gesture cues are often effective (e.g., pointing to materials involved or moving materials associated with the missed step into his view). Thus, for the toileting sequence, they used constant time delay with a prompt that paired pointing to and showing a photo of him doing the next step. He had no problem when the prompt was given at a 0-second delay, but he sometimes failed to use the prompt when it was delayed four seconds. At these times, they used gentle physical assistance (as little as possible) to get him to complete the step, and on the next trip to the bathroom, they gave the prompt at a 0-second delay for the step that had been missed.*

*Jacob becomes resistant if teachers verbally point out his errors. The word “no” seems to be a stimulus for anger. His teachers have found better ways to prevent and to address his mistakes during early learning tasks. First, they start by getting his attention or pausing for him to get ready. Second, they use a systematic prompt strategy, such as time delay for academic tasks and least prompts for chained tasks, because these methods make prompts available before errors typically occur. So if he fails to respond or makes an error, they say nothing, provide assistance instead, and then praise his efforts. Finally, his teachers have learned that interspersing known responses with new responses is a great way to motivate him. Thus, when working on new words, problems, or routines, they add items, questions, or steps that review the responses that he already knows well.*

Figure 5–11 gives descriptions of ways to handle errors and lists considerations for their use. When a student has learned more than half of a skill and moves into the fluency, maintenance, or generalization stage, less structured and less informative error correction procedures should be used. Because the student is now more proficient at

**FIGURE 5–11**  
Strategies for Handling Incorrect Response Errors and Considerations for Their Use

Strategy	Considerations for Use
<ul style="list-style-type: none"> <li>• During acquisition, it may be best to gently interrupt errors with a prompt (as in most prompt systems).</li> <li>• After an error, provide feedback (pause, hold up index finger, say “Not quite”) and give another immediate opportunity to perform while increasing the assistance (as in a system of least prompts).</li> <li>• Gently stop an error and wait to see if the student will self-correct. Direct the student’s attention to relevant task stimuli, add prompts as needed. Reinforce any self-corrections.</li> <li>• Later in learning, it may be good to follow some errors by waiting for the student to self-correct; if this does not occur, give assistance to correct the error.</li> <li>• Simplify those responses that are frequently missed or performed incorrectly.</li> <li>• Gently interrupt errors and provide several immediate opportunities to practice the missed response (or steps in a chained task) that are frequently missed.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect responses can be missed steps in a chain or discrimination errors. Repeated error correction is aversive for most students and inefficient. Analyze performance data to decide how to improve instruction. Also, consider the student’s stage of learning and motivation for the task.</li> <li>• Sometimes improving the antecedents may be necessary to reduce errors:               <ol style="list-style-type: none"> <li>a. Improve the task analysis of the steps frequently missed.</li> <li>b. Select a simpler version of the same skill.</li> <li>c. Use backward chaining to teach these steps.</li> <li>d. Use simpler prompts (gestural model instead of verbal).</li> <li>e. Replace a prompt hierarchy with a single prompt system (constant time delay, simultaneous prompts).</li> <li>f. Provide a visual cue (permanent prompt) such as a picture sequence.</li> <li>g. Use stimulus prompts like color coding temporarily.</li> </ol> </li> <li>• During the later learning stages, allowing or prompting students to self-correct lets the students experience the natural stimuli resulting from the error and learn ways to improve the situation. Self-correction needs to be used carefully in order not to endanger or embarrass the student.</li> </ul>

the skill, errors are less frequent and may be caused by distraction or carelessness instead of by not knowing what to do.

*For some math, reading, and spelling tasks, Jacob and his classmates are working on improving their accuracy and speed. Teachers have students (a) correct their own worksheets, giving them time to redo the items that they missed; and (b) count the number of items that they got correct during flash card drills or timed math fact tests, and enter the number on their personalized bar graph.*

When students have moved beyond acquisition into the advanced stages of learning, one of the following procedures may be chosen:

1. The student who makes an error or hesitates may be given a few seconds to self-correct. Some errors, if uninterrupted, will provide natural learning opportunities for students. If a correction is not forthcoming, then one of the other procedures can be tried.
2. The error may be acknowledged (holding up an index finger, saying “Oops” or “Not quite”) without providing negative or harsh feedback. The teacher then requests another try at the same step (“Try it again.”). If a second error results, some assistance is given. Efforts to soften the acknowledgment of an error, however, should not result in confusing or ambiguous feedback. For example, smiling and saying “That was a great try,” in response to an error can be misinterpreted by the student as praise. Many students tune more into facial expression and tone of voice than to the specific words spoken. Thus, being neutral instead of animated is important.
3. A minimal prompt (“What’s next?”) or a verbal rehearsal of the last step correctly performed (“You just finished getting the plates, now what’s next?”) may be provided as soon as the error is stopped. If the student stops before a step has been completed, the teacher may offer confirmation and urge the student to continue (“That’s right, keep going.”).

