Chapter 1: Student Development and the Learning Process

Learning is defined as "long-term change in mental representations or associations due to experience (Ormrod, 2009). The process of learning begins in utero and continues throughout the lifespan, becoming more directed and purposeful as individuals grow and develop new strategies and skills.

Perspectives on Learning

Educators recognize and debate many different theoretical perspectives on learning. Some theories, such as behaviorist theories, are general learning theories that apply to humans and non-human animals equally. Others, such as information-processing theory, largely address human behavior and thinking. The application of

basic learning theories to the field of education enriches and informs teaching, curriculum development, and academic administration.

Five key theories of learning, summarized in Table 3.1, are behaviorism, social learning theory, information-processing theory, constructivism, and sociocultural theory. It is recommended that you review the theories as well as the contributions of the prominent theorists listed.

Table 3.1 Theories of learning

Theoretical Perspective	General Description
Behaviorism	Behaviorists argue that because thought processes cannot be directly observed and measured, it is difficult to study thinking objectively and scientifically. Instead, they focus on two things that researchers can observe and measure: people's behaviors (responses) and the environmental events (stimuli, reinforcement) that precede and follow those responses. Learning is viewed as a process of acquiring and modifying associations among stimuli and responses, largely through a learner's direct interactions with the environment.
Social Learning Theory	Social learning theorists focus on the ways in which people learn from observing one another. Environmental stimuli affect behavior, but cognitive processes (e.g., awareness of stimulus–response relationships, expectations about future events) also play a significant role. Oftentimes people learn through modeling: They watch and imitate what others do. Whether people learn and perform effectively is also a function of their self-efficacy, the extent to which they believe they can successfully accomplish a particular task or activity. Although the environment certainly influences people's behaviors, over time most people begin to engage in self-regulation; that is, they take charge of and direct their own actions. In recent years social learning theory has increasingly considered the role of thought processes in learning, and so it is sometimes called social cognitive theory.
Information Processing Theory	While not denying that the environment plays a critical role in learning, information processing theorists investigate what goes on inside learners, focusing on the cognitive processes involved in learning, memory, and performance. From observations of how people execute various tasks and behave in various situations, these theorists draw inferences about how people may perceive, interpret, and mentally manipulate information they encounter in the environment. They speculate about what internal mechanisms underlie human cognition (e.g., working memory and long-term memory) and about how people mentally process information (e.g., through elaboration and visual imagery). Initially, some information processing theorists believed that human thinking is similar to how a computer works (hence, they borrowed terms such as encoding, storage, and retrieval from

	computer lingo), but in recent years most theorists have largely abandoned the computer analogy.
Constructivism	Constructivists, like information processing theorists, concern themselves with internal aspects of learning. They propose that people create (rather than absorb) knowledge from their observations and experiences. They suggest that people combine much of what they learn into integrated bodies of knowledge and beliefs (e.g., these might take the form of schemas and theories) that may or may not be accurate and useful understandings of the world. Some constructivists focus on how individual learners create knowledge through their interactions with the environment; this approach is known as individual constructivism. Others emphasize that by working together, two or more people can often gain better understandings than anyone could gain alone; this approach is called social constructivism.
Sociocultural Theory	Sociocultural theorists emphasize that the social, cultural, and historical contexts in which children grow up have profound influences on thinking, learning, and effective instructional practice. In social interactions within their communities, young learners encounter culturally appropriate ways of thinking about and interpreting objects and events. With time and practice, these ways of thinking—which are first used in a social context—are gradually internalized into non-spoken, mental processes that learners use on their own. Because of their varying environments, historical circumstances, and needs, different cultures have developed somewhat different ways of thinking, learning, and teaching.

Adapted from Ormrod, J. (2009). *Essentials of educational psychology.* (2nd Ed., pp.19-20). Columbus, Ohio: Merrill. To purchase a copy of this book, click here.

Behaviorism: Understanding Antecedents and Consequences

Early behaviorist theories focused on the principle of *learning by association* — when two or more sensations occur together often enough, they become associated.

Classical conditioning occurs when automatic and reflexive responses to stimuli become associated with new stimuli that previously had no effect. In behaviorist terms, the automatic responses are known as **unconditioned responses** (e.g., reflexive blinking) to **unconditioned stimuli** (e.g., a puff of air to the eye). When a **conditioned stimulus** (e.g., a buzzer regularly paired with the puff of air) evokes a**conditioned response** (e.g., blinking), learning has occurred. A prominent example of classical conditioning is Pavlov's classic experiment in which dogs were conditioned to salivate when they heard a bell ring.

Operant conditioning occurs as a result of the consequences of behavior. Behaviors that are **reinforced** are strengthened — they are repeated. Reinforcers can be positive (e.g., presentation of a reward) or negative (e.g., removal of an aversive

stimulus). Behaviors that are **punished** are extinguished; punishments, too can be positive (e.g., presentation of an aversive stimulus) or negative (removal of a positive stimulus). A prominent example of operant conditioning is Skinner's classic experiment in which rats were conditioned to press a lever to receive food.

Behaviorist theories and tenets are most often applied to classroom management, which is discussed in more detail in Chapter 3 on *Student Motivation and the Learning Environment.*

Social Learning Theory: Learning By Watching Others

Social learning theory expanded on early behaviorist theories, including new emphasis on **vicarious reinforcement** and **modeling**. A prominent example of social learning is Bandera's classic experiment in which children observed an adult model acting aggressively toward a toy (the "Bobo doll"). When the model was rewarded for the aggression, children imitated the behaviors toward the doll, but when the model was punished, children did not. Bandura argued that observational learning required that children pay attention to certain behaviors and their consequences and be motivated to repeat those behaviors.

Social learning theory has been further expanded to include cognitive factors in learning — the resulting expansion is known as social cognitive theory. Social cognitive theorists suggest that reinforcers and punishers create *expectations*, which then influence behavior. Teachers use principles of social cognitive theory when they clearly specify classroom rules (i.e., expected behaviors that will be reinforced and violations that will be punished).

Information-processing Theory: Conceptions of Memory and Cognitive Processes

Information-processing theorists present a model of the human memory with three major components: **sensory register**, **working memory** (sometimes called short-term memory) and **long-term memory**. Remember that these terms refer to parts of the theoretical model of how human memory works and not physical parts of the human brain. In general, the human memory model and basic cognitive processes underlie most educational practices designed to encourage students to attend to, store, and recall information (i.e., **semantic knowledge**) as well as to reproduce motor behaviors or enact scripts (i.e.,**procedural knowledge**).

The sensory register holds the information that our senses bring in from the environment. This unprocessed information is held for a very short time—some estimates are one second for visual images and three seconds for auditory stimulation. If we pay attention to the information, it will be transferred to working memory. If not, it will be lost from the memory system.

Working memory includes a storage and a processing system; its components include the phonological loop, the visuospatial sketchpad, and the central executive. Although researchers once argued that, in general, we can hold 5 to 7 chunks of information in working memory at one time, more recent research suggests that working memory capacity is limited to the amount of information we can rehearse subvocally (i.e., in our heads, not necessarily with conscious awareness) in approximately 3 seconds. In working memory, information is either processed enough that it is stored in long-term memory or it is lost.

Long-term memory supposedly has a limitless capacity and can hold information perhaps indefinitely. Many researchers believe that the more information we have stored on a particular topic, the easier it is to remember new information about that topic. When we store information in long-term memory and are able to retrieve it, we say that we have "learned" that information. Generally, the more deeply we process information in working memory and the more we connect it with what we already know, the more likely we are to move that information into long term memory.

Some common methods used to try to move information into long-term memory include

- Rehearsal
- Meaningful learning
- Elaboration
- Organization
- Visual imagery
- Mnemonics

Contemporary theories of cognitive psychology go beyond information processing to include new research exploring the neurological foundations of learning and memory. Specifically, researchers are systematically mapping the areas of the brain most active for particular tasks. Among the "hot" topics in this area are localization of function to specific hemispheres, lobes, or parts of the brain; the way neurons grow and communicate via synapses; and neural imaging.

Constructivism: Creating Knowledge from Observations and Experiences

We do not simply take information from the world around us and store it, as is, in our memories. We usually use what we already know to interpret and understand new information. So, our new knowledge is usually *constructed* from what we already know—**prior knowledge**—and the new information. Constructivist theory is grounded in the philosophy of John Dewey, the leader of the progressive education movement in America and an early advocate of inquiry learning.

For the classroom teacher, the basic tenets of knowledge construction are foundational: Instruction should be student centered, involve problem solving, and require students to interact socially and environmentally. Additionally, teachers should remember that each learner has unique prior knowledge, provide students with the opportunity to interpret and elaborate, and encourage students to view errors as opportunities to learn.

Piaget's Conception of Cognitive Development

Jean Piaget's theory of cognitive development is perhaps the most influential constructivist theory. Piaget argued that our understanding of the world is organized into **schemes**, which he defined as organized group of similar actions or thoughts that are used repeatedly in response to the environment. For example, we have schemes for riding a bike, adding and subtracting numbers, the concept family, and so on. We use these schemes to help us interpret and respond to the world.

New information is adapted into existing schemes through **assimilation** and **accommodation**. Assimilation occurs when people deal with a new experience in a manner that is consistent with a present scheme. For example, a young child may have a scheme for the concept "dog" that is based on the neighbor's large black lab. For the child, dogs are big, hairy, friendly, and they bark. Sitting outside in his stroller one day, he sees a collie. His mother points to it and says, "dog." The collie is big and hairy and barks. The child says, "dog," even though the collie is a different color, not quite as big as the lab, and has a longer, narrower snout. Note that assimilation requires rigid adherence to an established scheme and can sometimes lead to errors and misconceptions (e.g., a coyote isn't a dog).

Accommodation is required when people must incorporate a new experience by modifying an old scheme or forming a new scheme. For example, a chihuahua does not fit the child's existing scheme for dog. For the child to accept it as a dog, he must adjust the "dog" scheme to include small dogs. The period of flux when individuals are attempting to adjust prior schemes with new experiences that do not fit into their

existing schemes is known as **disequilibrium**, and the process of moving from disequilibrium to a new state of learning is known as **equilibration**.

Piaget's theory detailing four stages of cognitive development — **sensorimotor**, **preoperational**, **concrete operational**, and **formal operational** — has been extremely influential in the fields of developmental and educational psychology. See Table 3.2.

Table 3.2 Piaget's stages of cognitive development

Stage	Characteristics	Educational Implications
Preoperational (ages 2-7 years).	• Begins using symbols but cannot manipulate them • Realism, animism, artificialism, transductive reasoning, centering, egocentrism and irreversibility • Egocentric and socialized speech •	• Deferred imitation, symbolic play, drawing and mental images • Encourage the use of language
Concrete operational (ages 7-11 years)	• Can perform mental operations with the use of concrete objects, not verbal statements • Conservation, seriation, classification and number concepts • Verbal understanding	• Classification activities • Integrated activities that allow students to make connections between ideas previously thought to be separate
Formal operational (ages 11 years and up)	• Released from the restrictions of tangible and concrete • May separate real from the possible, hypothetic/deductive reasoning • Development of logico-mathematical structures • Language freed from concrete, able to express the possible	• Challenge, do not frustrate • Be aware of adolescent limitations • Encourage analysis of information in drawing conclusions

Adapted from Ormrod, J. (2009). *Essentials of educational psychology* (2nd Ed, p. 149) Columbus, Ohio: Merrill. To purchase a copy of this book, click here.

Sociocultural Theory: Scaffolding through the Zone of Proximal Development

Lev Vygotsky proposed that social interactions with more knowledgeable partners can aid in learning and even accelerate cognitive development. Vygotsky's concept of the **Zone of Proximal Development** implies an optimal time for individuals to learn. This Zone is an area where students, with assistance from more knowledgeable others, can grasp ideas that they would otherwise not be able to understand and solve problems that they would otherwise not be able to solve. It is the figurative space between

1. Someone's actual level of development or competence, where she can understand concepts and perform tasks without anyone else's help; and
2. The level of development or competence, where, even with the assistance of someone else, she cannot understand concepts or perform tasks.

The social aspect of Vygotsky's theory hinges on the interaction between learners and mentors (or students and teachers) in the Zone of Proximal Development. The support provided by experienced mentors is known as **scaffolding** — Jerome Bruner used this term to describe the support that learners need when faced with a task that presents too much of a challenge for the student to accomplish alone.

Sociocultural theory has many applications to teaching. For example, to maximize effectiveness, teachers can:

- Relate new knowledge to prior knowledge
- Design the curriculum so that tasks develop from less to more complex as the student becomes increasingly sophisticated
- Offer apprenticeships, which consist of working with an expert who guides thinking and planning how to perform a task
- Encourage interaction with peers, including having similar others explain concepts and justify ideas.

Perspectives on Development

Whereas principles of *learning* focus on both long-term and short-term changes in behaviors and information storage, principles of *development* are used to explain changes in physical, cognitive, and social-emotional behaviors. Although development generally refers to changes across (any) age, many researchers concentrate their study specifically on infancy, childhood, and adolescence. This discussion follows that trend, which is most appropriate for teachers intending careers in K-12 education. Table 3.3 presents five theoretical perspectives on development.

Table 3.3 Theoretical perspectives of development	
Theoretical Perspective	**General Description**
Cognitive-Developmental Theory	Cognitive-developmental theorists propose that one or more aspects of development can be characterized by a predictable sequence of stages. Each stage builds on acquisitions from any preceding stages and yet is qualitatively different from its predecessors. Many cognitive-developmentalists are constructivists, in that they portray children as actively trying to make sense of their world and constructing increasingly complex understandings to interpret and respond to experiences. Both Piaget and Kohlberg are associated with this theoretical perspective.
Nativism	Some behaviors are biologically built in. A few behaviors (e.g., the reflex to suck on a nipple placed in the mouth) are evident at birth. Others (e.g., walking) emerge gradually, and usually in a predictable order, as genetic instructions propel increasing physical maturation of the brain and body. Nativists suggest that in addition to genetically preprogrammed behaviors, some knowledge, skills, and predispositions—or at least the basic "seeds" from which such things will grow—are also biologically built in.
Sociocultural Theory	Sociocultural theorists emphasize the role of social interaction and children's cultural heritage in directing the course of development. Parents, teachers, and peers are especially instrumental, in that they pass along culturally prescribed ways of thinking about and responding to objects and events. As children gain practice in certain behaviors and cognitive processes within the context of social interactions, they gradually adopt and adapt these behaviors and processes as their own.
Information Processing Theory	Developmental psychologists who take an information processing approach focus on how memory capabilities and specific cognitive processes change with age. For example, some examine how an expanding working memory capacity enables more complex thought. Others consider how increasingly sophisticated metacognitive knowledge and beliefs spur more advanced and effective learning strategies. Still others explore the cognitive processes involved in children's social interactions with peers.
Psychodynamic Theory	By and large, psychodynamic theorists focus on personality development, and sometimes on abnormal

	development as well. They propose that a child's early experiences can have significant effects on a child's later developments, even when those experiences are buried in a child's unconscious and so are unavailable for recall and self-reflection. Some theorists also propose that children go through qualitatively distinct stages in their development. One key concept in many psychodynamic theories is identity, one's self-constructed definition of who one is and hopes to become.

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Development: Change Over Time

When addressing developmental change in children and adolescents, researchers and educators usually focus on 3 key domains (i.e., physical, cognitive, and socioemotional) and 5 continuous developmental periods (i.e., infancy, early childhood, middle childhood, early adolescence, and late adolescence). The distinguishing characteristics of each period are shown in Table 3.4; note, however, that a full discussion is beyond the scope of this tutorial.

Table 3.4 Distinguishing characteristics of development

Age	What You Might Observe	Diversity
Infancy (Birth–2)	**Physical Development** • Motor skills including rolling over, sitting, crawling, standing, walking • Growing ability to reach, grab, manipulate, and release objects • Rudimentary self-feeding by the end of infancy **Cognitive Development** • Ability to distinguish among different faces • Rapid growth in communication, including crying, using gestures and facial expressions, synchronizing attention with caregivers, babbling, forming one-word sentences, constructing multiple-word sentences • Ability to imitate simple gestures with a model present, moving to complex imitation of actions and patterns from memory • Remembering people and things	• Considerable diversity exists in age when, and in manner in which, babies develop motor skills. • Self-feeding and self-help skills emerge later when families encourage children to rely on others for meeting basic needs. • Children's temperaments and physical abilities affect their exploration of the environment. • In unsafe environments, families may limit children's exploration. • Some young children learn two or three languages, especially when knowing more than one language is valued by caregivers. • Ability to pretend is displayed early by some children and later by others. • Nonverbal communication varies with culture. For instance, a child may be discouraged from making eye contact with an elder as a sign

	out of sight **Social-Emotional Development** • Formation of close bonds with responsive and affectionate caregivers • Use of words to name needs and desires • Playing side by side with peers but also interacting at times • Increasing awareness of ownership and boundaries of self ("Me!" "Mine!") • Developing sense of power and will ("No!")	of respect. • Children who have few experiences with peers may appear tentative, detached, or aggressive. • Infants and toddlers who spend time in multi-age settings interact differently than do those accustomed to same-age groups. • Some children are encouraged by families to share possessions, and others are encouraged to respect individual rights of property.
Early Childhood (2–6)	**Physical Development** • Increasing abilities in such motor skills as running and skipping, throwing a ball, building block towers, and using scissors • Increasing competence in basic self-care and personal hygiene **Cognitive Development** • Dramatic play and fantasy with peers • Ability to draw simple figures • Some knowledge of colors, letters, and numbers • Recounting of familiar stories and events **Social-Emotional Development** • Developing understanding of gender • Emerging abilities to defer immediate gratification, share toys, and take turns • Modest appreciation that other people have their own desires, beliefs, and knowledge • Some demonstration of sympathy for people in distress	• Children master coordinated physical skills (e.g., skipping) at different ages. • Individual differences in fine motor proficiency and gross motor agility are substantial. • Some children enter kindergarten having had few social experiences with age-mates; others have been in group child care since infancy. • Family and cultural backgrounds influence the kinds of skills that children have mastered by the time they begin school. • Some children have had a lot of experience listening to storybooks, but others have been read to only rarely. • Many children at this age have difficulty following rules, standing quietly in line, and waiting for their turns.
Middle Childhood (6–10)	**Physical Development** • Ability to ride a bicycle • Successful imitation of complex physical movements • Participation in organized sports **Cognitive Development**	• Children begin to compare their academic and physical performance to that of others, and children who perceive they are doing poorly may have less motivation to achieve. • Many children are unable to sit

	• Development of basic skills in reading, writing, mathematics, and other academic subject areas • Ability to reason logically about concrete objects and events in the immediate environment **Social-Emotional Development** • Increasing awareness of how one's own abilities compare with those of peers • Desire for time with age-mates, especially friends of the same gender • Increasing responsibility in household chores • Adherence to rules in games • Understanding of basic moral principles (e.g., fairness and equity)	quietly for long periods. • Individual differences are evident in children's performance in academic areas. • Children differ in temperament and sociability; some are outgoing, others are more reserved and shy. • A few children may show unacceptable levels of aggression toward others.
Early Adolescence (10–14)	**Physical Development** • Onset of puberty • Significant growth spurt **Cognitive Development** • Emerging capacity to think and reason about abstract ideas • Preliminary exposure to advanced academic content in specific subject areas **Social-Emotional Development** • Continued (and perhaps greater) interest in peer relationships • Emerging sexual interest in the opposite gender or same gender, depending on orientation • Challenges to parents, teachers, and other authorities regarding rules and boundaries • Occasional moodiness	• Young adolescents exhibit considerable variability in the age at which they begin puberty. • Academic problems often become more pronounced during adolescence; students who encounter frequent failure become less engaged in school activities. • Adolescents seek out peers whose values are compatible with their own and who will give them recognition and status. • Some young adolescents begin to engage in deviant and risky activities (e.g., unprotected sex, cigarette smoking, use of drugs and alcohol).
Late Adolescence (14–18)	**Physical Development** • Achievement of sexual maturity and adult height • For some teens, development of a regular exercise program • Development of specific eating habits (e.g., becoming a vegetarian, consuming junk food)	• Some adolescents make poor choices regarding the peers with whom they associate. • Older adolescents aspire to widely differing educational and career tracks (e.g., some aspire to college, others anticipate seeking employment immediately after high

	Cognitive Development • In-depth study of certain academic subject areas • Consideration of career tracks and job prospects **Social-Emotional Development** • Dating • Increasing independence (e.g., driving a car, making choices for free time) • Frequent questioning of existing rules and societal norms	school, and still others make no plans for life after high school). • Some teens participate in extracurricular activities; those who do are more likely to stay in school until graduation. • Some teens become sexually active, and some become parents. • Teenagers' neighborhoods and communities offer differing opportunities and temptations.

Adapted from McDevitt, T.M., & Ormrod, J.E. (2010). *Child development and education* (4th Ed, pp. 24-25). Columbus, Ohio: Merrill. To purchase a copy of this book, click here.

Merging Learning Theory, Developmental Theory, and Educational Practice

Good teachers can integrate learning theory with developmental theory to guide educational practice. For example, identifying the appropriate zone of proximal development for students at a particular cognitive or social level is a necessary step for effective curricular development and classroom management. In a sense, development occurs in part through learning, and learning is constrained in part by development.

The *taxonomy of educational objectives* developed by Benjamin Bloom and colleagues is an important example that shows how these ideas can be merged successfully. This taxonomy, which is discussed in greater detail in Chapter 6 of this tutorial, includes educational objectives from the three main domains of development (i.e., socioemotional, cognitive, and physical/psychomotor). For more than 50 years, since its publication, this taxonomy has guided educational planning, instruction, and assessment for students at all levels, from preschool through post-secondary education. It remains one of the most significant educational writings of the 20th century.

Chapter 2: Students as Diverse Learners

Students' learning is influenced not only by age and cognitive development, as discussed in Chapter 3 of this tutorial, but also by language, culture, family, and community values (i.e., primarily group differences) as well as individual experiences, talents, motivations, and prior learning (i.e., primarily individual differences). Successful teachers need to understand how each of these variables, and others, affect how individual students learn.

Group Differences

In addition to general trends and age-related developmental differences addressed in Chapter 1 of this tutorial, researchers have identified **group differences** — behaviors that are generally shared among students of specific cultural and ethnic groups, gender, or socioeconomic backgrounds but consistently differ from those of students in other groups. The characterization of the behavior of a particular group is based on

the **norm**, or average behavior of the members of that group, but it's important to remember that individuals within the group will also be somewhat different from one another. Group differences are identified when the behavior of the individuals in the *same* group is more similar, on average, than the behavior of individuals from *different* groups.

Gender Differences

Physical activity and biological development

- Boys tend to be more active than girls.
- Girls develop fine motor skills earlier than boys.
- Girls reach puberty earlier than boys, but after puberty, boys are taller and stronger.

Cognitive and academic abilities

- On average, boys and girls perform similarly on tests of general intelligence, although boys show more variability. In other words, the average scores for girls and boys are about the same, but more boys score extremely high and extremely low.
- Boys perform better on tasks requiring **visual-spatial skill**. Girls perform better on some, but not all, verbal skills and tend to have larger vocabularies. Researchers speculate that these differences are due, at least in part, to biological differences in brain development, perhaps as a result of gender-specific hormones both in utero and during puberty.
- More boys than girls are identified with learning disabilities.

Motivation

- Boys have more ambitious career aspirations than girls have.
- Girls are more concerned about doing well in school, are more engaged in classroom activities, work more diligently on school assignments, and are more likely to graduate from high school.
- Girls to prefer tasks at which they know they can succeed, and often have difficulty dealing with failure. Boys are more willing to take on academic challenges and risks and are more likely to take their failures in stride.

Classroom behavior

- Boys are more active—they talk more and ask more questions, and they are more likely to call out answers and dominate class discussions.
- Girls are slower to respond in groups, less likely to volunteer ideas and ask questions, and often wait to be called on directly.

Cultural Differences

Research on cultural differences is only beginning to identify consistent behavior patterns, and it's important to keep in mind that recognition of typical behaviors within a culture can lead, inappropriately, to stereotyping. Nevertheless, teachers

should keep cultural differences in mind when anticipating or evaluating student behaviors, as the **cultural mismatch** that occurs when the child's home culture and school culture have conflicting expectations can negatively affect students' academic achievement.

Researchers have identified cultural differences on the following characteristics:

Use of language and dialect. Cultures tend to be associated with specific languages (e.g., students in the United States are educated in English; students in Germany speak German; students in Hong Kong SAR are educated in Chinese or in English). However, individuals who speak the specific language of their country may use forms different than the standard acceptable at school. For example, African American English is a dialect of English, with its own consistent pronunciations, syntax, and figures of speech. Dialects are not "bad" or "substandard" speech, but many people in mainstream culture continue to believe that speakers of the language "standard" are smarter or better educated.

Talking and remaining silent. In some cultures, for example, speaking frequently or without being asked is seen as a sign of low intelligence or immaturity. For example, children in some Southeast Asian countries are taught to speak only when addressed. In others, such as mainstream American culture, casual conversation is expected and used as a form of affiliation.

Asking and responding to questions. In many cultures, children are expected to ask and answer questions as part of learning, but for some (e.g., some Mexican Americans and some Native Americans), asking questions is inappropriate and even rude. Furthermore, although American teachers and parents often ask children questions for which they know the answers (e.g., "And how old are you?" "So what does the first paragraph say?"), in some cultures, children are not asked this type of question. In other cultures, children are taught not to answer questions about personal things (e.g., "What does your father do?").

Taking turns in a conversation. Some cultures are more tolerant of — and in fact even encourage — interruptions and overlap while others are speaking, rather than waiting for the current speaker to end his or her turn. Others learn that waiting for a speaker to finish is a sign of respect.

A focus on cooperation or competition within the group. Children from cultures valuing cooperation and interdependence (e.g., many Hispanic and Native American cultures) may prefer and excel at group activities, whereas those from cultures

emphasizing competition may have more difficulty with group work but excel at individual seatwork.

Socioeconomic Differences

Group differences due to family socioeconomic status (SES) are often confused with ethnic differences. Research consistently shows that students from lower socioeconomic status, especially those who live in poverty, are at risk of academic difficulties and behavioral problems. Higher-SES students tend to have higher academic achievement, and lower-SES students tend to be at greater risk for dropping out of school. Differences among students from different socioeconomic backgrounds become greater as the students get older.

Children who live in chronic poverty experience the greatest risk — they are frequently faced with poor nutrition, exposure to toxins, inadequate and often unstable housing, and fewer community and home resources (e.g., less parental involvement, fewer classroom resources and teachers with lower expectations, less safe neighborhoods).

Individual Differences

As noted previously, individuals within a group will also be somewhat different from one another. These differences are known as **individual differences**. Examples include differences in intelligence and learning styles, which are discussed in detail in the following sections. Teachers should also recognize and attend to individual differences in temperament, personality, and motivation (discussed in greater detail in Chapter 5 of this tutorial).

Intelligence

Intelligence has traditionally been difficult to define, and researchers hold diverse views on the sorts of behaviors that show intelligence and on how to measure it. For example, Spearman hypothesized about general intelligence as a single factor (***g***)**,** whereas Sternberg suggested intelligence is **triarchic,** comprising analytical, creative, and practical intelligences. However, researchers generally agree that we can identify clear differences in students' information-processing abilities (i.e., **fluid intelligence**) and basic knowledge (i.e., **crystallized intelligence**). Teachers can look beyond just these skills and focus on**distributed intelligence** — the idea that people act more "intelligently" when they have physical, symbolic, or social assistance — or other abilities, skills, or talents that some researchers label as "intelligences." For example, Gardner's theory of **multiple**

intelligences currently identifies individual differences in linguistic intelligence, logical-mathematical intelligence, spatial intelligence, musical intelligence, bodily-kinesthetic intelligence, interpersonal intelligence, intrapersonal intelligence, and naturalist intelligence.

Learning Styles and Dispositions

Students with the same intelligence levels often approach classroom tasks and think about classroom topics differently. Some of these individual differences are due to **cognitive** or learning styles. One consistent finding is that some learners are analytic, whereas others process information holistically. For example, analytic learners break down tasks into pieces and approach each piece separately and in turn, whereas holistic learners approach a task as a single integrated project. Another consistent finding is that some people prefer and learn better from verbal information, whereas others prefer a visual presentation.

Additionally, researchers have identified certain dispositions — general inclinations to approach tasks in a particular way — that differ among individuals. For example, some individuals seek more stimulation than others, some seek more challenging cognitive tasks than others, and some are more open-minded than others. These dispositions are often correlated with aspects of motivation and student achievement.

Accommodating Differences in the Classroom

Group differences can often be accommodated in multicultural or culturally inclusive classrooms, which integrate into the curriculum the perspectives and experiences of diverse cultural groups. A**multicultural curriculum** includes varied activities that encourage student understanding of different points of views, rather than requiring acceptance of particular beliefs and values.

Many individual differences can be accommodated through **ability grouping** or by flexible teachers who are sensitive to individual learning styles and dispositions. However, some individual differences result in students having special needs in the classroom (see Table 4.1 for examples). In some cases, these needs must be accommodated, or in other words, the classroom experience must be adapted, enriched, or replaced in some way to ensure that the student's needs are met. Referral to special education programs can come from parents, teachers, or physicians, and the school and the parents must agree to testing. Evaluation of students must be nondiscriminatory, multidisciplinary, and comprehensive. This initial evaluation determines whether the student is eligible for special education services and is based on whether the student can successfully meet educational objectives in the traditional classroom environment.. Federal funds are provided when students have been identified as needing special services.

Special education in the United States is mandated by law: In 1975 the U.S. Congress passed Public Law 94-142, which is now known as the **Individuals with Disabilities Education Act (IDEA)**. IDEA has been amended and reauthorized several times and now grants educational

rights for all people, from birth until age 21, regardless of cognitive, emotional, or physical disabilities. The law guarantees the right to a **free and appropriate education**, **fair and nondiscriminatory evaluation**, education in the **least restrictive environment**, and an **individualized education program (IEP)**. Development of the IEP involves collaboration among the student's parents, a general education teacher, a school administrator, a special education teacher, an IEP specialist, and sometimes the student him- or herself. The IEP specifies the student's present level, unique needs, necessary modifications or related services, goals and objectives, and transition planning. Additionally, IDEA specifies that students are entitled to**due process** regarding their educational planning.

Not all students who need special accommodations in school are covered by IDEA, but their needs may be addressed by other laws. **Section 504 of the Vocational Rehabilitation Act of 1973** prevents discrimination against people with disabilities in any program that receives federal money, such as public schools. Through Section 504, all school-age children are ensured an equal opportunity to participate in school activities. **The Americans with Disabilities Act of 1990 (ADA)** extends the protections of Section 504 beyond the school and workplace to libraries, local and state governments, restaurants, hotels, theaters, stores, public transportation, and many other settings.

Specific cognitive or academic difficulties that must be accommodated with special education and related services are shown in Table 4.1.

Table 4.1 General and specific categories of students with special needs

General Category	Specific Categories	Description
Students with specific cognitive or academicdifficulties	**Learning disabilities**	Difficulties in specific cognitive processes(e.g., in perception, language, or memory) that cannot be attributed to such other disabilities as mental retardation, emotional or behavioral disorders, or sensory impairments
	Attention-deficithyperactivity disorder (ADHD)	Disorder marked by either or both of thesecharacteristics: (a) difficulty focusing andmaintaining attention and/or (b) frequenthyperactive and impulsive behavior
	Speech andcommunication disorders	Impairments in spoken language (e.g.,mispronunciations of certain sounds,stuttering, or abnormal syntactical patterns)or in language comprehension that significantly interfere with classroom

		performance
Students with social orbehavioral problems	**Emotional and behavioraldisorders**	Emotional states and behaviors that are present over a substantial period of time andsignificantly disrupt academic learning andperformance
	Autism spectrumdisorders	Disorders marked by impaired social cognition, social skills, and social interaction, as well as repetition of certain idiosyncraticbehaviors; milder forms (e.g., Aspergersyndrome) associated with normaldevelopment in other domains, extreme forms associated with delayed cognitive and linguistic development and highly unusual behaviors
Students with general delays in cognitive andsocial functioning	**Mental retardation**	Significantly below-average general intelligence and deficits in adaptive behavior (i.e., in practical and social intelligence)
Students with physical or sensory challenges	**Physical and healthimpairments**	Physical or medical conditions (usually long-term) that interfere with school performance as a result of limited energy and strength, reduced mental alertness, or little muscle control
	Visual impairments	Malfunctions of the eyes or optic nerves thatprevent normal vision even with correctivelenses
	Hearing loss	Malfunctions of the ear or associated nervesthat interfere with the perception of soundswithin the frequency range of normal speech
	Severe and multipledisabilities	Presence of two or more disabilities, thecombination of which requires significantadaptations and highly specialized educational services

Adapted from *Educational Psychology: Developing Learners*, by J. E. Ormrod, 2009, Columbus, OH: Merrill. To purchase a copy of this book, click here.

Other Exceptionalities

In addition, students who are gifted and students for whom English is not a first language may need additional assistance in the classroom to help them reach their potential.

Students who are gifted. Students who are gifted are eligible for special servicse under the current federal guidelines. Giftedness is defined as an exceptionally high ability in one or more areas. High IQ (above 125 or 130) is one typical measure of giftedness. However, because IQ tests are not always unbiased or reliable measures and because some students do not have an exceptionally high IQ overall but are gifted in only one or a few domains (e.g., math, music), school personnel are increasingly relying on multiple assessment measures (see Chapter 7 of this tutorial) to identify students who are gifted. Typical characteristics of students who are gifted include advanced language and social skills, rapid acquisition of new information and learning strategies, flexibility in their thought processes, positive self-concepts, and high intrinsic motivation (see Chapter 5 of this tutorial).

Students learning English. When confronted with an English-only curriculum, students whose heritage language is not English (i.e., "English language learners," or ELL students) face extra challenges. Even if they have mastered basic conversational English, they often find that the academic language used in the classroom has its own vocabulary, expressive style (e.g., may be more expository than narrative), and sociolinguistic conventions. When teaching and especially when assessing ELL students, teachers should make every effort to attend to and address students' English language skills.

Accommodations for Learning

Approaches for accommodating various learning styles, intelligences, and exceptionalities include:

Alternative assessments or modified procedures. For example, students with ADHD may need several sessions to complete one assessment; students with dyslexia may benefit from an oral exam rather than a paper-and-pencil test. Teachers can also reduce the difficulty level or the amount of work required for particular assignments and/or can offer more time or more support to complete the work.

Differentiated instruction. This practice involves development of individualized instructional methods based on the student's existing knowledge and specific needs.

An individualized education program (IEP). The **IEP,** as noted previously, is a formal agreement between parents and the school that outlines the services that the child will receive during the year to help him or her achieve specified performance goals.

Functional analysis. This practice involves an examination of the antecedents and consequences of inappropriate behavior to identify the purpose the behavior may

serve for the learner. Functional analysis is frequently followed by **positive behavioral support**, a systematic intervention to alter those behaviors.

***An inclusive classroom*.** **Inclusion** refers to the practice of educating students with special needs in neighborhood schools and with nondisabled peers to the extent possible. Students are provided with the necessary support services to ensure success. Additional accommodations may be necessary to support the learning of students for whom English is not a first language, including:

Bilingual education programs. These programs allow students to study most content areas in their heritage languages while taking dedicated English-language classes. This type of program can be helpful for students because it reduces the memory load — they can concentrate on the subject matter more than the language itself.

Immersion programs. These programs involve instruction almost exclusively in English. Research suggests that most students in immersion programs become proficient in English fairly quickly and they can thus keep up in the other subjects.

Supporting dialectical differences. As noted previously, dialects are often not considered acceptable in the classroom or in written work. Teachers should work to help students understand when dialectical variations are most appropriate.

Chapter 3: Student Motivation and the Learning Environment

When educators use the term *motivation,* they are referring to inner states that energize, direct, and sustain behavior toward a goal. Motivation is correlated with achievement; motivated students persist, take risks, and cause fewer discipline problems. Learning to recognize, increase, and in some cases redirect student motivation is key to success as a teacher.

Intrinsic and Extrinsic Motivation

Some students are motivated by their own likes or dislikes; others are motivated by factors that are inherent to the task they are performing. In other words, performing the task well is a personal reward. For example, some students read the newspaper daily simply because they love to read; others may view reading the newspaper as an important component of being a good citizen. These students are described as having **intrinsic motivation** to read. Intrinsic motivation is correlated with academic success and typically occurs during activities that are affective (i.e., high in emotional satisfaction), challenging, personally selected, or highly novel.

Other students are motivated by factors unrelated to the task itself. For example, they may be working for the grades, money, or praise and recognition that successful completion of the task may bring. These students are described as having **extrinsic motivation** for this task.

Extrinsic motivation is easy to reinforce — a teacher offers rewards upon completion of a certain behavior (e.g., reading the newspaper), and the students continue to perform the behavior to achieve the rewards. In general, teachers should be selective when reinforcing extrinsic motivation because the focus on rewards decreases the interest in the task itself. However, reinforcement can be legitimately employed as a way to motivate an unmotivated student or group of students, to engage students in an activity or task of low interest, to provide feedback for increasing competence, and to give students social support and acceptance. Once students experience success in a task or activity, the goal for a teacher is to decrease reinforcers that encourage extrinsic motivation and refocus students on the intrinsic satisfaction of a job well done.