There are many other methods for correcting errors; however, to be effective, error correction procedures must reflect the following characteristics:

- be suited to the learner’s age, level of understanding, and preferences
- be suited in the amount of assistance and reinforcement (if any) to the student’s stage of learning for that task
- be applied immediately and consistently, but unemotionally
- be non-stigmatizing, humane, and socially valid, and do not endanger the student
- provide enough help to correct the error quickly, but not so much as to create dependency on the teacher
- be followed by additional opportunities to respond to the task or step
- encourage and reinforce independence

**Precautions.** Some precautions must be taken with error correction so that it is not punishing to students. Facial expression, tone of voice, and the actual correction methods need to be matched to students’ preferences. While it is important throughout learning that students discriminate making errors from making correct responses, error correction should not be aversive or reinforcing, but instead neutral and informative. When there are repeated errors, it is critical that the team examine student performance data gathered during skill probes and also training trials to better understand possible reasons for the errors. For example, some task steps may be too difficult and simplifying the steps in the task analysis might improve the student’s performance. At other times, it may be that the type of chaining strategy needs to be revised (e.g., change from a total-task approach to a backward chaining strategy). Another option is to add extra instruction on just the difficult steps. Depending on the student, the teacher might ask the student whether he or she needs a prompt (“Need help?”) and allow the student to choose self-correction or assistance. Another option that reduces

the probability of errors is to replace a prompt hierarchy with a single prompt system (time delay, simultaneous) or with a most-to-least approach like graduated guidance. Adding temporary stimulus prompts (such as color coding or putting a large X on a shirt label) also is a way to help students discriminate difficult steps like identifying the front and the back of a T-shirt while dressing. Teachers also might teach students to use a series of photos of the steps that will offer permanent reminders. Finally, teachers can make digitized videos that model the task and show difficult steps in slow motion or close up.

There are also numerous ways to improve a teaching plan that can reduce a particular student's errors: (a) changing the prompting system (e.g., changing to time delay or simultaneous prompts), (b) increasing or reducing the response latency (before the prompt) or the time allowed to complete a task step, (c) using a simpler prompt that does not require understanding words (gestural/model instead of verbal), (d) increasing motivation for task participation and refreshing the reinforcing consequences, or (e) giving choices (select task, choose order of task completion). The approaches used will be individually selected to suit the student.

### Arranging Teaching Trials

Earlier we noted that when students are provided instruction on a targeted skill, planned teaching often consists of one or more instructional trials. Each discrete trial contains the elements described earlier: (a) the discriminative stimulus to be learned, followed by (b) a latency period, (c) a known discriminative stimulus or prompt, (d) the student response, and (e) the teacher's consequence for that response.

### Distributed or Massed Trial Instruction

There are a number of options for arranging teaching trials. Teaching trials may be clustered and taught in a massed manner with short intertrial intervals (as in discrete trial training). Teaching trials also may be distributed over time with minutes or hours between teaching trials (as in incidental teaching, or embedding a discrete trial within a functional routine). Distributed teaching has been credited with being more effective in producing generalization of skills than massed trial teaching; yet massed trial teaching is credited with faster learning during acquisition.

The teaching setting often influences the intensity of trials (massed versus distributed trials) during instruction. Teaching trials may be presented within meaningful contexts (contextualized) or may be presented at times and in places that are not logically connected to the skill and may be removed from the natural environment. When teaching trials are clustered together, or *massed*, so that many trials are presented on the same target skill (e.g., as in teaching Jacob to read vocabulary words or asking Marc to repeatedly use the bathroom), trials typically are not contextualized and generally do not conform to the natural performance of the skill. However, there are some exceptions. Some skills and routines offer natural repeated teaching opportunities, such as learning to eat with a spoon, putting toys away, clearing tables in a cafeteria, and filling salt and pepper shakers in a restaurant job. Similarly, when teaching skills during natural or contextualized opportunities (e.g., greeting others, toileting), teaching trials are more often distributed over an activity or a day instead of massed with repeated opportunities to teach. If we consider teaching Marc to hang up his jacket, a massed trial approach would involve asking him to repeat the behavior several times in a row—not a very natural way to perform this skill. In a more natural context, the opportunities that Marc has to put his coat away occurs only upon arrival at school and after recess; thus, his teaching trials are both distributed and contextualized.

Intensive teaching or using repeated trials is not uncommon when teaching academic skills. For example, reading and writing instruction in small groups offer students many opportunities to respond in a single 15-minute session. Massed discrete trial instruction has been shown to be successful in teaching some skills to some

students during acquisition (e.g., communication in children with autism in Lovaas & Taubman, 1981, and toileting skills in Richmond, 1983). However, despite agreement that discrete trial instruction can be effective for teaching skills to children with autism, it has many limitations. Researchers and practitioners have been critical of the unnatural intensity of such teaching, the lack of generalization for skills taught in this intensive manner, the reliance on tangible reinforcers that are not available under natural conditions, and the difficulty of using an approach that requires one-to-one adult–student interactions (Charlop-Christy & Carpenter, 2000). Recent reviews of early intensive behavioral interventions (EIBI) for children with autism have found that effectiveness is highly variable at the individual level with the child’s IQ at the beginning of training being predictive of how effective this intervention has been for preschoolers with autism (Howlin, Magiati, & Charman, 2009).

Another complication with massed trial instruction is its association with pull-out instruction. While massed trial instruction on academic skills can be used in some small group instruction, generally this approach means removing the student from peers with pull-aside, one-to-one instruction in the general education classroom or taking the student to another setting. Using massed trials also often means that natural conditions must be simulated so that repeated trials can be conducted (e.g., asking Marc to take off and hang up his backpack and coat four times upon arrival, after which the natural cues of arrival have long since passed).

As we discuss further in Chapter 6, there are times when intensive instruction is appropriate. There are several criteria that should be met if teams decide to use *remedial* or *compensatory instruction* (the term that we use for massed trial instruction) for basic skills. First, teachers must be skilled in using direct instruction with prior training to implement a research-based model or program (e.g., discrete trial instruction, functional communication training, and certain commercial reading programs) and be able to evaluate student progress. Intensive one-to-one teaching sessions may also be directed toward motor, speech, and communication goals. Second, remedial instruction should be truly specialized; be prescriptive; and yield measurable, noticeable, and valued gains (e.g., functional communication training, pivotal response treatment, discrete trial instruction, structured teaching). Third, remedial instruction should be conducted with careful team planning so that (a) skills transfer and generalize to general classroom activities, (b) students’ time away from their peers does not interfere with their class membership, and (c) students’ removal from the general education classroom is planned so that it is not disruptive and does not occur at times when valued activities are scheduled.

### Contextualized or Decontextualized Instruction

*Teaching in context* means that the relevant stimuli for the skill being taught are present and that teachers can take advantage of naturally reinforcing consequences. Contextualized instruction appears to be more effective overall for students with severe disabilities because it promotes skill generalization. Methods that address naturalistic or contextualized communication instruction have received a lot of attention by researchers in an effort to overcome the difficulties that discrete trial instruction yields (e.g., poor generalization, segregated instruction) (Snell, Chen, & Hoover, 2006). The incidental teaching approach (McGee, Krantz, Mason, & McClannahan, 1983; McGee, Morrier, & Daly, 1999) involves discrete trial instruction in the natural classroom setting with teaching initiated whenever the student shows an interest in an activity or item during regularly scheduled activities. Both student-preferred items and the natural consequence of communicating—such as giving the student what he or she asks for—are offered as the reinforcers for communication. Another approach is milieu teaching (Kaiser, Hancock, & Nietfield, 2000; Kaiser, Ostrosky, & Alpert, 1993), which builds on student interests and uses carefully planned instructional trials embedded into natural and created opportunities for communication. Both incidental and milieu

teaching use time delay to prompt correct responses, but milieu teaching also makes use of models and a procedure that involves a least-to-most prompt hierarchy. Because one downside to distributed trial instruction is that there may not be enough opportunities to teach, teachers can increase the number of trials under natural circumstances. For example, the environment can be arranged to create opportunities for teaching the target skill, such as adding preferred items (e.g., toys, play equipment, games, and books), giving choices, and withholding help to give students the opportunity to request assistance, and so forth. (See Chapter 12 for more on environmental arrangements.) Another approach for addressing inadequate distributed teaching opportunities is to increase the number of trials during each natural opportunity. Modified incidental teaching incorporates two practice trials following every trial taught during a natural opportunity to communicate (Charlop-Christy & Carpenter, 2000).