Theories of Human Motivation and Behavior

Early theories regarding the factors that influence and direct motivation focused on drives, needs, and rewards and punishments. Many theories of motivation are informed by **cognitive dissonance** theory, a social psychological construct suggesting that, when confronted with two opposing beliefs, individuals are motivated to resolve the conflict (i.e., the dissonance) because it causes discomfort. This focus on cognition is clear in more contemporary approaches to motivation, which center on how an individual's perceptions, thoughts, and beliefs influence his or her behavior toward a goal.

Nine perspectives on human motivation and behavior are summarized in Table 5.1.

Table 5.1 Theories of human motivation and behavior

Theoretical Perspective	General Description
EARLY PERSPECTIVES	
Behaviorism	Behaviorist perspectives on motivation are largely influenced by the work of ***B. F. Skinner***, who was himself influenced by ***John Watson*** and***Edward Thorndike***. From a behaviorist perspective, motivation is often the result of drives, internal states caused by a lack of something necessary for optimal functioning. Consequences of behavior (**reinforcement**, **punishment**) are effective only to the extent that they either increase or decrease a learner's drive state. In recent years, some behaviorists have added a purposeful element to the behaviorist perspective: They suggest that learners intentionally behave in order to achieve certain end results.

Humanism	Historically, humanists have objected to behaviorists' depiction of people's behaviors as being largely the result of external environmental factors. In the humanist view, people have within themselves a tremendous potential for psychological growth, and they continually strive to fulfill that potential. When given a caring and supportive environment, human beings strive to understand themselves, to enhance their abilities, and to behave in ways that benefit both themselves and others.***Abraham Maslow****'s* hierarchy of human needs is most commonly associated with the humanistic perspective on motivation. Unfortunately, early humanist ideas were grounded more in philosophy than in research findings, so many contemporary motivation theorists have largely left them by the wayside. However, one contemporary perspective**,** **positive psychology** (see the final row of this table), has some roots in the humanist perspective.
CONTEMPORARY PERSPECTIVES	
Self-determination theory	Self-determination theorists propose that human beings have three basic needs: a need to be effective in dealing with the environment (**competence**), a need to control the course of their lives (**autonomy**), and a need to have close, affectionate relationships with others (**relatedness**). Learners are more effectively motivated to learn school subject matter when these three needs are met**.**
Self-worth theory	Self-worth theorists believe that protecting one's own sense of competence—that is, one's sense of self-worth—is a high priority for human beings. One way to maintain and possibly enhance self-worth, of course, is to be successful in daily activities. But curiously, when learners suspect that they may fail at an activity, they sometimes do things (e.g., procrastinating until the last minute) that make failure even more likely. Although such **self-handicapping** decreases the probability of success, it also enables people to justify their failure, both to themselves and to others, and so enables them to maintain their self-worth.
Expectancy-value theory	**Expectancy-value theorists** propose that motivation for performing a particular task is a function of two variables. First, learners must believe they can succeed. In other words, they must have a high expectation, orexpectancy, for their task performance. Second, learners must believe that they will gain direct or indirect benefits for performing a task. In other words, they must place value on the task itself or on the outcomes that are likely to result.
Social cognitive theory	Social cognitive theory is a contemporary, cognitively oriented version of social learning theory, including that of ***Albert Bandura***. Social cognitive theorists emphasize the importance of **self-efficacy**—believing oneself capable of successfully performing certain behaviors

	or reaching certain goals—in motivation. Social cognitive theorists also point out that human behavior is typically goal directed, thereby providing a foundation for**goal theory** (described separately below).
Goal theory	Goal theorists focus on the kinds of outcomes (goals) toward which learners direct their behavior. Learners are apt to have goals in a variety of areas, including but not limited to academic performance, social relationships, careers, financial gain, and physical and psychological well-being. In recent years, goal theorists have focused largely on students' goals in academic settings, which they refer to as achievement goals.
Attribution theory	Attribution theorists look at learners' beliefs about why various things happen to them—for instance, about why they do well or poorly on academic tasks. These beliefs, known as **attributions**, influence learners' optimism about future success and about the actions they take (or perhaps don't take) to bring about such success. For instance, learners are more likely to work hard on classroom tasks if they believe that their ultimate success depends on something they themselves do—that is, if they attribute classroom success to internal and controllable factors.
Positive psychology	Positive psychology embraces early humanists' belief that people have many uniquely human qualities propelling them to engage in productive, worthwhile activities. But like other contemporary motivation theories, it bases its views on research findings rather than philosophical speculations. As a distinct perspective of motivation, positive psychology emerged on the scene only in the late 1990s, and in its current form it is better characterized as a collection of ideas rather than as a full-fledged, well-integrated theory.

Adapted from *Essentials of Educational Psychology* (2nd ed., pp. 19−20), by J. Ormrod, 2009, Columbus, OH: Merrill. To purchase a copy of this book, click here.

Encouraging Students to Become Self-Motivated

Ideally, teachers should encourage students to find their own motivation to complete tasks and meet their goals to the best of their abilities. Educators sometimes use Erik Erikson's framework for psychosocial development as a guide to understanding students' needs at particular ages. Central to Erikson's theory of personality development is the idea that people pass through eight stages, each of which is centered on a psychological conflict that causes tension until it is resolved. During the preschool years, for example, children begin to assert control over their environments and must balance their drive toward initiative with some way to curb those tendencies to assert power when it is inappropriate; that is, they must also develop a sense of guilt. Note that successful resolutions of Erikson's conflicts

require a balance — children who never feel guilty and children who always feel guilty will continue to have problems later in life. Erikson's theory postulates that children face the conflict between *industry and inferiority* during the grade school years and the conflict between *ego identity and role confusion* during adolescence. Motivating students in grade school, then, often requires encouraging their feelings of pride and competence; motivation during middle school often requires helping students develop independence and a strong sense of self.

Additional strategies for fostering self-motivation (Ormrod, 2008) include:

Encouraging realistic challenges and rewarding efforts to achieve them. Students who aim high toward an achievable goal show an increase in their feelings of competence and in their intrinsic motivation for similar tasks. Once students experience the delight of success, they are often motivated to take on additional academic challenges and risks.

Providing opportunities for choice and independent decision making. This strategy addresses students' **need for self-determination**; as students develop a feeling of ownership toward the task, their motivation increases.

Providing opportunities for social interaction. This strategy addresses students' **need for relatedness** and encourages a sense of community within the classroom.

Increasing the students' sense of the value in the task and their expectation of success. Expectancy-value theory suggests that students are more motivated to work harder at tasks that are seen as important or interesting and at which they expect to do well.

Keeping group and individual differences in mind when planning class activities. For example, girls appear to have a greater need for affiliation than boys. (See Chapter 4, Students as Diverse Learners, for additional information on group and individual differences.)

Recognizing students' personal interests and tailoring activities to them. Research suggests that **situational interest** captures students' attention, but *personal interests* drive motivation over time.

Recognizing differences in students' goals and redirecting them if necessary. **Mastery goals** are more motivating in the long term than *performance goals* or *social goals.* Often, students whose goals are mostly performance goals look

outward for validation of their competence. These students are likely to cheat, compare their performance with that of others, seek attention for their performance, and focus on grades instead of the acquisition of knowledge. Teachers may need to help students select appropriate, reachable goals.

Helping students to recognize attributions of success and failure and redirecting them if necessary. Attributions vary based on three primary factors: *locus* (internal or external), *stability*, and*controllability*. In general, students tend to attribute success to internal and stable factors and failure to external, uncontrollable ones. At-risk students, in particular, often attribute their lack of academic success to factors outside their control, thus resulting in a lack of motivation and persistence. When students come to believe their success or failure lies within their control, they believe that with the necessary instruction and the right amount of effort, they can experience success.

To summarize, teachers need to design challenging and developmentally appropriate activities and ensure that students have the necessary tools for success. As success continues, students can develop a sense of **self-efficacy**, a belief that they are capable or competent to perform certain tasks or activities. Once students experience a positive outcome and can attribute it to their own effort, motivation for future endeavors is increased.

Classroom Organization and Management

Knowledge of human motivation and behavior should influence strategies for organizing and supporting individual and group work in the classroom. A setting conducive to learning and effective classroom management will help promote positive relationships, cooperation, and purposeful learning.

Models of Classroom Management

Classroom management models range from highly directive behaviorist techniques to democratic and nondirective, facilitative procedures. Most classes include a variety of techniques.

Highly directive models of classroom management occur when teachers direct students' behavior and control them with the use of external rewards and punishment. Instructional methods that accompany this model are lecturing, drill and practice, and questioning (see Chapter 7 of this tutorial). An example of a highly directive approach is **assertive discipline**, a behaviorist approach in which teachers establish rules, require student compliance, and expect parental and administrative support. Highly directive models often use some form of behavior modification, in which behavioral problems are defined and measured to determine

what **antecedents** (triggers) or **consequences** (reinforcers) must be adjusted to successfully guide behavior. Punishment is an option in these models.

Democratic models of classroom management encourage students to be accountable for their own behavior rather than maintaining control. Most democratic models allow students to participate in the management of the classroom, encouraging them to help develop rules and consequences for breaking them. Some address logical consequences rather than punishments, whereas others focus on attempts to prevent misbehavior rather than on disciplining students following misbehavior.

Current Trends in Classroom Management

A well-designed environment with rules and routines facilitates the teaching and learning process. New teachers should initiate the process of managing their classrooms by creating a mental checklist for the first day of a new school year. This will initially ensure that all aspects are addressed and that expectations are clearly communicated to students. Students who are aware of a teacher's expectations are less likely to make errors in judgment regarding acceptable behavior in that particular classroom. Current trends in classroom management focus on:

Arranging classroom space appropriately. Furniture should be placed to allow interaction or individual work when appropriate. Teachers should be able to walk through the classroom to monitor behavior as well as to speak with students who need individual attention. Teachers should also consider what and where to post on walls, and where materials should be kept.

Establishing classroom rules, daily procedures, and routines. The key to positive classroom management is to determine the necessary procedures and routines before the students arrive. It's especially important to set guidelines at the beginning of the year and for younger students, who may not yet be able to self-regulate. Helping students to understand and allowing them to take ownership for some classroom policies helps increase motivation. One way teachers can communicate expectations is through a **contingency contract,** a formal agreement between teacher and student that identifies behaviors the student will exhibit and the reinforcers that will follow. Consistency is a key in implementation.

Communicating with parents and caregivers. Regular communication helps to develop a sense of partnership among teachers and families, which has a positive effect on students.

***Pacing and structuring lessons in developmentally appropriate ways*.** See Chapters 6 and 7 of this tutorial for additional information on lesson planning and implementation.

Maintaining accurate records and giving timely feedback. Students learn to assess their own behavior in part by watching how their teachers assess them. Teacher feedback can provide students with their present level of competence and guidance on how to attain the desired level of competence. The focus must be on improvement as opposed to final performance.

Responding to student misbehavior fairly and immediately. When students misbehave, focusing on objective descriptions of the behavior, rather than traits or characteristics of the students themselves, encourages better communication. Consequences for noncompliance to the rules should move from less to more severe. **Cueing**, discussing the problem with the student, conferring with parents, or conducting an intervention are possible response strategies. Students should understand why their behavior is inappropriate; when they understand the natural and logical consequences of that behavior, they are better able to self-regulate in the future. In some cases, **functional analysis** and **positive behavioral support** help students to develop more appropriate behaviors.

Modeling conflict resolution, problem solving, and anger management. Students internalize behaviors that they see modeled by trusted and respected adults. Teachers who are enthusiastic, with a desire to learn, inspire their students to exhibit those same qualities. Peer modeling is another useful tool for teachers — in the classroom, students witnessing a similar peer successfully performing a task often feel that they too are capable of performing that task.

Chapter 4: Planning instruction

When planning curricula and lessons, teachers need to attend to both scope and sequence. **Scope** refers to the span and depth that content will be covered in the curriculum, whereas **sequence** refers to the order in which content will be delivered. Together, a scope and sequence ensures that instruction is well planned, covers learning standards, and provides instruction appropriate for grade level learners. For example, the scope of a high-school English curriculum may specify instructional components (e.g., literature, composition, language/word study, etc.). The sequence may specify competencies at each level (e.g., English I: Connect literature with other art forms; English II: Connect literature to a universal theme; or English III: Compare and contrast literary selections).

Content Standards

In most school districts, state or national standards set both the scope and sequence of the curriculum. Standards provide specific learning goals for each grade level in basic disciplines such as reading, writing, mathematics, and science, as well as in other academic content areas. The development of and adherence to academic standards helps ensure that education is relatively comparable across schools within any school district or U.S. state. Table 6.1 provides Internet addresses for various content

standards developed by national organizations. States may place their standards under curricular frameworks and indicate expectations for grade level performance; local schools may ask teachers to use curriculum guides to ensure that a year's worth of lessons cover all expectations.

Table 6.1 Web sites with standards for various academic disciplines

Content Domain	Organization	Internet Address	*Once You Get There …
Civics and government	Center for Civic Education	www.civiced.org	Go to *Publications*and then *Resource Materials*.
English and language arts	National Council of Teachers of English	www.ncte.org	Select *Standards*from the *Quick Links*menu.
Foreign language	American Council on the Teaching of Foreign Language	www.actfl.org	Select *Standards for Foreign Language Learning* from the*Publications* menu.
Geography	National Council for Geographic Education	www.ncge.org	Select *Geography Standards* from the*Geography* menu.
Health, physical education, and dance	National Association for Sport and Physical Education	www.aahperd.org/NASPE	Select *National Standards & Activity Guidelines*from the *Publications*menu.
History	National Center for History in the Schools	www.sscnet.ucla.edu/nchs	Click on *Standards*(*Online*).
Information literacy	American Association of School Librarians	www.ala.org/aasl	Click on *Issues & Advocacy* and then on *Information Literacy*.
Mathematics	National Council of Teachers of Mathematics	www.nctm.org	Click on *Standards and Focal Points*.
Music	National Association for Music Education	www.menc.org	Click on *National Standards*.
Science	National Academy of Sciences	www.nap.edu	Click on *Education*(under *Topics*) and then on *Testing, Assessments, and Standards* (under*Subtopics).*

Visual arts	National Art Education Association	www.naea-reston.org	Click on*Publications* and then on *Publications List*; scroll to the two-column table below the list of titles.

[a] Given the dynamic nature of many Web sites, you may find that you are directed to new or different links when you get to the site in question.

Used with permission from J. Ormrod. (2009). *Essentials of educational psychology*. (2nd ed, p. 284). Columbus, OH: Merrill. To purchase a copy of this book, click here.

Developing Learning Objectives

Content standards guide teachers in developing specific instructional or learning **objectives**, which are clear statements of what the student is expected to accomplish. Objectives are written as part of the planning process so that both teachers and students are clear about what the students are responsible for mastering. Objectives must be modified to meet the needs of all students, including those with special needs, and should address the diversity of the school population (see Chapter 4 of this tutorial). By connecting standards, learning objectives, and assessment, teachers can achieve instructional alignment that maximizes effectiveness in teaching and learning. Clear learning objectives also help teachers to assess student achievement fairly and accurately.

Objectives may be written from a cognitive or a behavioral perspective, but in either case, teachers must ensure that any objectives that they write are measurable and include language that specifies how students will demonstrate learning. Cognitive objectives emphasize thinking and comprehension and generally include words such as *understand*, *recognize*, *create*, or *apply*. Behavioral objectives focus on observable behaviors and use terms such as *list, define, add*, or *calculate.* Behavioral objectives tend to be used more frequently because they specify directly how a teacher will determine that the students have met the learning goal. For example, "Students will understand multiplication." does not provide a clear, measurable behavior or a criterion for passing. "Given 20 double-digit multiplication problems, students will be able to compute accurate answers for 15." is a more specific and thus better-written objective.

Note, however, that teachers should also attend to the tenets of constructivism and social learning theory when developing objectives and planning lessons. For example, learning objectives may specify behaviors outside students' initial zones of proximal development (i.e., constructivist theory); plans to help students reach those objectives may include modeling (i.e., social learning theory) or extrinsic rewards

(i.e., behaviorist theory). See Chapter 3 of this tutorial for additional details on these four learning theories, and consider how they can best be applied to lesson planning.

Relating Objectives to Cognitive Processes

Developing objectives, whether stated in behavioral or cognitive terms, requires attention to the various types of thinking associated with student learning. Many lessons should encourage higher-level thinking, which generally involves application, analysis, or evaluation of the new material. Examples of higher-level thinking include **creative thinking**, **convergent** and **divergent thinking**, **critical thinking**,**inductive** and **deductive reasoning**, **problem solving** and **transfer**, and **social negotiation**. Each of these processes involves applying previously learned knowledge or skills to a new situation.

In general, students are more likely to engage in higher level thinking when they have sufficient knowledge about a topic, much of which is acquired first through lower-level thinking—cognitive processes that involve learning or remembering specific information or skills in more or less the same form in which they were initially presented. For example, students often need to engage in memorization of new material, such as vocabulary words, names of countries, historical dates, and the meanings of mathematical symbols. Other times, they must recall previously encoded problem-solving strategies, algorithms, or mental representations. Keep in mind that lower-level thinking is an important component of the learning process, and both types of thinking skills should be incorporated when developing learning objectives. **Bloom's Taxonomy** is often used by teachers as a hierarchical guide for developing objectives to address lower- and higher-order thinking skills. The taxonomy, in its current revision, describes learning objectives in three domains: cognitive, affective, and psychomotor. The cognitive domain, which emphasizes academic and school learning, is particularly useful for planning class lessons and objectives. It includes six levels:

- ***Remembering:*** rote memorization of specific information
- ***Understanding:*** explaining information in one's own words
- ***Applying:*** using information in a particular situation
- ***Analyzing:*** examining the various parts of information
- ***Evaluating:*** appraising information or data
- ***Creating:*** constructing something unique by combining information

Remembering and understanding are lower-order thinking skills, whereas application, analysis, evaluation, and creation are higher-order thinking skills. The affective domain includes five levels of objectives (i.e., receiving, responding, valuing, organizing, and characterizing by value). The psychomotor domain, in the current

revision, does not specify objectives by level. Figure 6.1 provides some guidelines for developing class goals and objectives during the planning process.