Some of the targeted skills for students with severe disabilities are *functional skills* that cannot be completed within regularly scheduled class activities. Apart from self-care skills, such instruction is less frequent for elementary and middle school students. However, during the high school and postsecondary years, students will have many functional skills targeted on their IEP and transition plans (e.g., learning to make purchases in stores, learning specific job skills). These skills are best taught using contextualized instruction in a real setting that is natural to the skill. Thus, teams will need to plan for community-based instruction.

### Embedding Instruction Within Activities

*Embedding instruction* means inserting teaching trials into ongoing schedules “without breaking the flow of the routine or the ongoing activity” (Schepis, Reid, Ownbey, & Parsons, 2001, p. 314). This strategy is also referred to as activity-based instruction. Much instruction on functional skills and physical education is somewhat naturally embedded into the actual activity—for example, teaching students to set tables, throw balls, or open lockers (Fetko, Schuster, Harley, & Collins, 1999). But more recently, embedding has been applied to academic skills in general education settings (McDonnell, Johnson, & McQuivey, 2008). While embedding is sometimes used with typical students, its use with students who have severe disabilities must be more systematic to yield learning. Generally, with embedding, the teacher provides teaching trials to students in a distributed manner over time instead of massed in a short amount of time. One caution is that an adequate number of teaching opportunities should be scheduled to yield learning. Knowing what is adequate requires conducting periodic probes of the skill to see how well the student performs.

Younger students have been successfully taught a range of skills (speaking, cutting, putting things away, following instructions) through embedded teaching opportunities applied during play, meals, recess, and self-care (Schepis, Reid, Ownbey, & Parsons, 2001). With older students, general and special education teachers, as well as paraprofessionals, have embedded instruction during general education classes, school transitions, and class breaks (Johnson, McDonnell, Holzwarth, & Hunter, 2004; McDonnell, Johnson, Polychronis, Riesen, Jameson, & Kercher, 2006), while parents and others have embedded their instruction on restaurant use during community-based instruction (Sowers & Powers, 1995). Embedding can make efficient use of otherwise non-instructional time, but should not be used to the exclusion of social interaction with peers.

Some researchers have suggested that learning through embedded instruction may be as good as learning through small group instruction. McDonnell et al. (2006) taught paraprofessionals how to teach middle school students with moderate intellectual disabilities scientific concepts and vocabulary (e.g., the cell is a basic unit of living things) and history (e.g., a citizen is a member of a country) during general education classes. They compared two approaches—embedded instruction and instruction in small groups—and found that students learned equally well whether taught embedded instruction within activities or directly in small groups; students

also generalized their knowledge to classroom teachers. While there is no specific guiding research, embedded trials can also supplement instruction in small groups. The key is to monitor learning through regular data collection.

When and how do you embed instruction? First, teachers identify the material to be taught during embedded trials; then they identify the opportunities for instruction that do not interfere with classroom operations or schedules; finally, they specify and use the teaching procedure. Team members can embed instruction in a number of ways:

- Instruction on academics can be embedded into opening or closing activities, activity transitions, and breaks:

*Several trials are given to Jacob on his weekly vocabulary words while students are settling into their seats.*

- Instruction can be embedded as “rehearsal” trials before an activity where those skills will be needed:

*Several trials are given to Marc on today’s day and month during his transition to kindergarten circle time.*

- Instruction on communication skills can be embedded into functional routines, either occurring naturally or created:

*When Christine was younger, her teachers gave her embedded instruction on using a communication device during specific situations to request (a) help on tasks that were too difficult or where needed materials were missing; (b) a snack when presented with a pair of food items, one preferred and one non-preferred; or (c) a break after being engaged longer than usual in a work activity. (Johnson, McDonnell, Holzwarth, & Hunter, 2004)*

- Instruction can be embedded as “instruction on the way” with regard to behavior, schedule, and upcoming activity:

*Marc’s assistant teacher reviews cafeteria rules with him before leaving class and as he enters the lunch line.*

Embedded instruction itself involves one or several discrete trials (Johnson et al., 2004):

*Using the fourth-grade reading curriculum, Jacob’s teachers identified three sets of five words that would be useful to him. These words were ones that his peers were learning, but also were words likely to be encountered or used by him. Then they determined six times each day when several instructional trials could be embedded and taught one set at a time. At these times, the teaching assistant or the classroom teacher would present Jacob with two words, one the target word and the other a distracter word, and ask him to “Touch \_\_\_,” naming the target word. The instructor used a touch prompt (touching the correct word card) and constant time delay so that prompts were given initially with no delay; Jacob always imitated correctly. Errors were followed by “no” and the trial was repeated with physical assistance. Once he responded correctly on all zero-delay trials two consecutive times, the delay before giving the prompt was increased to four seconds. The goal was to provide 15 trials for each word daily.*

Teams will want to answer several questions when deciding whether to use embedded instruction:

- Is there adequate opportunity to use embedded instruction trials without interfering with the student’s interaction with peers or classroom routines?
- Is the student motivated to learn during activities?
- What students and skills are best taught this way?
- How will you prompt and handle errors? Embedding does not specify these strategies, only when skills are taught.