Figure 6.1 Identifying the goals and objectives of instruction

- ***Identify both short-term objectives and long-term goals.***
    - An elementary school teacher wants students to learn how to spell 10 new words each week. She also wants them to write a coherent and grammatically correct short story by the end of the school year.
- ***In addition to goals related to specific topics and content areas, identify goals related to students' general long-term academic success.***
    - A middle school social studies teacher realizes that early adolescence is an important time for developing the learning and study strategies that students will need in high school and college. Thus, throughout the school year, he continually introduces new strategies for learning and remembering subject matter—effective ways that students might organize their notes, mnemonic techniques they might use to help them remember specific facts, questions they might try to answer as they read a textbook chapter, and so on.
- ***Include goals and objectives at varying levels of complexity and sophistication.***
    - A high school physics teacher wants students not only to understand basic kinds of machines (e.g., levers and wedges), but also to recognize examples of these machines in their own lives and use them to solve real-world problems.
- ***Consider physical, social, and affective outcomes as well as social outcomes.***
    - A physical education teacher wants his students to know the basic rules of basketball and to dribble and pass the ball appropriately. He also wants them to acquire a love of basketball, effective ways of working cooperatively with teammates, and a general desire to stay physically fit.
- ***Describe goals and objectives, not in terms of what the teacher will do during a lesson, but rather in terms of what students should be able to do at the end of instruction.***
    - A Spanish teacher knows that students easily confuse the verbs *estar* and *ser* because both are translated in English as "to be." She identifies this objective for her students: *"Students will correctly conjugate* estar *and* ser *in the present tense and use each one in appropriate contexts."*
- ***When formulating short-term objectives, identify specific behaviors that will reflect accomplishment of the objectives.***
    - In a unit on the food pyramid, a health teacher identifies this objective for students: "Students will create menus for a breakfast, a lunch, and a dinner, which, in combination, include all elements for the food pyramid in appropriate proportions.
- ***When formulating long-term goals that involve complex topics or skills, list a***

few abstract outcomes and then give examples of specific behaviors that reflect each one.

- Faculty members at a junior high school identify this instructional goal for all students at their school: "Students will demonstrate effective classroom listening skills—for example, by taking complete and accurate notes, answering teachers' questions correctly, and seeking clarification when they do not understand.

Sources: Suggestions based on Brophy & Alleman, 1991; N.S. Cole, 1990; Gronlund, 2000, 2004; R.L. Linn & Miller, 2005; Popham, 1995 as noted in J. Ormrod (2009) *Essentials of Educational Psychology*. (2nd ed. p. 285). Columbus, OH: Merrill. To purchase a copy of this book, click here.

Task Analysis

When developing objectives and planning lessons, some teachers engage in the process of **task analysis,** which is a method of identifying specific knowledge, behaviors, or cognitive processes necessary to master a particular subject area or skill. Task analyses can be behavioral (e.g., identifying the specific behaviors necessary to perform a particular skill), based on subject matter (e.g., identifying the specific topics, concepts, and principles to be taught), or based on cognitive processing (e.g., specifying the mental processes involved in the task or activity, such as recall, elaboration, etc.).

Having identified the task's components, the teacher has a better understanding of what students need to learn and what they need to do to demonstrate that learning. Once the task has been analyzed, writing objectives and planning classroom activities to help meet them are relatively straightforward.

Unit and Lesson Planning

As part of planning, teachers should ensure that classroom activities and assessments are tied directly to the learning objectives at the curricular level, the unit level, and the lesson level. The curricular objectives are frequently determined by state and local standards, as discussed previously. Teachers often have more flexibility in determining unit and lesson structure and objectives.

Unit planning is an intermediate step between curricular planning and lesson planning. Units comprise related lessons that together address a common topic or theme. A unit can last anywhere from a week or two to a month or more, depending on the topic and the age of the students.

Units may be subject-focused or interdisciplinary. "Nouns" (in elementary Language Arts), "Electricity" (in middle-school science), and "The Civil War" (in middle-school

social studies) are subject-focused units; each addresses a single topic or theme within one content area. Within a subject-focused unit, each individual lesson addresses one or several related components of the overall topic (e.g., proper nouns, collective nouns, mass nouns versus count nouns, etc.). Typically, standard textbooks are arranged in (subject-focused) units, with each chapter representing one unit.

In contrast, interdisciplinary units are designed to include multiple content areas, all focused on the same theme. Themes of interdisciplinary units are frequently realistic and focused on student interests and experiences outside the classroom. For example, "Recycling" is an interdisciplinary unit that may include science (e.g., chemistry involved in organic waste), social studies (e.g., history of Earth Day), language arts (e.g., writing letters to the editor or essays), and math (e.g., computing volume and surface area of compacted trash). Effective teachers plan learning activities directed toward important global issues, and well-designed interdisciplinary units address those issues as they integrate ideas from different content areas.

Planning interdisciplinary units can be challenging at the middle-school and secondary levels because it usually requires cooperation and collaboration among teachers from different classes and/or disciplines. First, teachers need to agree on a theme, a process that can involve brainstorming sessions to identify and share content objectives. Next, teachers must address and reconcile sometimes disparate teaching methods, goals, and assessment measures while planning specific and integrated lessons. Teachers need also to share specific resources and discuss how content-specific activities can be used for an interdisciplinary goal. Finally, collaboration for interdisciplinary units should involve shared reflection after the unit is complete; the teachers should honestly evaluate themselves, each other, and the success of the unit as a whole.

At the primary levels, interdisciplinary units tend to be planned within single classes or sometimes across grades. Some teachers create **curricular webs** for unit planning. Curricular webs are graphical representations that show interrelationships among course content and are used when planning interdisciplinary units. Webs are nonlinear, fluid unit plans that allow teachers to move cohesively to any element within the web as teachable moments arise.

Curriculum webs are **advance organizers** used within an emergent curriculum, an idea based in part on constructivist theories of learning. An emergent curriculum often begins with a general idea of student and teacher interest and progresses based on interactions among the teacher and students, rather than along a predetermined plan developed in advance by the teacher. It requires flexibility and creativity on the

part of the teacher but is often seen as more fun, more relevant to contemporary issues, and more meaningful to students.

Unit planning thus involves selecting the appropriate topic or theme, determining whether the unit will be interdisciplinary or subject-focused, developing individual but integrated lesson plans, planning learning activities, selecting appropriate resources for those activities, and designing assessments to measure student learning. Note that unit planning can emphasize a cognitive component (e.g., addressing specific information-processing skills to be used), a constructivist component (e.g., encouraging students to develop and test their own hypotheses through interactions with the environment), a social learning component (e.g., modeling during an internship or field trip), and/or a behavioral component (e.g., with an emphasis on rewarding appropriate behaviors).

Because units comprise lessons, **lesson planning** is a necessary component of unit planning. Lessons typically are conducted in a single class period; lesson plans most commonly include a breakdown of class time by activity, indicate the content to be introduced and/or practiced, and identify the materials and procedures by which that content will be delivered. When planning lessons, effective teachers specify the topic and objectives for the lesson (which should be clearly tied to the unit goals and should specify measurable outcomes), any relevant prerequisites, the methods by which the material to be learned will be presented and practiced, and some plan for evaluation of student learning (see Chapter 9 of this tutorial for a detailed discussion of formative and summative assessment). Note that assessment should measure student achievement as well as the effectiveness of the instruction and the lesson or unit.

Planning for a Diverse Classroom

One sometimes-forgotten but very important component of lesson planning involves preparing adequately to meet the needs of a diverse student population. As discussed in Chapter 4 of this tutorial, most classrooms will include students with a range of abilities, interests, background preparation, and motivations. As a result, many school districts and state departments of education recommend that lesson plans directly address this diversity with the inclusion of sections for enrichment and remediation.

Enrichment. Enrichment refers to the provision of activities that go beyond the basics of the curriculum—additional topics and activities that can be used to keep gifted students motivated, highly motivated students engaged, or simply all students increasingly involved in a topic of interest.

Remediation. Remediation also adds to the curriculum, but usually for the opposite reason—remediation is provided when students need additional practice or alternative approaches to master the basic curricular material. Well-planned remediation activities are especially important when a classroom includes students with learning disabilities or English language learners; because these students must be adequately and fairly accommodated, effective teachers think about their needs as they plan the lesson, not just after a difficulty arises. Remediation tends to be individually focused, for example, extra assistance such as tutoring (by peers or more-experienced individuals), additional worksheets or exercises, and directed feedback with scaffolding.

Note that enrichment and remediation can, but need not, involve pull-out instruction (i.e., separating the special-needs students from the rest of the class). Teachers can provide individual enrichment activities (e.g., extra reading) or activities in which the entire class participates (e.g., field trips to the local science museum); they can plan a variety of remediation activities at different levels to ensure that all students' needs are met.

Moreover, note that effective enrichment and remediation, either within the classroom or as pull-out instruction, often require assistance from specialists and para-educators. These individuals play important roles in all instruction and should be included throughout the planning process. Typical specialists include special-education teachers, library media specialists, teachers of the gifted and talented, IEP team members, counselors, or English language specialists. **Para-educators** (or **paraprofessional educators**) are individuals who are supervised by teachers or other professionals and can include teachers' aides, instructional assistants, communication aides, and, in some cases, work-study students from local colleges or universities. In general, para-educators provide direct services to students and their families, such as tutoring, parents' activities, translation, and library assistance. Especially when supervised by the classroom instructor, the activities and support for para-educators should be addressed as part of lesson planning.

Identifying Additional Resources

Developing lessons to help students meet educational objectives, especially in today's increasingly complex digital environment, requires thorough understanding of the resources and materials available to support student learning. Specifically, teachers should be prepared to identify and use, in addition to textbooks and other standard curricular materials, the following:

- A library collection (books, magazines, pamphlets, reference works)

- Computers, the Internet and other electronic resources
- Videos, DVDs
- Artifacts, models, manipulatives
- Guest speakers and community members

Students are increasingly using multimedia resources at home as well as in school, and technology-rich learning environments are becoming more readily available both for direct instruction (e.g., computer-based tutoring systems) and as supplemental support (e.g., problem-based learning simulations). Manipulatives and other hands-on materials help facilitate active learning and can make abstract ideas more concrete, which may be especially helpful for students in lower grades. Guest speakers can serve as models for students and can increase communication and help to develop positive relations between the school and the home and community.

When selecting new technologies or other hands-on learning materials, teachers should be sure to let the pedagogy drive the technology and not the reverse. In other words, resources should be selected because they provide something special to help students achieve their learning goals and not simply because they are new or attention catching. Most important is recognizing how to select content to achieve lesson and unit objectives.

Chapter 5: Instructional Strategies

Having set learning goals based on the type of thinking skills expected of students, teachers must identify the most appropriate instructional strategy to meet those goals. Instructional strategies vary along a continuum, from largely teacher-directed to largely student-directed strategies. The choice of instructional method depends on the objectives the teacher wants the students to achieve, and no single model is most effective for all students or for helping students reach all learning objectives. Additionally, the choice of instructional strategy depends on the cognitive processes that are expected of the students during the lesson, as discussed throughout this chapter.

Types of Instruction

Teacher-Directed Instruction

Teacher-directed instructional strategies are so named because the teacher controls the content and the progression of the lesson. One primary model of teacher-directed instruction is thus known as **direct instruction**. Direct instruction is not just one-way presentation of material by the teacher — it can take many forms, including lectures, demonstrations, drills, guided practice (e.g., seatwork with teacher assistance as needed), and opportunities for independent practice (e.g., homework). Because this method allows teachers to present a large amount of material to many students in a relatively short time, it is most appropriate for teaching basic and lower-level thinking skills such as concept learning and recall or recognition of facts, procedures, formulas, and other content (see Chapter 3 of this tutorial for additional details on information

processing and the memory model). Direct instruction is best used for material that is difficult for students to learn independently and may be especially useful for students with learning disabilities.

Student-Directed Instruction

Indirect instruction, in contrast, is a **student-directed (or learner-directed)** model. The teacher sets up the environment and provides a basic framework for the learning activities but then serves as a facilitator for (i.e., **scaffolds** learning; see Chapter 3 of this tutorial) student interaction and thinking, rather than as a primary source of information; the student serves as the "director" of the learning process. Indirect instruction generally encourages higher-level (i.e., critical) thinking. Note, however, that direct and indirect instruction are often used together within a lesson or curricular unit. Instructional strategies and cognitive processes associated with indirect instruction include:

- Problem solving, including **critical** and **creative thinking**.
- Reading for meaning (may involve summarizing or sequencing information, making inferences, **inductive** and **deductive reasoning**, and predicting outcomes or events).
- Inquiry (e.g., gathering information about an issue or problem; may involve evaluating, comparing and contrasting, synthesizing, and generalizing).
- Case studies (e.g., detailed analyses of particular individuals, situations, or events; may include summarizing, analyzing, making inferences, and generalizing beyond the case).
- Concept mapping (e.g., developing graphical representations of links among topics and concepts; may include categorizing, sequencing, and comparing and contrasting).
- Cloze procedures (e.g., using context to fill in missing words in a paragraph or story; may involve evaluating, making inferences, deductive reasoning, and decision making).

Another student-directed instructional model is ***experiential learning***. In this instructional model, students engage in some type of activity, which they analyze and share with classmates. Examples of experiential learning include field trips, experiments, simulations, role playing, games, and observations. Experiential learning emphasizes higher-order thinking skills, with a focus on the learning process itself. For example, the primary goal of an activity in which students observe animals at the zoo may be for students to become objective observers, with conceptual knowledge about the specific animals as a secondary goal. Experiential learning also encourages planning, questioning, and inductive reasoning, as well as transfer of knowledge from one situation to another. Experiential learning often allows teachers or experienced mentors to serve as models or coaches.

Educators use the term ***interactive instruction*** to refer to educational activities that emphasize discussion and cooperation among participants. Interactive instruction is largely student-directed and can take any of the following forms:

- Brainstorming (e.g., free association or unedited, stream-of-consciousness generation of ideas)
- Cooperative learning groups (e.g., students work in small groups to achieve a common goal, with success based in part on the collaborative interactions among the participants)
- Interviews
- Discussions
- Peer practice
- Debates

Interactive instruction encourages higher-level thinking, such as questioning, problem solving, and metacognition, as well as development of social skills. Interactive instruction also may provide practice in distinguishing fact from opinion, detecting bias, comparing and contrasting, and generalizing. During interactive activities, the teacher can scaffold student learning and model appropriate behaviors.

Independent instruction is perhaps the most student-directed model of instruction; in this approach, teachers may (or may not) initiate a project, but the learner generally takes responsibility for setting goals, planning learning activities, and completing the work. Independent projects can take the form of learning contracts, research projects, computer-mediated instruction, and distance learning. A particular strength of independent instruction is that it encourages student self-reliance, self-regulation, and self-evaluation. Effective teachers can help students learn to set goals, manage their time, monitor their own progress, and reflect on their achievements.

This discussion is not exhaustive; many different instructional strategies are available to teachers (see Table7.1). Effective teachers make careful and wise choices, based on the particular learning objectives, the content of the lesson, and the characteristics and abilities of the students.

Table 7.1 Choosing an instructional strategy

You Might Use…	When…	For Example, You Might…
Expository instruction(e.g., lectures, textbook readings)	• The *objective* is to acquire new information. • The *lesson* involves information best learned within a specific organizational structure. • *Students* have some capacity for abstract thought, have	• Describe critical battles of World War I to advanced history students. • Demonstrate several defensive strategies to a junior high school soccer team.

	knowledge to which they can relate new material, and have effective learning strategies for the medium in question (e.g., note-taking skills for lectures, comprehension-monitoring skills for reading assignments).	
Direct instruction	• The *objective* is to learn a well-defined body of knowledge and skills. • The *lesson* provides critical information or skills for later instructional units. • *Students* need considerable guidance and practice in order to learn successfully.	• Explain how to add fractions with different denominators, and give students practice in adding such fractions both in class and through homework. • Demonstrate how to use a jigsaw, and watch carefully as students use the tool to cut irregularly shaped pieces of wood.
Computer-based instruction	• The *objective* is to acquire basic knowledge and skills. • The *lesson* involves information that students can learn from reading text or from watching and listening to multimedia presentations. • *Students* have some familiarity with computers and can work with only minimal guidance from their teacher.	• Use a typing-skills tutorial that helps students develop automaticity in keyboarding. • Use educational software designed to teach the basics of musical notation. After students have mastered the basics, follow up with *music editor*software that allows them to experiment with different notes, keys, instrumental sounds, and time signatures.
Teacher questions	• The *objective* is to check for understanding and elaborate on a topic in greater depth. • The *lesson* involves complex material, such that frequent monitoring of students' learning is essential, mental elaboration of ideas is beneficial, or both. • *Students* are unlikely to elaborate spontaneously or to monitor their own	• Ask questions that promote recall and review of the previous day's lesson. • Ask students for examples of how nonrenewable resources are recycled in their own community.

	comprehension effectively.	
Homework	• The *objective* is to learn new yet simple material, gain additional practice with familiar information and procedures, or relate classroom subject matter to the outside world. • The *lesson* involves a task that students can complete with little or no help from others. • *Students* have sufficient self-regulation skills to complete the task independently.	• Have students read the next chapter in their health book and answer several questions about its content. • For a unit on migration, have students find out what state, province, or country their parents and grandparents were born in.
Mastery learning	• The *objective* is to learn knowledge or skills very well (perhaps to automaticity). • The *lesson* provides critical information or skills for later instructional units. • *Students* vary in the time they need to achieve mastery.	• Have each student in instrumental music practice the C major scale until he or she can do so perfectly. • Have students practice 100 single-digit addition facts until they can answer all of the facts correctly within a 5-minute period.
Class discussion	• The *objective* is to achieve greater conceptual understanding, acquire a multisided perspective of a topic, or both. • The *lesson* involves complex and possibly controversial issues. • *Students* have sufficient knowledge about the topic to offer informed ideas and opinions.	• Ask students to discuss the ethical implications of Harry Truman's decision to drop an atomic bomb on Hiroshima. • Ask groups of four or five students to prepare arguments for an upcoming debate on the pros and cons of increasing the minimum wage.
Cooperative learning	• The *objective* is to develop the ability to work cooperatively with others on academic tasks. • The *lesson* involves tasks that are too large or difficult for a	• Have groups of two or three students work together on complex, multifaceted mathematical problems. • Have students in a Spanish class work in small groups to

	single student to accomplish independently. • *Students'* cultural backgrounds emphasize cooperation rather than competition.	write and videotape a soap opera episode spoken entirely in Spanish.
Discovery learning	• The *objective* is to gain firsthand experience with a phenomenon. • The *lesson* involves information that can be correctly deduced from experimentation or other personal experience. • *Students* have enough knowledge to interpret findings correctly but may have trouble learning from strictly abstract material.	• Ask students to find out what happens when two primary colors of paint (red and yellow, red and blue, or yellow and blue) are mixed together. • Conduct a simulation activity in which students discover firsthand how it feels to experience "taxation without representation."
Computer-based research	• The *objective* is to gain information literacy skills, especially in use of the World Wide Web. • The *lesson* requires information not readily available in the classroom. • *Students* have some familiarity with computers, Internet software (e.g., Web browsers), and search engines.	• Ask students to identify demographic differences among various regions of theUnited States using data from the U.S. Census Bureau. • Have students learn about current events by visiting the Web sites of national news bureaus and news magazines.
Peer tutoring	• The *objective* is to learn basic knowledge or skills. • The *lesson* contains material that can effectively be taught by students. • *Students* vary in their mastery of the material, yet even the most advanced can gain increased understanding by teaching it to someone else.	• Have students work in pairs to test each other on their conjugations of irregular French verbs. • Have some students help others work through simple mathematical word problems.

Authentic activities	• The *objective* is to apply class material to real-world situations. • The *lesson* involves synthesizing and applying a variety of knowledge and skills. • *Students* have mastered the prerequisite knowledge and skills necessary to perform the task.	• Have students construct maps of their local community, using appropriate symbols to convey direction, scale, and natural and man-made features. • Have students write a résumé using a word processing program.

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Classroom Composition and Grouping Techniques

When planning and selecting an instructional strategy, consideration of the classroom composition and student grouping is key for successful learning. Direct instruction in the form of lecture or lecture-discussion may be best with the whole class, although it's important to keep in mind that even in communities where the population is not very diverse, the students in any one classroom can be quite different from another: They will likely differ in terms of their background knowledge, learning preferences, demographic characteristics (e.g., race, sex, socioeconomic level of the family), and motivation. This diversity generally benefits the students, although research suggests particular benefits for all-girl or all-boy schools and/or instruction on particular topics (e.g., teenage girls may prefer to take health or sex education classes in single-sex classrooms; in some cases communities may encourage that the school administration make this accommodation). Furthermore, although many schools still favor tracking and other forms of **ability grouping**, research suggests that both high-achieving and lower-achieving students do well in classrooms where ability levels are mixed (i.e., **heterogeneous ability grouping**), if teachers are attuned to individual student needs and carefully plan classroom activities to address them.

Many student-directed instructional strategies require small groups or pairs. In true cooperative learning, for example, students are each responsible for the other students' learning, which requires that they be placed into manageable groups. Group work of this sort encourages **collective self-efficacy**, a shared belief that students can be successful when they work together on a task. Independent work is, by definition, independent, but teachers can use one-on-one conferences to guide the project initially and to provide feedback, or small groups or pairs for students to share their final products and reflections with one another.

Teachers may place students into groups randomly (e.g., by counting, by drawing names) or more systematically, depending on the lesson objectives. Heterogeneous grouping (i.e., grouping students with diverse abilities) can be beneficial in **collaborative learning**, in which students work as a team. **Cooperative learning** is a form of collaborative learning in which students work together to achieve a common goal. During cooperative learning activities, students both teach and learn from their peers; there is direct social interaction among group members and shared responsibility for each others' learning and for any final product or outcome. For some cooperative projects, teachers may choose to join classrooms, including those with different-age students. In fact, nongraded elementary schools can be effective, as long as the grouping allows the teachers to attend to students' abilities and interests. Note that when young students work in cooperative groups, teachers may need to provide guidance or even direct instruction on conflict resolution and the difference between shared and individual accountability.

Most important when grouping students for activities is to be sure that students are given clear instructions about their roles and their responsibilities to one another. For example, do all students contribute to all parts of a group project, or are tasks assigned and then each individual part is joined into a shared portfolio? Note that sometimes instruction on how to work in a group is necessary, especially for younger students.

Ideally, when forming cooperative groups, teachers should follow these general guidelines:

- Include students of differing abilities.
- Include students who can work together successfully (e.g., students with a history of conflict should not be in the same group).
- Establish or help students establish clear guidelines for the group process and for the expected outcomes.
- Assign individual tasks to encourage collaboration.
- Assess individual student contribution as well as the group together.

Focusing on the Individual: Differentiated Instruction

To address some of the issues raised in the discussion of grouping students, many teachers have adopted the technique known as **differentiated instruction**. Differentiated instruction is often used with special-needs students (i.e., gifted students, those with learning disabilities) and English learners. It can easily be adapted to all classrooms. The theory behind differentiated instruction is that to accommodate student diversity, teachers should plan instruction that matches students with tasks best suited to their needs and in some cases allows students to make

choices for their learning. For example, teachers can differentiate the content of a lesson (e.g., specifically link to relevant individual experiences or students can choose to learn more or less about a particular topic); they can differentiate the process by which students learn (e.g., group work, peer tutoring, or independent work); or they can differentiate the required product by which students express what they've learned (e.g., a project, a term paper, a film, a bilingual product). Differentiated instruction can have the added benefits of increasing student motivation and self-regulation skills.

Beyond Planning: Flexibility and Feedback

As discussed in Chapter 8 of this tutorial, effective teachers recognize the importance of reflecting on, analyzing, and evaluating the effectiveness of the instructional strategies they choose. Classroom teaching, regardless of instructional strategy, needs to be seen as a two-way dialogue between teacher and students in which all participants monitor learning and help drive the classroom experience.

Most important, effective teachers must check for student understanding regularly, especially when working with students at risk, such as English language learners or students with other special learning needs. If students don't understand a particular concept, teachers need to select alternative strategies or in some cases adjust the lesson or unit plans to ensure that learning takes place. In some cases, teachers may have planned specific approaches to check for understanding as well as approaches to enrich or remediate the lesson. For example, a lecture-discussion on civics could be enriched with authentic activities such as one-day "internships" at City Hall, or even something simpler such as a guest lecture from the town mayor or police chief. In other cases, the situation may arise unplanned, based on classroom interactions. For example, if students show particular interest in a topic that may at first seem tangential, teachers should seize the "teachable moment" and present a spontaneous lesson (e.g., a class discussion or debate in response to a student question about current events). These spontaneous activities can be energizing for a teacher and especially meaningful for students.

Chapter 6: Communicating with Students

A positive classroom climate conducive to learning may be the most important component of any instructional experience. Effective teachers plan for and emphasize a sense of community and belongingness. Such a community requires successful communication with and among students. Communication takes many forms, including verbal and nonverbal modes, both of which are discussed in this chapter.

Verbal Communication: Considering Both Content and Method of Delivery

Successful verbal communication requires attention not only to the content of the message itself but also to the way the message is phrased. **I-messages** are particularly effective when addressing discipline problems. I-messages are phrased to emphasize how students' behaviors directly affect the teacher's feelings and/or ability to teach the class. For example, "I have trouble hearing other students ask their questions when you are talking, and I need to be able to hear them to be a good teacher" is a nonjudgmental I-message that lets students know some of the problems with talking out of turn.

Teachers need also to attend to the method of delivery. For example, teachers must moderate their tone of voice and overall inflection, including the way they stress or emphasize words or phrases. For example, raising one's voice in anger is frequently

less effective than conveying the same message in a neutral but authoritative tone. Important communication skills for teachers include

- Speaking in an audible, clear, and pleasant tone, with variation for emphasis
- Controlling volume and stress appropriately
- Enunciating properly when speaking
- Using correct grammar in both spoken and written language
- Using correct spelling and age-appropriate language in written communications

Asking Questions

A well-developed area of research on effective verbal communication is teacher questioning. In the classroom, teachers often ask questions to evaluate student learning or to structure and guide discussion, especially in direct instruction (see Chapter 7). Teachers may also ask questions to encourage participation or increase motivation. For example, teachers can begin a discussion by asking how the topic under study is related to or reflected in one's own life. Other reasons to ask questions in class include

- Capturing or maintaining attention
- Developing interest
- Evaluating students' preparation and determining prior knowledge (e.g., "Does anyone know…")
- Reviewing previous lessons (e.g., "Who remembers…")
- Engaging students in discussion ("Who wants to state his or her opinion on…")
- Guiding thinking (e.g., "Did you consider…")
- Developing critical and creative thinking skills (e.g., "What might happen if…")
- Checking for comprehension or level of understanding (e.g., "Can you explain, in your own words…")
- Summarizing information (e.g., "What's the take-home message of…")
- Stimulating students to pursue knowledge on their own (e.g., "What questions do you still have about…")

One question can serve many purposes, and in fact, varying question type within a lesson is one way to keep students' attention.

Teachers use many different types of questions, and effective teachers select a question type based on the learning objectives of the lesson. Some questions

are **lower-level questions** that focus on information already learned (see the lower levels of Bloom's cognitive taxonomy, discussed in Chapter 6 of this tutorial). Teachers frequently use lower-level questions to evaluate their students' knowledge of lesson content. For example, during lessons, many teachers ask direct, **convergent questions** that require recall of key concepts: "And what is the genus name for this group of animals?" This type of question, which has only one correct answer, can also be used as review to introduce new material or remind students of basic material that forms the foundation for a new lesson: "Yesterday we talked about right triangles. Who can explain what makes a triangle 'right'?" Convergent questions are common in lower grades and introductory classes and often include key words such as *recall*, *when,* or *define*.

Other questions are considered **higher-level questions**. These questions may ask students to go beyond information they have learned (e.g., think of new examples, apply concepts to new situations), guide thinking (e.g., develop and test new hypotheses), and develop creative or critical thinking skills (e.g., make inferences or judgments).
Effective higher-level questions guide students to the following cognitive processes, among others:

- Reflect (focus inward and use metacognitive skill; e.g., "What is the most important thing you learned in class this week?")
- Challenge assumptions (focus inward and use critical analysis; e.g., "Ships that are made of steel are heavy, yet they don't sink in water. Why not?")
- Transfer knowledge (focus on application to new concepts; e.g., "Would a ship made of glass float or sink? What about a ship made of Styrofoam but filled with people?")
- Find relations among concepts or ideas (e.g., "How are arachnids similar to and different from insects of the order hymenoptera?")
- Draw conclusions (e.g., "Did the data support the hypothesis? What have we learned from this experiment?")

Higher-level questions tend to be **divergent questions**, ones for which many different answers are correct, and often include key words such as *classify, analyze, design, criticize,* or *justify*. However, note that higher-level questions often tap lower-level thinking as well: For example, students need to understand and remember what they've learned previously to be able to apply the content to new situations.

Characteristics of Effective Questioning

Regardless of the type or format of the question, effective teachers have good communication skills that allow them to ask questions in the most constructive way. Indeed, the characteristics of effective questioning described here go beyond

just questioning and also influence other classroom behaviors (e.g., lecturing, managing behaviors, directing activities). In addition to the suggestions presented in Figure 8.1, keep in mind the following three basic principles.

First, questions should encourage participation. Sometimes teachers need to call on individual students, but other times they can design activities in which students ask each other questions. As participation increases, students are better able to develop their own links among concepts and to draw on their previous knowledge and interests.

Second, teachers need to allow appropriate **wait time**. Wait time is defined as the length of time a teacher pauses, after either asking a question or hearing a student's comment, before saying something. Many teachers allow only a second or less of wait time before calling on a different student, paraphrasing the question, or providing the answer. This wait time is too short for most students to formulate and articulate a response. Research suggests that increasing wait time to 3 seconds or more encourages more students to respond, and their responses tend to be more insightful, well-reasoned, and directed toward the classroom discussion.

Third, as students begin to respond to questions and participate in discussion, teachers have the added responsibility to help students articulate their ideas. They can ask additional questions, either for content (e.g., "Can you think of a good example of that idea?") or for clarification (e.g., "Can you explain to the class what you mean when you say the poem is 'uninspired'?"). Note that helping students to articulate ideas goes beyond just asking questions and includes verbal and nonverbal **prompting**: "Tell me more" or a nod can encourage students to expand on their ideas. Additionally, teachers (or other students) can restate what a student has said, using **reflective listening** skills (e.g., "So, your idea is …" or "It sounds as if you think…; is that correct?"). A reflective listening approach is based on the perspective that with a bit of scaffolding and attention to feelings, the student can solve the problem or explain the idea himself or herself. Reflective listening is one component of **active listening**, in which individuals work together to ensure that the message sent was the message received.

Figure 8.1 Asking questions to promote and assess learning.

- ***Direct questions to the entire class, not just to a few who seem eager to respond.***

  The girls in a high school science class rarely volunteer when their teacher asks questions. Although the teacher often calls on students who raise their hands, he

occasionally calls on those who do not, and he makes sure that he calls on every student at least once a week.

- ***Have students "vote" when a question has only a few possible answers.***

  When beginning a lesson on dividing one fraction by another, a middle school teacher writes a problem on the chalkboard. She asks, "Before we talk about how we solve this problem, how many of you think the answer will be less than one? How many think it will be greater than one? How many think it will be exactly one?" She tallies the number of hands that go up after each question and then says, "Hmmm, most of you think the answer will be less than one. Let's look at how we solve a problem like this. Then each of you will know whether you were right or wrong."

- ***Ask follow-up questions to probe students' reasoning.***

  In a geography lesson on Canada, a fourth-grade teacher points out the St. Lawrence River on a map. "Which way does the water flow, toward the ocean or away from it?" One student shouts out, "Away from it!" "Why do you think so?" the teacher asks. The student's explanation reveals a common misconception that rivers can flow only from north to south, never vice versa.

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Creating a Climate for Questions

Of course, questioning techniques are most effective when a teacher has established a noncritical environment in which students feel comfortable asking and answering questions. Such an environment is created when the teacher and students respect other students' responses even when beliefs are different from one's own. In a noncritical environment, teachers must handle incorrect answers gracefully and without judgment; in particular, teachers should make an effort to understand why the student had a misconception or produced an error (e.g., "I can see why you'd think that … I think you were using the wrong operand. You divided the numbers … if you multiply instead, what do you get? And why should you multiply instead of divide?").

Development of a noncritical environment, then, requires that teachers know and employ strategies for promoting a safe and open forum for discussion. Key among these strategies are establishing and maintaining standards of conduct for discussions and promoting active listening skills. Depending on the topic and the situation, teachers should consider whether students will feel most comfortable posing questions anonymously, privately via email, in small groups with peers, or in open classroom

discussion. A successful **community of learners** will engage all learners in creating a collaborative environment that supports risk taking and respects alternative outlooks.

Nonverbal Communication

Not all communication is done verbally — nonverbal communication plays a large role in the classroom, and elsewhere. Examples of nonverbal communication include:

- *Gesture*. Hand movements (e.g., pointing) can be used to capture or direct attention, and nodding can be used to indicate assent or agreement. Raised eyebrows and winks can also quietly affect student behavior.

- *Eye contact*. Direct eye contact can be used to encourage tentative students to respond to questions orally or to engage in discussion. Eye contact for several seconds can also provide a cue to misbehaving students without embarrassing them.

- *Body language and facial expression* are especially important in these situations — smiles and frowns can go a long way to encourage or discourage behaviors. Note that you'll want to respect students' personal space while also recognizing when to step into it.

Communication Tools

Communication is not just interactions among people — effective teachers also know how to use various communication tools to enrich the learning environment. Teachers can move beyond texts and worksheets to take advantage of contemporary trends in technology. For example, overhead projectors are still favored in many K−12 classrooms, but software for digital presentation (e.g., PowerPoint®) is increasingly available for dynamic and interactive classroom use. Moreover, students themselves can use this type of technology for presentations, portfolios, and other class projects. Indeed, with the explosion of the World Wide Web, students can conduct research not only with the printed material in the library but also with the vast wealth of Internet resources. Remember, however, that most students need instruction and supervision to sort through and identify relevant and trustworthy information.

Other new technology is also available and useful in educational settings — word processors alter and simplify the editing process for some students, digital encyclopedias provide new and current resources, instant-messaging clients and online discussion forums encourage increased communication among students within the classroom and more broadly around the world, video games and simulations can encourage critical thinking, and of course many new computer programs

(i.e., **computer-based instruction**, **hypermedia**) are designed specifically as educational tools and tutorials.

Additionally, students like and attend to recordings, both audio and visual, that provide concrete illustrations of new concepts (e.g., photographs that show animals or plants, popular rap songs that reflect trends in poetry) or allow them to relate classroom content to popular culture images (e.g., discussing whether an adapted screenplay accurately captures the tone of a classic novel). CDs, DVDs, and online streaming video are among the resources currently available to teachers for this purpose.

Note that communication tools enhance classroom teaching — they don't replace it. Teachers should plan to integrate these types of material successfully into a lesson that may also include lecture or discussion. Furthermore, teachers may need to scaffold students' use of new media, attending to important information despite potential distractions (e.g., Internet advertisements, music, or clip art).

Diversity in Communication Styles

For all types of communication and when employing any communication tools, teachers must attend to the diversity of the student population with which they work. For example, as discussed in Chapter 2 of this tutorial, in some cultures asking questions is seen as rude; students from those backgrounds may thus be reluctant to ask questions even when they don't understand. In some cultures, speaking at the same time is discouraged, whereas in others overlapping utterances are seen as co-constructing a dialogue and thus a method of affiliation. Other research has focused on gender differences in communication style — in the classroom, for example, boys tend to be more active than girls, asking more questions and needing less wait time to respond. Teachers need to be sensitive to these differences and in some cases be proactive —indirectly, perhaps by calling on girls without their hands up, even if several boys have their hands waving, or in some cases directly, through a dialogue with the class or individual students, as long as it is conducted in a nonevaluative way.

Chapter 7: Assessment Strategies and Measures

Assessment refers to the process of drawing inferences about a student's knowledge and abilities based on a sample of the student's work. The product of assessment certainly influences admission to higher education and career opportunities, but assessment goes well beyond just assigning grades. When used successfully, assessment results can provide valuable information about students' achievements and motivations to teachers, parents, students, and educational administrators as well as information about the success of the teacher in meeting his or her personal and professional goals.

Effective teachers consider assessment when first planning a lesson, and many make the assessment tools (e.g., **rubrics**, scoring systems) available to students at the start of the lesson to help them focus their attention on the learning goals, identify the cognitive processes necessary to achieve those goals, and provide ongoing feedback about what has and has not yet been learned. To be useful, assessments must be clearly tied to learning objectives and any content standards, but they should also be flexible enough that the teacher doesn't end up "teaching to the test." Wise teachers also realize that no single assessment measure should serve to determine a student's achievements, aptitudes, or abilities.

Assessments come in many forms and can be used to serve many purposes. This chapter presents commonly used assessment formats and measures along with a

discussion of how and when they are best applied. What's critical is that the proper assessment be selected for the intended purpose. For example, if the instructional objective involves students' ability to use various scientific formulas successfully in hypothesis testing, then any assessment should measure those procedures, rather than merely recall the formulas themselves. If the instructional goal includes students' use of proper spelling in an essay, the assessment should require students to write an essay, rather than identify misspelled words, either in or out of context.

The Purpose of Assessment

Assessment can be used for formative, summative, or diagnostic purposes. **Formative evaluations** are designed to provide information regarding what students know and can do before or during instruction. For example, a geography teacher may interrupt a lecture to say, "Please make a list of all the state capitals you can think of right now," or an English teacher might say, "Take out your journals and summarize the main points we've been discussing today." Use of formative assessment helps to drive the direction of the lesson — allowing teachers and students to judge whether the lesson is going well, whether students need additional practice, or whether more information needs to be provided by the teacher. Teachers engaging in reflective practice often use formative assessments to evaluate their own achievements in light of student performance as well (e.g., how well am I getting the point across? am I providing enough opportunities for critical thinking? etc.).