## LEARNING OUTCOME SUMMARIES

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### 5.01 Principles to Guide Instruction

#### Learning Outcome

*Describe the principles that should guide the development and implementation of teaching plans.*

Developing effective teaching plans requires that IEP team members work collaboratively to develop a consensus on the routines, activities, and skills that students should be taught and how these plans should be structured. It is critical that teams understand that students move through different phases of learning and that IEP goals and objectives, and the teaching plan, must reflect students' stage of learning. There are four phases of learning: acquisition, maintenance, fluency, and generalization. Teaching plans should employ the simplest but most effective strategies available. Teaching methods and strategies should be only as specialized as necessary to promote student learning. The effectiveness of teaching plans for students should be regularly evaluated through the ongoing collection and monitoring of student performance data.

### 5.02 “Universal” Strategies That Are Effective with a Wide Range of Student

#### Learning Outcome

*Describe the teaching strategies that are effective for most students in general education classes.*

There are a number of “universal” strategies that have shown to be effective for all students including those with severe disabilities. These include (a) providing information to team members about students' education programs and learning needs, (b) using materials that are universally designed, (c) using instructional procedures for students with severe disabilities that mesh with the schedules and activities of the general education class, (d) collaborative team work to identify goals and develop teaching plans, (e) relying on peers and general educators to provide instruction to students rather than paraprofessionals, (f) using small group teaching formats, (g) preventive strategies to minimize inattentive or disruptive behavior, (h) using peer-mediated instruction and supports, (i) using individualized adaptations, and (j) using strategies that allow students to self-monitor their own learning and behavior.

### 5.03 Specialized Teaching Strategies That Are Effective with Students Who Have Severe Disabilities

#### Learning Outcome

*Describe the teaching strategies that are effective for students with severe disabilities.*

Research has validated a number of “specialized” teaching strategies for students with severe disabilities. These include (a) visual support strategies, (b) task analysis and chaining, (c) discrete trial instruction, (d) stimulus and response prompting, (e) and the use of both distributed and massed trial instructional formats.

## SUGGESTED ACTIVITIES

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1. Use the table that follows to evaluate the school program that you work in or are familiar with. If possible, gather a focus group of educators and an administrator and involve them in this evaluation process. First, work together and use the following grid to rate your school on the following five school practices using a scale from 0 (not present) to 4 (schoolwide evidence of its practice):
  - a. Students' IEP objectives address priority skills and some are linked to the general education curriculum.
  - b. Students' IEPs include teaching and testing accommodations that facilitate their progress in learning.

- c. Collaborative teaming is ongoing and supported by school staff and administrators. Teams plan for individualized adaptations, use problem solving, and reach consensus among team members. Relevant team members are involved.
- d. All students are members of general education classrooms alongside age peers; their membership is valued.
- e. Instruction is planned, individualized, and makes use of strategies that are supported by the literature.

Conduct Needs Assessment of Best Practices and Complete Issue–Action Problem-Solving Form					
Supportive practice	Not present	Spoken about but not practiced	Some evidence of its application	Good evidence of its application	Schoolwide evidence of its application
List below:	0	1	2	3	4

Then, with the focus group, rank order the practices (issues) that need improvement in your school and brainstorm the actions needed to tackle each priority issue. Use the following issue–action problem-solving form:

Issue	Action	Taken by whom	Taken when

2. Examine the IEP of a student with more extensive support needs. If the student is being included with his or her peers in general education activities, observe the student over one or several days and check how adequately his or her IEP objectives are being addressed. Complete a matrix for this student by listing IEP objectives down the left side and the class schedule across the top. Indicate with check marks the activities during which it would be logical to teach each objective. Note when (or if) pull-out instruction is being used. Explore how inappropriate instances of pull-out instruction might be replaced with adaptation of classroom activities.

If the student is not included in general education activities, observe a class (or classes) in which it might be suitable for the student to be included. Complete a matrix as you did previously and then explore the steps needed to include the student in that class.

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