Whereas formative assessments generally address the question, "What are students learning?" **summative evaluations** address the question, "What have students learned?" In other words, summative assessments provide information regarding what students know or have achieved following instruction. Final exams are summative assessments; so are high-stakes achievement tests. As with all assessments, it's critical that any measure designed for summative assessment adhere closely to the learning objectives.

Diagnostic assessments are intended to identify what students know before instruction. Although sometimes used as pretests at the start of a term or unit, diagnostic tests are more commonly used to identify exceptionalities in learning, including disabilities and giftedness (see Chapter 4). IQ tests, for example, were originally designed for diagnostic purposes. Diagnostic assessments are frequently conducted outside the classroom by education specialists or school psychologists.

Assessment Measures

Informal assessments are spontaneous measures of student achievement. For example, teachers who listen to the types of questions students ask during a lesson are informally assessing the degree to which they comprehend the lesson. Similarly, when teachers observe children during daily tasks — at play, with peers, at their desks, during routines — they are informally assessing them. Informal assessments are not graded and are primarily used for formative purposes: Data collected via informal assessments offer continuous feedback regarding the daily lessons, classroom experience, student motivation, and so on.

Formal assessments, in contrast, are planned and structured, although they can be used for formative as well as summative evaluation. For example, a pop quiz can be formative if the teacher uses the information not as an assessment of each students' final knowledge but rather to identify areas that need additional instruction, whereas the same quiz at the end of a unit may be summative. A variety of measures can be used for formal assessments.

Testing

Written tests may be the most commonly used assessment measures. **Objective tests** (i.e., selected responses) include multiple-choice and matching tests. This type of test is popular for many reasons, including that they can be scored easily and objectively and are efficient and usually inexpensive to administer. Because many objective tests require students to recognize a correct answer, they are best used to assess lesson content that is highly structured or concrete; however, well-designed objective tests can also be used to assess higher-level thinking, such as application or analogical reasoning.

Essay tests, also known as free-response tests, are an alternative to objective tests; essays require students to create their own answers, rather than select from a set of possible responses. Essays can be quick to construct, although they can be challenging to grade fairly. They are, however, a good teaching tool as well as an assessment measure: When students create responses on essay tests, they are likely to engage in higher-level thinking skills and are better able to transfer their knowledge to other situations outside the testing environment.

Standardized tests are developed by test construction experts and are used in many different schools or settings — in this case, *standardized* means that everyone takes the same test in the same way. Standardized tests can include both objective and essay components — the SAT is an example of a standardized test with both selected-response items (i.e., the verbal and math sections) and a free-response section (i.e., the

writing test). In the era of **high-stakes testing**, standardized tests are becoming more common.

Standardized tests can be used to measure achievement, aptitude, or ability. Table 9.1 provides descriptions and comparisons of these types of standardized tests.

Table 9.1 Commonly Used Standardized Tests

Kind of Test	Purpose	General Description	Special Considerations
Achievement tests	To assess how much students have learned from what they have specifically been taught	Test items are written to reflect the curriculum common to many schools. Test scores indicate achievement only in a very broad and (usually) norm-referenced sense: They estimate a student's general level of knowledge and skills in a particular domain relative to other students across the country.	• These tests are usually more appropriate for measuring general levels of achievement than for determining specific information and skills that students have and have not acquired.
General scholastic aptitude and intelligence tests	To assess students' general capability to learn; to predict their general academic success over the short run	Test items typically focus on what and how much students have learned and deduced from their general, everyday experiences. For example, the tests may include items that ask students to define words, draw logical deductions, recognize analogies between seemingly unrelated topics, analyze geometric figures, or solve problems.	• Test scores should not be construed as an indication of learning potential over the long run. • Individually administered tests (in which the tester works one-on-one with a particular student) are preferable when students' verbal skills are limited or when exceptional giftedness or a significant disability is suspected.
Specific aptitude and ability tests	To predict how well students are likely to perform in a specific content domain	Test items are similar to those in general scholastic aptitude tests, except that they focus on a specific domain (e.g., verbal skills, mathematical reasoning). Some aptitude tests, called *multiple aptitude batteries*, yield subscores for a variety of domains simultaneously.	• Test scores should not be construed as an indication of learning potential over the long run. • Tests tend to have only limited ability to predict students' success in a particular domain and so should be used only in combination with other information about students.

Adapted from J. Ormrod. (2009). *Essentials of Educational Psychology* (2nd ed, p. 391). Columbus, OH: Merrill. To purchase a copy of this book, click here.

Alternatives to Testing

Alternative assessment approaches include observations, performance evaluations, portfolios, and conferencing, among others. Used alone or in combination with testing, these qualitative assessments can provide a more complete picture of a student and his or her achievements and abilities.

Direct observations of what students say and do in the classroom can be recorded as **anecdotal** or **running records**, which qualitatively capture the flavor of the behaviors, or they can be guided by **checklists** or **rating scales** that allow teachers to quantify the observations. These techniques can be used individually or in combination. For example, a teacher may keep a detailed account of behavior as it occurs (e.g., a running record of playground activity that includes aggression among children) and may then use a rating scale to evaluate a particular behavior that occurs during that interval (e.g., very aggressive, moderately aggressive, relatively neutral). Direct observations can be especially useful when both verbal and nonverbal behaviors are recorded (e.g., one observation during free play can provide information about both physical coordination and social skills). Teachers can also review observational records to identify patterns of behavior over time. Note, however, that when observing, teachers must strive for objectivity, and that can sometimes be difficult when the teacher has formed expectations for and relationships with the students.

A **performance assessment** is a specific type of observation frequently used for assessment of procedural knowledge (e.g., skills; see Chapter 3 of this tutorial). In some cases, students are assessed as they perform a particular procedure (e.g., mixing chemicals in the lab, playing piano); in other cases, the product is assessed (e.g., the color of the liquid in the test tube after mixing, the piano concerto composed by the student). Performance assessments are well suited for the arts and for laboratory sciences; they are also useful as **authentic assessments** that emphasize skills used outside the classroom in the "real world." For example, a chemistry performance assessment may include the prompt, "Is this sample of water safe to drink?" Because of their relevance and hands-on characteristics, performance assessments may increase student motivation, especially when used formatively.

A **portfolio** is a collection of a student's work systematically collected over a lengthy time period. Portfolios can include any number of different items — writing samples, constructions or inventions, photographs, audiotapes, videotapes, and so on. They also frequently include **reflections**, which are the students' own evaluations and

descriptions of their work and their feelings about their achievements. Because of their diversity, portfolios can capture a broad picture of the student's interests, achievements, and abilities and are best used for summative purposes. Student selection of portfolio content and the reflection process both encourage critical thinking, self-regulation and self-evaluation, and metacognitive skills. In addition, students' pride in their work, when collected and displayed in their portfolios, may increase self-esteem and motivation.

Finally, assessments can take the form of one-to-one **conferences** between a student and the teacher. Conferences need not be oral exams; they can be an informal method for learning more about what the student knows, thinks, or feels and how the student processes learning. (See Chapter 8.) Teachers should take care to ensure that conferences are nonthreatening to students, keeping in mind that they must also be focused to yield useful results. Note that a conference may or may not include feedback — when a conference is used just for assessment, the teacher is collecting information about the student but not offering conclusions based on that information.

Self-Assessment and Peer Assessment

Teachers who focus on self-directed learning often encourage students to engage in self-assessment, in which students have input in determining their grades, based on reflection and objective evaluation of their work. In other situations, students evaluate each others' work. In this case, students should have an opportunity to challenge or discuss a peer-assigned grade.

In general, self-assessment and peer assessment allow students to serve as agents of their own learning and can lead to increased motivation for schoolwork. However, it's necessary that the teacher guide the process, sometimes by providing standards for evaluation and other times by facilitating a discussion in which students come to agreement regarding those standards and the procedures to follow. Once standards are developed, students can use checklists, rubrics, rating scales, observations, or any of the other tools described in this chapter to identify the extent to which they, or their peers, have met those standards. Journals can be particularly effective for encouraging less formal and more reflective, qualitative assessments.

Evaluating the Quality of Assessment Measures

Each assessment format just discussed has specific strengths and limitations; the choice of format ultimately depends on the specific educational context and instructional objectives. To make the determination, teachers rely on four

characteristics, which also help determine the quality of any particular assessment tool. The acronym RSVP is used to help recall these characteristics: reliability, standardization, validity, and practicality. Table 9.2 shows how the RSVP characteristics are applied in evaluating assessment measures.

The **reliability** of an assessment instrument refers to its consistency in measurement. In other words, if the same person took the same test more than once under the same conditions and received a very similar score, the instrument is highly reliable. If an assessment instrument is not reliable, teachers cannot use the results to draw inferences about students' achievement or abilities.

Standardization refers to uniformity in the content and administration of an assessment measure. In other words, standardized measures have similar content and format and are administered and scored in the same way for everyone. When tests are standardized, teachers have a way to compare the results from diverse populations or different age groups. For example, if a child takes the same standardized achievement test in both the third and fourth grades, a teacher (or the parents) can compare the results to determine how much the child learned in the intervening time. Using measures that are standardized reduces bias in testing and scoring.

The **validity** of an assessment instrument refers to how well it measures what it is intended to measure. For example, a final exam with only 10 multiple-choice questions is probably not a valid measure of the amount of information a student has learned in an entire term, nor is it likely a valid measure of the skills a student has learned during that same time period. Note that the validity of any measure depends on the purpose and context of its intended use. The same assessment instrument may be valid for some purposes and less valid for others. For example, a performance assessment may be a valid measure of laboratory skills but not a valid measure of content learned in science class. Measures that are not valid should not be used.

Practicality refers, broadly, to ease of use. For example, when evaluating practicality, teachers may ask, Is the measure affordable given the budget? Can it be administered by current staff, or with little training? Is special equipment needed? Can it be completed in the time allotted? Sometimes, measures that are standardized, reliable, and valid are simply impractical given the circumstances.

Table 9.2 Evaluating RSVP Characteristics of Different Kinds of Assessments				
Kind of Assessment	**Reliability**	**Standardization**	**Validity**	**Practicality**
Informal assessment	A single, brief assessment is not a reliable indicator of achievement. Teachers must look for consistency in a student's performance across time and in different contexts.	Informal observations are rarely, if ever, standardized. Thus teachers should not compare one student to another on the basis of informal assessments alone.	Students' "public" behavior in the classroom is not always a valid indicator of their achievement (e.g., some may try to hide high achievement from peers, others may come from cultures that encourage listening more than talking).	Informal assessment is definitely practical. It is flexible and can occur spontaneously during instruction.
Formal paper-pencil assessment	Objectively scorable items are highly reliable. Teachers can enhance the reliability of subjectively scorable items by specifying scoring criteria in concrete terms.	In most instances paper-pencil instruments are easily standardized for all students. Giving students choices (e.g., regarding topics to write about or questions to answer) may increase motivation, but it reduces standardization.	Using numerous questions that require short, simple responses can make an assessment a more representative sample of the content domain. Tasks requiring lengthier responses may sometimes more closely match instructional goals.	Paper-pencil assessment is usually practical. All students can be assessed at once, and no special materials are required.
Formal performance assessment	It is often difficult to score performance assessment tasks reliably. Teachers can enhance reliability by	Some performance assessment tasks are easily standardized, whereas others are not.	Performance tasks may sometimes be more consistent with instructional goals than paper-pencil tasks. A single	Performance assessment is typically less practical than other approaches. It may involve

	specifying scoring criteria in concrete terms.		performance task may not provide a representative sample of the content domain; several tasks may be necessary to ensure content validity.	special materials, and it can take a fair amount of class time, especially if students must be assessed one at a time.

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Recognize, too, that assessment measures, and the teachers who use them, need to be fair and unbiased. When creating or selecting assessments, teachers must look for bias in content (e.g., material known by only one culture) or in administration (e.g., assessing students with limited English-language skill is challenging). Teachers need to remain aware of the diversity of the student population when considering standardization, validity, and practicality.

Scoring Assessment Measures

Scoring selected-response measures can be quite easy, especially if the test is carefully constructed. In general, the person scoring the test must only identify whether the test taker selected the correct response for each item; scoring of this sort is objective and fast. Evaluating and/or grading the alternative assessments objectively can be much more challenging, especially when a **holistic scoring** system is used. Holistic scoring refers to an assessment method in which an overall score is determined based on the teacher's impression of the quality of work. Performance assessments, essays, and portfolios are frequently scored holistically.

In contrast, an **analytic scoring** system is a quantitative measure in which individual components of a project, portfolio, performance, or essay are scored individually and then the scores are added together to form an overall score or grade. For example, rubrics are often used to score alternative assessment measures. In general, a rubric includes a list of characteristics that responses may include and that will be considered in the evaluation. More specifically, rubrics stipulate the scoring dimensions in terms of content or process (e.g., writing style, introduction, required facts) and a scale of values for evaluating each dimension (e.g., beginner, developing, advanced; some rubrics use a point scale or letter grade). Good rubrics also include clear explanations and examples of expected responses at each level of the scale. Additionally, the individual components in the rubric are often weighted — perhaps, for example, content is weighted more than writing style. Note that, as

mentioned previously, instructors can give scoring rubrics to students at the start of a lesson to help students identify and work toward optimal performance.

Types of scores

The most common type of score, used most frequently for classroom (nonstandardized) tests, is the **raw score**. A raw score indicates the number of correct responses on a particular assessment measure. For example, on a quiz with 10 points, a student can earn 0, 1, 2, 3 points, and so on up to a raw score of 10. Interpreting a raw score requires knowledge of the test — for example, a score of 3 is only useful to someone who knows the total number of questions. For that reason, raw scores are often transformed into criterion-referenced or norm-referenced scores, especially when grades are attached.

Criterion-referenced scores specify how one student's raw score compares with an absolute standard based on the specific instructional objectives. For example, if a 100-point test is constructed to sample the content of one semester, then a student who has a raw score of 58 can be said to have mastered approximately 58% of the course material. Note that when a criterion-referenced scoring system is used, each student is evaluated against the standard (i.e., the criterion), not against other students. In many classrooms, teachers assign letter grades based on criterion-referenced scores (e.g., 90% or above = A). Note that criterion-referenced scoring systems need not be point totals; rubrics that provide detailed descriptions of expected performance at each scoring level are also criterion-referenced.

Two common types of criterion-referenced scores used in standardized testing are **grade-equivalent scores** and **age-equivalent scores**. Grade-equivalent scores are generally computed by comparing one person's performance to the average score for all students in the same grade taking the same test, and age-equivalent scores are computed by comparing one person's performance to the average score for all individuals at the same age taking the same test. For example, if the average (raw) score for all eighth graders taking a reading achievement test in the first semester is 72, then any student who scores a 72 would have an eighth-grade equivalent score; students scoring above 72 would be performing comparably to students in a later semester or in a higher grade.

In contrast, a **norm-referenced score** is determined by comparing a student's performance with the performance of others. For example, teachers using a norm-referenced scoring system may determine that the top 10% of scores earn As, the next 10% earn Bs, and so on — regardless of the students' raw scores. Many teachers

(usually incorrectly) refer to norm-referenced scoring as "grading on a curve." Norm-referenced scoring is most common in standardized testing but can also be used in other classroom settings (e.g., some instructors grade holistically rather than using a rubric: "This essay is the best in the class and thus earns an A; these two are almost as good and thus earn A-"; note the subjectivity in this type of grading).

Percentile rankings are one type of norm-referenced score. In percentile ranking, each student's individual score is compared with the individual scores of other students taking the same test at the same time. The percentile rank shows the percentage of students in the group who scored equivalent to or below a particular raw score — not the percentage of correct answers. For example, if a student accurately answered 83% of the questions on a test and had the highest score in the class, the student would have a percentile rank of 100% — 100% of the group scored at or below 83% correct. In this situation teachers would describe this student as "in the top 1% of the class."

Other types of norm-referenced scoring require an understanding of basic descriptive statistics, including measures of central tendency and variance. Measures of **central tendency** are indicators of the score that is typical or representative of all test takers (i.e., the distribution of scores). The most frequent measure of central tendency is the **mean**, which is simply the arithmetic average of a group of scores. When there are a few very high or low scores, the **median** may be a better representative of the central tendency of a group. The median is the middle score in a ranked list of scores. By definition, half the scores are larger than the median, and half are smaller. The **mode**, the score that occurs most often, is another measure of central tendency, although it's less often used to characterize student performance on an assessment measure.

Variance refers to the amount of spread among scores. The most frequently used measure of variance is the **standard deviation**, a measure of how much the scores differ from the mean. The larger the standard deviation, the more spread out the scores are in the distribution. The smaller the standard deviation, the more the scores are clustered around the mean. For example, if everyone scores a 50% on a test, the mean is 50 and the standard deviation is zero — there's no variance in the scores. If one person scores 52 and one person scores 48 on a test with a mean of 50, the standard deviation is greater than zero but still small; if many students score above 65 and below 40, the standard deviation will be relatively large.

When instructors know both the mean and standard deviation for a group of scores, they can easily determine how any individual compares with the larger

group. Sometimes, however, scores are reported as **standard scores**, which are derived from the standard deviation. A ***z* score**, for example, indicates how many standard deviations above or below the mean a particular score is. For example, if the mean of a test is 60 and the standard deviation is 5, a student scoring a 55 will have a *z* score of –1 and a student scoring a 70 will have a *z* score of 2.

Interpreting and Communicating Test Scores

Effective teachers can accurately interpret assessment measures — they understand the connections between objectives and measures, and they can make valid inferences from the data regarding a student's ability, aptitude, or performance. Furthermore, effective teachers must explain results of assessments using language appropriate for the audience, whether that audience includes the students themselves, the parents, school administrators, or government officials. Some general guidelines to keep in mind:

1. In the United States, test scores are confidential information under the Family Educational Rights and Privacy Act (FERPA). Teachers can share assessment results with the student, that student's parents or guardians, and any school personnel directly involved with the student's education. Teachers cannot post scores publicly or in a fashion that allows identification (e.g., by social security number), nor can teachers leave a stack of graded papers for students to pick up.
2. Teachers should be well informed about the test when communicating results to parents or students. Sometimes it's best to use general statements when communicating assessment results (e.g., "your child is on target for children of her age"), but if a parent asks for more detailed or specific information, FERPA requires that it be given. For example, if a student scores at the "proficient" level on a standardized achievement test, a teacher should be able to explain the various other levels, the percentage of students achieving this score, and the reliability of the test.
3. Be attentive to the feelings of the students and/or the families involved. "Your child scored significantly below the rest of the class" may be truthful, but an effective teacher should communicate in a positive, encouraging fashion.
4. Attend to differences in language and culture when discussing assessment results. Be sure that everyone understands the data and the implications.

Chapter 8: Professional Development, Leadership, and Community

Teaching is a profession with many rewards and many challenges. Among the challenges can be the difficulty of juggling professional roles: as an instructor creating productive learning environments for students, as an advisor to parents and other caregivers, as a colleague, as a resource person for the community, and as a continual learner.

Teachers as Part of the Academic Community

First and foremost, teachers are experts in teaching practices (i.e., **pedagogical knowledge** and **pedagogical content knowledge**) and in specific content areas. Additionally, teachers have expert knowledge on learners and learning. Effective teachers understand not only the theories of learning and development (as discussed in Chapter 3 of this tutorial) but also both sides of the debates that surround each theory, the empirical data that support or contradict them, and the implications of those debates and data for educational practice. They should be aware of a broad range of teaching materials, including current technological innovations and trends (e.g., computer-mediated communication such as chat clients or forums), and should understand the benefits and challenges of introducing them into the classroom.

Teachers need not carry all their knowledge in their heads at all times — effective teachers also typically have access to a set of resources (e.g., research journals, websites, and texts) that they can consult and share. For example, teachers should know how and where to find state curricular standards, and information about approved texts and activities (see Chapter 6 of this tutorial for additional information about state standards). Additionally, teachers should know where to find high-stakes test scores for their students and/or schools and how to interpret them.

Although teachers may sometimes feel that they are alone and independent in their classrooms, effective teachers know how to share their expertise within the community of educators. Among the school support personnel are:

Guidance counselors. Guidance counselors typically provide advice to students as they make educational and vocational decisions. Classroom teachers often confer with guidance counselors about class placement or about students' social or emotional needs. Guidance counselors may administer and coordinate statewide assessments, and they also sometimes mediate between teachers and parents, IEP team members, who work with classroom teachers while developing individualized plans for students with exceptionalities, and sometimes for others.

Special education specialists. Special education teachers and teachers of the gifted and talented are licensed teachers who work with students with exceptionalities individually, in small groups, or in specialized classrooms. Some work alongside other teachers in the classroom, especially inclusive classrooms; others have separate classrooms and coordinate schedules and lesson plans with classroom teachers to develop the most effective program for all students.

Speech or physical therapists. Speech, physical, and occupational therapists are professional, (usually) non-teaching staff who work with teachers to coordinate support for students' special needs. They are sometimes on staff at schools or for districts, but they may also be independent of a particular educational setting. These therapists often play an essential role as a part of an IEP planning team.

Librarians or media specialists. Librarians and library media specialists frequently work with teachers to identify resources. For example, media specialists can help teachers to identify contemporary videos or computer tutorials to match a lesson plan. They can also work directly with students, for example to provide guidelines to help them identify whether websites have reliable or unreliable information.

Paraprofessionals. Paraeducators or **paraprofessionals** typically include assistants or aides who work under the supervision of a classroom teacher or other credentialed professional. Work-study students from local colleges, full-time instructional assistants, translators, and physical aides are all paraprofessionals. Teachers should recognize that many paraeducators plan to

become credentialed teachers in the future and should serve as reliable and effective mentors.

Administrative office staff. Many school staff members offer support for administrators, teachers, and students. Teachers' ability to work with and communicate effectively with school nurses, school administrative and office staff, and custodial and cafeteria staff is essential to the smooth operation of a school.

Most important, effective teachers know basic strategies for developing collaborative relationships with their colleagues, administrators, other school personnel, parents/caregivers, and the community so that they can best support the educational process. Recommendations for successful **collaboration** include:

- Identifying the purpose of the collaboration
- Identifying the stakeholders (i.e., those directly or indirectly affected by the collaboration, such as students, parents, etc.)
- Developing an action plan to guide interactions
- Supporting effective communication among the collaborators
- Seeking support from professionals and paraprofessionals when necessary

Teachers as Learners

In addition to in-service conferences and workshops that are typically part of district teacher support, experiential learning—from student teaching and from supervising one's own classroom—supplements the education that teachers received during degree and credentialing programs, ensuring that teachers become lifelong learners.

Effective teachers regularly engage in **reflective practice** to encourage professional growth. Reflection involves thinking about and analyzing one's own actions. Reflective teachers thus set aside time to analyze and critique their lessons, class activities, and other elements of their teaching so that they can improve their effectiveness in the classroom and develop as professionals. A number of activities support reflective practice, including:

Keeping a reflective journal. Journaling is a particularly good method to sort out one's thoughts. Teachers can privately write self-evaluations (e.g., "Today's lesson didn't go well because I …") or raise questions for further thought (e.g., "Am I really satisfied with my job?" "Am I confident with my own knowledge of algebra?"). Journals also provide a history of teacher growth; rereading earlier entries

can remind teachers of the changes they've made and those they have yet to implement.

***Professional observations*.** Assessment and observation by others, including colleagues, supervisors, or critical friends, supports reflective practice. Some teachers like to participate in lesson study groups in which peers cooperatively plan and evaluate each other. Others may ask supervisors (e.g., principals, mentor teachers) to sit in during class and offer feedback or may choose to have a classroom lesson videotaped for later critique.

***Critical incident analysis*.** Critical incidents are events (typically unplanned or unexpected) that challenge the way a teacher thinks about something, expose a gap in knowledge or a specific belief or bias, or evoke an emotional response. Analysis involves thinking about what happened, why it happened, how it made the teacher and/or student feel, and what can be done to resolve the situation and/or prevent similar situations in the future. Critical incident analyses may be a key part of a reflective journal.

***Developing a portfolio*.** Like journals, **portfolios** provide a history of teacher growth. They may include elements such as a resume, certification records, a statement of teaching philosophy, lesson plans, self-developed materials and assessments, graded student work, observational records by peers, and other things that provide evidence of a teacher's style and achievements. Teachers should regularly reflect on and update their portfolios, which they may use when applying for new jobs, promotion and tenure, or teaching awards.

Membership in professional organizations. Teachers also learn from affiliations with professional associations that will contribute to their professional growth (see Table 10.1).

Table 10.1 Major Specialized Professional Organizations for Teachers	
American Alliance for Health, Physical Education, Recreation and Dance	http://www.aahperd.org/
American Association for Gifted Children	http://www.aagc.org/
American Council for the Teaching of Foreign Languages	http://www.actfl.org/
Association for Career and Technical Education	http://www.acteonline.org/
American Montessori Society	http://www.amshq.org/
Association for Supervision and Curriculum Development	http://www.ascd.org/
Council for Exceptional Children	http://www.cec.sped.org/
International Reading Association	http://www.reading.org/
International Society for Technology in Education	http://www.iste.org/

Modern Language Association	http://www.mla.org/
Music Teachers National Association	http://www.mtna.org/
National Art Education Association	http://www.naea.org/
National Association for Bilingual Education	http://www.nabe.org/
National Association for Multicultural Education	http://www.nameorg.org/
National Association for Music Education	http://menc.org/
National Association for the Education of Young Children	http://naeyc.org/
National Council for the Social Studies	http://www.ncss.org/
National Council of Teachers of English	http://www.ncte.org/
National Council of Teachers of Mathematics	http://www.nctm.org/
National Science Teachers Association	http://www.nsta.org/

From *Foundations of American Education*. (6th ed., p. 42), by L. Dean Webb, A. Metha, & K. Forbis, 2010, Columbus, OH: Merrill. To purchase a copy of this book, click here.

The professional organizations cited in Table 10.1 often host workshops and presentations at national and regional conferences for teacher collaborative learning. Many associations publish professional journals, such as *Teacher Education Quarterly*, published by the California Council on Teacher Education. Many other journals focused on teaching are available from university libraries or direct subscriptions from the publishers; they may be general (e.g., *Harvard Educational Review*) or topic-specific (e.g., *Journal of Computers in Mathematics and Science Teaching)*. These journals usually include theoretical articles on the nature of teaching, trends in education, policy issues and debates on pedagogy, and sometimes specific teaching methods or techniques.

Professional learning communities. Collaboratively, teachers may share experiences and hone their skills through **learning communities** or study groups. Learning communities bring teachers and sometimes administrators together into a network of support; teachers can share anecdotes, experiences, and concerns, and they can share in planning and decision making that affects the entire school or district. Frequently, schools provide structured time for learning community meetings or **lesson study**, a form of study group in which teachers collectively design a lesson, watch each other teach that lesson, and then share in discussion of it.

Internships or mentorships. Teachers often work in smaller groups or in one-to-one relationships such as internships or **mentorships**. Student teaching is perhaps the most familiar example, but even seasoned teachers learn much from having mentors and from serving as a mentor to new teachers. In some cases, peer observations or critical friends can be particularly informative in a less formal arrangement.

National Board Certification. As teachers become more proficient practitioners they have an opportunity to become nationally board certified. National Board Certification is often a two- to three-year process and requires teachers to demonstrate their teaching prowess by collecting portfolio materials and engaging in a number of assessment exercises. Teachers must apply for and be accepted by the National Board for Professional Teaching Standards to participate in the evaluation process. More information about National Board Certification can be found at http://www.nbpts.org/.

Teachers as Community Leaders

Teachers provide an essential service to society: mentoring and helping to direct future generations of students. Teachers are advocates for the teaching profession more generally within the community and nationwide. They must work in collaboration with parents, community leaders, civic organizations, and others who look up to them for information and to model good citizenship. They must adhere to a **code of ethics** regulated by the state in which they teach or become familiar with the ethical standards set up by national organizations that represent the teaching profession.

As leaders, teachers have a responsibility to be informed of the implications of major legislation and court decisions relating to education, to follow the laws earnestly, and to convey the standards to others in the community. Among the issues of importance to teachers and students are

- ***Equal access.*** The Civil Rights Act of 1964 specifies that federally funded education cannot be withheld from students on the basis of race, color, or national origin. Title III of this act prohibited state and municipal governments from denying access to public facilities on grounds of race, religion, gender, or ethnicity. Title IX of 1972 provides prohibits discrimination on the basis of gender.
- ***Privacy and confidentiality.*** The Family Educational Rights and Privacy Act (FERPA) makes student records open to students and their parents, but it also restricts teachers from disclosing those records to others. For example, teachers cannot legally post exam grades for all to see or leave graded assignments in a pile for students to pick up. The Fourth Amendment of the U.S. Constitution also protects both students and teachers against unreasonable search and seizure. Whether school officials can legally search through student lockers or require students to take drug tests are two issues that have received much recent court attention.

- ***First Amendment***. First Amendment issues, including freedom of speech, affect teaching practice. Students' freedom of speech is guaranteed as long as it is not considered vulgar or offensive and/or it doesn't interfere with their or others' learning. Teachers' freedom of speech generally has the same guarantees and is often protected by the professional expectation of academic freedom (which is not a legal right). The U.S. courts continue to define "speech" in educational contexts, including addressing topics such as slogans on student t-shirts and banners.
- ***Mandated reporting of child neglect/abuse.*** Every state and the District of Columbia has laws requiring educators to report knowledge or suspicions of child abuse. If a person acts in good faith when making a reasonable report, he or she is protected from retaliation if the suspicions turn out to be incorrect. In other words, a teacher who believes a child may be abused by his father has a responsibility to report this belief, and, if the belief turns out to be wrong, the father cannot have the teacher fired.
- ***Due process.*** The Fourteenth Amendment of the U.S. Constitution provides general guidelines for due process. Due process is thus a right given to both students and teachers; it includes fair procedures for individuals facing disciplinary actions (e.g., fair and impartial hearing, the right to representation, the right to appeal).
- ***Liability.*** Teachers are legally responsible for the safety of the children they supervise. The school is also responsible for exercising care in protecting students from injury.
- ***Corporal punishment.*** No federal law in the U.S. bans the use of corporal punishment. Local school boards typically set the policy for classroom teachers since federal courts and statutes provide little guidance and many states only provide parameters within which schools must operate. Influenced by religious leaders, some believe that schools must be able to use corporal punishment to exact authority and increase order. Other school leaders see schools as a sanctuary from social violence and would prohibit the use of paddles or straps used on children of any age. Legal, educational, and social issues continue to fuel discussions on the use of corporal punishment.
- ***Licensing***. Every state has teacher licensure requirements, which typically include a bachelor's degree and no history of felony arrests or child abuse. Licensure (i.e., competency) exams are also common for credentialing.
- ***Tenure.*** Tenure is a safeguard that provides job security by preventing teacher dismissal without cause. Teachers may be tenured following a probationary period of several years and a review of their work; once tenured, teachers typically have an ongoing, permanent position unless circumstances

require a reduction in teaching staff or for disciplinary issues. Tenured teachers generally cannot be dismissed because of their speech (i.e., the topics they teach or examples they use), politics, dress, or other personal characteristics.

- ***Copyright laws***. Copyright laws are designed to protect the creators of intellectual property, including videos, texts, computer software, music, and other creative products. Teachers must follow fair-use guidelines when copying material for students; they cannot simply photocopy multiple articles or chapters of a text, nor can they make one copy and post it on the Internet. Teachers may legally tape a television show for class use within several days of taping; they cannot, however, legally keep the tape and show it every year. Librarians and media specialists are good resources for copyright laws, which are complex and frequently updated to address new media and material on the Internet.

The Case Histories

The teaching scenarios presented in this section of the Praxis II exam are short and focused. They may include (a) an anecdotal description of a classroom lesson or event; (b) summaries of documents, such as a letter from a parent or an observation by a supervisor; (c) notes regarding assessment or evaluation, such as standardized test scores or report cards; (d) examples of student work; and (e) transcripts or summaries of conversations, such as those between teacher and principal, teacher and student, teacher and parent, or teacher and paraprofessional. Remember that these summaries are edited for purposes of the exam; in a real classroom setting, they would likely contain additional details.

While reading the case histories on the test, you may want to underline information that will assist you in constructing your response (and you may want to review the test questions prior to reading the associated case history).

Test Questions

A sample case history follows. The exercises in this tutorial are based on the following case.

Sample Case History: Mr. Morgan's Class

Mr. Morgan is a second-year teacher. He has a class of 10- and 11-year-olds working at grade level. They are cooperative and involved. They include Mike, a student with low vision, and three students with limited English skills. Mr. Morgan's mentor teacher is Ms. Yee. For her observation, he has selected mathematics and a study skills class in which he is helping students review for an upcoming statewide achievement test.

Ms. Yee's Observation Summary: Mathematics

Mr. Morgan has written on the board, "Objective: learn how to calculate volume." He displays a rectangular box. He reminds the students what they already know about the area of a surface. He then defines volume as the space inside the box. Mr. Morgan also shows the class a sack full of cubes, each representing a cubic unit. He tells them that the cubes, arranged a certain way, will just fill up the box. Mr. Morgan then arranges the students into groups of five and distributes a sack of cubes and a box for each group. He instructs the groups to determine the volume of the box in cubic units, using the cubes in some way.

The students work together while Mr. Morgan circulates through the room, working with some groups to review square units and how to find the area of a surface. He uses the cubes as he reviews the meaning of a square unit and the formula for finding the surface area of objects.

Mr. Morgan checks on one of the groups closest to where Ms. Yee is observing. In that group only three students are actively participating; the other two just watch. The three students spend time counting all the cubes that fit in the box. Then they try to put them into the box in a different order to see if they get the same answer. One girl, Marsha, keeps insisting there must be a better way. Mr. Morgan suggests they use what they know about the area of a surface and apply that to the volume of a solid. The three students grab a piece of paper and begin talking excitedly. When the students have a solution, he suggests they explain to the other group members two different ways they figured out the volume, one using the cubes and one using the formula. First they show the other members of the group how they filled the box with the cubes, counting as they fill it up, and then they show them the formula they have devised. The other groups in the class appear to follow a similar pattern. Mr. Morgan concludes the lesson by writing the formula for finding volume on the board. He praises the groups for such effective work.

Ms. Yee's Observation Summary: Afternoon Review of History

Mr. Morgan begins by reminding the students about the upcoming statewide tests they will take, including one in history. He says it will cover more than just the history they have studied this year. He asks who can remember what they studied in fourth-grade history.

"I do!" shouts Alex. "It was something about the people who used to live around here."

"That's a good start," says Mr. Morgan. "Last year you studied the history of this state. There will be questions about that on the test, and because this is about your own state, it's good information for you to remember anyway. Today, I'm going to review some of the most important events, dates, and people that you learned about last year when you studied our state's history. Take out your notebooks. You should take some notes as I review this material, so you'll have it to study before the test.

Mr. Morgan spends 30 minutes giving a broad chronological review of major events in the state's history. He stops occasionally to write names of people and places on the board.

While Mr. Morgan presents the review, about half the class seems absorbed, taking notes. Occasionally, Janet, a girl toward the back, asks Gary, sitting next to her, for a piece of information she missed. Finally Gary says to her, "You'll have to keep up yourself. I can barely do this myself." "But it's so boring!" she says. Gary answers. "Just do it."

Mr. Morgan's Conversation with His Mentor

Mr. Morgan and Ms. Yee meet after school. When she asks how he thought the day went, Mr. Morgan says, "I thought the math went pretty well. But frankly, I'm opposed to spending time reviewing for the history test. I think I'll cheat the kids if I don't, though. I just wish there was a way to do this review that would get them more involved. Only about half were with me, and I heard Janet, who's usually really involved, tell Gary she thinks it's boring."

Ms. Yee replies, "You're right. The kids weren't involved. You know the faculty is working on making our instruction less teacher directed. Let's think about how you could have made the review more student centered. And in the math lesson, there were two kids in the group I observed who were not very involved. I am also worried about Mike and your second-language students, so let's think about them, too. But there was much that went well. Let's talk about that first."

The Short-Answer Questions

The questions in this section of the test ask you to demonstrate understanding of the importance of an aspect of teaching, demonstrate understanding of the principles of learning and teaching underlying an aspect of teaching, or recognize when and how to apply the principles of learning and teaching underlying an aspect of teaching. Typically, you are asked to provide examples and to justify your responses based on your knowledge of the principles of teaching and learning. Remember, the case history will contain more than enough evidence to support every question. You should not speculate on additional details or events beyond those presented in the scenario.

Reading a case history and responding to the questions should take you approximately 25 minutes to complete. This tutorial will provide you practice in answering case study questions so you are prepared to answer these questions successfully in the time allotted.
Three sample questions associated with the scenario in Mr. Morgan's classroom are shown in the following box. They are discussed in greater detail in the activities for this chapter of the tutorial; you will have a chance to write and score your own responses and to review responses by other examinees.

Question 1: Assume that at the end of their conversation, Mr. Morgan had said, "One reason I'm uncomfortable with the history review is that the statewide test is all fact based, so I'm just dealing with facts. But I'd like to build in some critical thinking, too."

- *Describe TWO activities Ms. Yee might suggest Mr. Morgan could use in a history review to build students' strengths in analysis, synthesis, and/or evaluation.*
- *Explain how each of your proposed activities would promote higher-order thinking skills. Base your response on principles of effective instructional strategies.*

Question 2: Ms. Yee asks Mr. Morgan about the two students who did not participate in the group she observed during the math lesson. Mr. Morgan replies, "I know. The same thing often happens when I assign group work. Two or three work well, but the others do almost nothing."

- *Identify TWO strategies Ms. Yee might suggest to Mr. Morgan to make group work more effective.*
- *Explain why each strategy would be effective. Base your response on principles of planning instruction.*

Question 3: Ms. Yee indicates that she is concerned about Mike, the visually impaired student, and the students with limited English skills. Assume that she follows up these comments by focusing on how Mr. Morgan could have helped these students during the history review.

- *Propose ONE strategy Mr. Morgan could use to help Mike and ONE strategy he could use to help the three English learners.*
- *Explain how each of your proposed strategies would promote learning. Base your response on principles of varied instructional strategies for different kinds of learners.*

Some points to remember in constructing your responses:

- Be sure your response is complete, clear, and appropriate in regard to the tasks the prompt asks you to perform.
- The points you make should be grounded in educational theory. Use the jargon and technical terminology of education.
- Restate the question in an introductory sentence to maintain your focus.

- The length of your response is unimportant. You do not need to respond in essay style and you can use sentences or bullet points to present your evidence and justifications.
- Writing mechanics are also unimportant; this is not a test of extemporaneous writing skill. However, legible writing will make your response more accessible.

PLT VOCABULARY

Ability grouping. The process of placing students of similar abilities into groups and attempting to match instruction to the needs of these groups.

Accommodation. Responding to a new object or event by either modifying an existing scheme or forming a new one.

Accountability. Mandated obligation of teachers and other school personnel to accept responsibility for students' performance on high-stakes assessments.

Achievement tests. Standardized tests measuring how much students have learned in a given content area.

Action research. Research conducted by teachers and other school personnel to address issues and problems in their own schools or classrooms.

Active listening. A technique in which the listener paraphrases the other person's message and directly mentions the feelings that underlie the message.

Advance organizer. An introduction to a lesson that provides an overall organizational scheme for the lesson.

African American English. Dialect of some African American communities characterized by certain pronunciations, idioms, and grammatical constructions different from those of Standard English.

Age-equivalent score. Test score indicating the age level of students to whom a test taker performed most similarly.

Americans with Disabilities Act of 1990, The (ADA). Legislation in the United States that extends civil rights protection of persons with disabilities to private-sector employment, all public services, public accommodations, transportation, and telecommunication including physical accessibility and the removal of barriers to hotels, restaurants, grocery stores, and parks if that can be accomplished without great difficulty or expense.

Analytic scoring. Scoring a student's performance on an assessment by evaluating various aspects of it separately.

Anecdotal records. Narrative accounts of observed student behavior or performance.

Antecedent stimulus. Stimulus that increases the likelihood that a particular response will follow.

Antecedents. Stimuli that precede and induce behaviors.

Applied behavior analysis (ABA). Systematic application of stimulus–response principles to address a chronic behavior problem.

Apprenticeship. Mentorship in which a learner works intensively with an experienced adult to learn how to perform complex new skills.

Aptitude tests. Standardized tests designed to predict the potential for future learning and measure general abilities developed over long periods of time.

Assertive discipline. An approach to classroom management that promotes a clear and firm response style with students.

Assessment. Process of observing a sample of a student's behavior and drawing inferences about the student's knowledge and abilities.

Assimilation. Responding to and possibly interpreting a new event in a way that is consistent with an existing scheme.

Attention. Focusing of mental processes on particular stimuli.

Attention-deficit hyperactivity disorder (ADHD). Disorder marked by inattention, inability to inhibit inappropriate thoughts and behaviors, or both.
Attributions. Personally constructed causal explanations for a success or failure.
Attribution theory. Theoretical perspective focusing on people's explanations (*attributions*) concerning the causes of events that befall them, as well as on the behaviors that result from such explanations.
Authentic activity. An approach to instruction similar to one students might encounter in the outside world.
Authentic assessment. Assessment of students' knowledge and skills in a "real-life" context.
Autism spectrum disorders. Disorders marked by impaired social cognition, social skills, and social interaction, presumably due to a brain abnormality; extreme forms often associated with significant cognitive and linguistic delays and highly unusual behaviors.
Autonomy. Basic need to control the course of one's own life.

Backward design. An approach to instructional planning in which a teacher first determines the desired end result (i.e., what knowledge and skills students should acquire) and then identifies appropriate assessments and instructional strategies.
Behaviorism. Theoretical perspective in which learning and behavior are described and explained in terms of stimulus-response relationships, and motivation is often the result of deficit-based drives. Adherents to this perspective are called behaviorists.
Belongingness. General sense that one is an important and valued member of the classroom.
Bloom's taxonomy. A taxonomy of six cognitive processes, varying in complexity, that lessons might be designed to foster.

Central tendency. Typical score for a group of scores.
Challenge. Situation in which a learner believes that success is possible with sufficient effort.
Checklist. Assessment tool with which a teacher evaluates student performance by indicating whether specific behaviors or qualities are present or absent.
Classical conditioning. Form of learning in which a new, involuntary response is acquired as a result of two stimuli being presented at the same time.
Classroom climate. Overall psychological atmosphere of the classroom.
Classroom management. Establishment and maintenance of a classroom environment conducive to learning and achievement.
Co-teaching. In co-teaching arrangements, two or more teachers teach together in the same classroom where students benefit from each teacher's specialty (e.g., a regular and a special education teacher working with regular students and students with a specific disability such as hearing impairments).
Code of ethics. Set of professional standards for behavior of members of a profession.

Cognitive apprenticeship. Mentorship in which a teacher and a student work together on a challenging task and the teacher gives guidance about how to think about the task.

Cognitive dissonance. Feeling of mental discomfort caused by new information that conflicts with current knowledge or beliefs.

Cognitive modeling. Demonstrating how to think about as well as how to do a task.

Cognitive style. Characteristic way in which a learner tends to think about a task and process new information; typically comes into play automatically rather than by choice.

Collaboration. Joint communication and decision making among educational professionals to create an optimal learning environment for students and especially for students with disabilities. A philosophy about how to relate to others—how to learn and work.

Collective self-efficacy. Shared belief of members of a group that they can be successful when they work together on a task.

Community of learners. Class in which teacher and students actively and collaboratively work to create a body of knowledge and help one another learn.

Competence. Basic need to be effective in dealing with the environment.

Comprehension monitoring. Process of checking oneself to be sure one understands and remembers newly acquired information.

Computer-based instruction (CBI). Instruction provided via computer technology.

Concept map. Diagram of concepts and their interrelationships; used to enhance learning and memory of a topic.

Conceptual change. Revision of one's understanding of a topic in response to new information.

Concrete operations stage. Piaget's third stage of cognitive development, in which adult-like logic appears but is limited to concrete reality.

Conditioned response (CR). Response that begins to be elicited by a particular (conditioned) stimulus through classical conditioning.

Conditioned stimuli (CS). Stimulus that begins to elicit a particular response through classical conditioning.

Conferences. Face-to-face interactions with teachers and students or teachers and parents to communicate strengths in student learning or areas that need improvement.

Consequences. Events (stimuli) that occur following a behavior and that influences the probability of the behaviors recurring.

Conservation. Realization that if nothing is added or taken away, amount stays the same regardless of alterations in shape or arrangement.

Constructivism. Theoretical perspective proposing that learners construct (rather than absorb) a body of knowledge from their experiences—knowledge that may or may not be an accurate representation of external reality. Adherents to this perspective are called constructivists.

Content validity. Extent to which an assessment includes a representative sample of tasks within the domain being assessed.

Contingency. Situation in which one event (e.g., reinforcement) happens only after another event (e.g., a specific response) has already occurred (one event is *contingent* on the other's occurrence).

Contingency contract. Formal agreement between teacher and student that identifies behaviors the student will exhibit and the reinforcers that will follow.

Convergent questions. Questions that have a single correct answer.

Convergent thinking. The process of pulling several pieces of information together to draw a conclusion or solve a problem.

Cooperative learning. Approach to instruction in which students work with a small group of peers to achieve a common goal and help one another learn.

Creative thinking. New and original behavior that yields a productive and culturally appropriate result.

Creativity (creative thinking). New and original behavior that yields a productive and culturally appropriate result.

Criterion-referenced score. Assessment score that specifically indicates what a student knows or can do.

Critical thinking. The process of evaluating the accuracy and worth of information and lines of reasoning.

Crystallized intelligence. Knowledge and skills accumulated from prior experience, schooling, and culture.

Cueing. Use of simple signals to indicate that a certain behavior is desired or that a certain behavior should stop.

Cultural bias. Extent to which assessment tasks either offend or unfairly penalize some students because of their ethnicity, gender, or socioeconomic status.

Cultural mismatch. Situation in which a child's home culture and the school culture hold conflicting expectations for the child's behavior.

Culture. Behaviors and belief systems that members of a long-standing social group share and pass along to successive generations.

Culture shock. Sense of confusion when a student encounters a culture with behavioral expectations very different from those previously learned.

Curricular web. Visual representation of organized content and useful for instructional planning as it identifies how concepts are connected.

Declarative knowledge. Knowledge related to "what is"—that is, to the nature of how things are, were, or will be.

Deductive reasoning. Process of drawing a logical inference about something that must be true, given other information that has already been presented as true.

Developmental milestone. Appearance of a new, developmentally more advanced behavior.

Diagnostic assessment. Highly specialized, comprehensive and detailed procedures used to uncover persistent or recurring learning difficulties that require specially prepared diagnostic tests as well as various observational techniques.

Dialect. Form of a language that has certain unique pronunciations, idioms, and grammatical structures and is characteristic of a particular region or ethnic group.

Differentiated instruction. Practice of individualizing instructional methods, and possibly also individualizing specific content and instructional goals, to align with each student's existing knowledge, skills, and needs.

Direct instruction. Approach to instruction that uses a variety of techniques (e.g., explanations, questions, guided and independent practice) in a fairly structured manner to promote learning of basic skills.

Discovery learning. Approach to instruction in which students develop an understanding of a topic through firsthand interaction with the environment.

Disequilibrium. Inability to explain new events with existing schemes; tends to be accompanied by a sense of discomfort.

Distributed intelligence. Idea that people act more "intelligently" when they have physical, symbolic, or social assistance.

Divergent questions. Questions that have no single correct answer.

Divergent thinking. The process of mentally moving in a variety of directions from a single idea.

Due process. The principle that government must respect all legal rights that are owed to a person.

Dynamic assessment. Systematic examination of how easily a student can acquire new knowledge or skills, perhaps with an adult's assistance.

Elaboration. Cognitive process in which learners embellish on new information based on what they already know.

Emotional and behavioral disorders. Emotional states and behaviors that consistently and significantly disrupt academic learning and performance.

Encoding. Changing the format of information being stored in memory in order to remember it more easily.

Entity view of intelligence. Belief that intelligence is a "thing" that is relatively permanent and unchangeable.

Equilibrium. State of being able to explain new events with existing schemes.

Essay tests. An assessment format that requires students to make extended written responses to questions or problems.

Ethnic group. People who have common historical roots, values, beliefs, and behaviors and who share a sense of interdependence.

Ethnic identity. Awareness of one's membership in a particular ethnic or cultural group, and willingness to adopt behaviors characteristic of the group.

ETS score. Standard score with a mean of 500 and a standard deviation of 100.

Expectancy-value theory. Theoretical perspective proposing that human motivation is a function of two beliefs: that one can succeed in an activity (*expectancy*) and that there are direct or indirect benefits in performing the activity (*value*).

Expository instruction. Approach to instruction in which information is presented in more or less the same form in which students are expected to learn it.

Extrinsic motivation. Motivation resulting from factors external to the individual and unrelated to the task being performed.

Extrinsic reinforcer. Reinforcer that comes from the outside environment, rather than from within the learner.

Fair and nondiscriminatory evaluation. Nonbiased, multifactored methods of evaluation to determine if child has disability and needs special education; nondiscriminatory evaluation with regard to race, culture, or native language, with placement decisions made on basis of multiple test scores and observations.

Fluid intelligence. Ability to acquire knowledge quickly and adapt effectively to new situations.

Formal assessment. Preplanned, systematic attempt to ascertain what students have learned.

Formal operations stage. Piaget's fourth and final stage of cognitive development, in which logical reasoning processes are applied to abstract ideas as well as to concrete objects, and more sophisticated scientific and mathematical reasoning processes emerge.

Formative evaluation. Evaluation conducted before or during instruction to facilitate instructional planning and enhance students' learning.

Free and appropriate public education (FAPE). Special education and related services that (a) have been provided at public expense, under public supervision and direction and without charge; (b) meet the standards of the state educational agency; (c) include an appropriate preschool, elementary, or secondary school education in the state involved; and (d) are provided in conformity with the individualized education program.

Functional analysis. Examination of inappropriate behavior and its antecedents and consequences to determine one or more purposes (functions) that the behavior might serve for the learner.

***g*.** Theoretical general factor in intelligence that influences one's ability to learn in a wide variety of contexts.

Giftedness. Unusually high ability in one or more areas, to the point where students require special educational services to help them meet their full potential.

Goal theory. Theoretical perspective that portrays human motivation as being directed toward particular goals; the nature of these goals determines the specific ways in which people think and behave.

Grade-equivalent score. Test score indicating the grade level of students to whom a test taker performed most similarly.

Group differences. Consistently observed differences (on average) among diverse groups of students (e.g., students of different genders or ethnic backgrounds).

Guided participation. A child's performance, with guidance and support, of an activity in the adult world.

Heterogeneous ability grouping. A strategy that groups students of varied ability instead of by grade/age level.

High-stakes testing. Practice of using students' performance on a single assessment instrument to make major decisions about students or school personnel.

Higher-level cognitive process. A cognitive process that involves going well beyond information specifically learned (e.g., by analyzing, applying, or evaluating it).

Higher-level question. Question that requires students to do something new with something they've learned (i.e., to elaborate on it in some way).

Holistic scoring. Summarizing a student's performance on an assessment with a single score.

Humanism. Philosophical perspective in which people are seen as having tremendous potential for psychological growth and as continually striving to fulfill that potential. Adherents to this perspective are called humanists.

Hypermedia. Collection of multimedia, computer-based instructional materials (e.g., text, pictures, sound, animations) that students can examine in a sequence of their own choosing.

I-messages. A form of communication in which a person directly states what another person is doing, its effect, and how he or she feels about it (e.g., "When you all call out, I can't concentrate on each answer, and I'm frustrated").

Inclusion. The practice of educating all students, including those with severe and multiple disabilities, in neighborhood schools and general education classrooms.

Incremental view of intelligence. Belief that intelligence can improve with effort and practice.

Individual constructivism. Theoretical perspective that focuses on how people, as individuals, construct meaning from the events around them.

Individual differences. Variability in abilities and characteristics (intelligence, personality, etc.) among students at a particular age and within any group.

Individuals with Disabilities Education Act (IDEA). U.S. legislation granting educational rights to people with cognitive, emotional, or physical disabilities from birth until age 21; initially passed in 1975, it has been amended and reauthorized in 1997 and again in 2004. IDEA operates under six basic principles: zero reject, nondiscriminatory identification and evaluation, free and appropriate public education, least restrictive environment, due process, and parent and student participation in shared decision making with regard to educational planning.

Individualized education program (IEP). Written document required by the Individuals with Disabilities Education Act (P.L. 94-142) for every child with a disability; includes statements of present performance, annual goals, instructional objectives, specific educational services needed, extent of participation in the general education program, evaluation procedures, and relevant dates, and must be signed by parents as well as educational personnel.

Inductive reasoning. Collecting data to draw a conclusion that may or may not be true.

Informal assessment. Assessment that results from a teacher's spontaneous, day-to-day observations of how students behave and perform in class.

Information processing theory. Theoretical perspective that focuses on how learners mentally think about (process) new information and events and how such processes change with development.

Instructional goal. A desired long-term outcome of instruction.

Instructional objective. Desired outcome of a lesson or unit.

Intelligence. Ability to modify and adjust behaviors to accomplish new tasks successfully; involves many different mental processes and may vary in nature depending on one's culture.

Intelligence test. General measure of current cognitive functioning, used primarily to predict academic achievement over the short run.

Internalized motivation. Adoption of others' priorities and values as one's own.

Intrinsic motivation. Motivation resulting from personal characteristics or inherent in the task being performed.

Intrinsic reinforcer. Reinforcer provided by oneself or inherent in a task being performed.

IQ score. Score on an intelligence test, determined by comparing a student's performance on the test with the performance of others in the same age group. For most tests, it is a standard score with a mean of 100 and a standard deviation of 15.

IRE cycle. Adult–child interaction marked by adult initiation (e.g., a question), child response, and adult evaluation.

Least restrictive environment. Educational setting for special needs child that most closely resembles a regular school program and also meets child's special educational needs.

Learned helplessness. General, fairly pervasive belief that one is incapable of accomplishing tasks and has little or no control over the environment.

Learner-centered instruction. Approach to teaching in which instructional strategies are chosen largely on the basis of students' existing abilities, predispositions, and needs.

Learner-directed instruction. Approach to instruction in which students have considerable say in the issues they address and how to address them.

Learning. Long-term change in mental representations or associations due to experience.

Learning communities. New and experienced teachers working together to pose problems, identify discrepancies between theories and practices, challenge common routines, draw on the work of others for generative frameworks, and attempt to make visible much of that which is taken for granted about learning and teaching.

Learning disability. Deficiency in one or more specific cognitive processes despite relatively normal cognitive functioning in other areas.

Learning strategy. Intentional use of one or more cognitive processes for a particular learning task.

Lesson planning. Instructional planning that requires writing a predetermined guide for a lesson that identifies learning goals or objectives, necessary materials, instructional strategies, and one or more assessment methods.

Lesson study. A form of study group in which teachers collectively design a lesson, watch each other teach that lesson, and then share in discussion of it.

Locus of causality. The location—internal or external—of the cause of behavior.
Logical consequence. Unpleasant consequence that follows naturally or logically from a student's misbehavior.
Long-term memory. Component of memory that holds knowledge and skills for a relatively long time.
Lower-level question. Question that requires students to express what they've learned in essentially the same form as they learned it.

Mastery goal. Desire to acquire additional knowledge or master new skills.
Mastery learning. Approach to instruction in which students learn one topic thoroughly before moving to a subsequent one.
Mastery orientation. General, fairly pervasive belief that one is capable of accomplishing challenging tasks.
Maturation. Unfolding of genetically controlled changes as a child develops.
Mean (M). Mathematical average of a set of scores.
Meaningful learning. Cognitive process in which learners relate new information to things they already know.
Median. Middle score in a group of scores.
Mental retardation. Disability characterized by significantly below-average general intelligence and deficits in practical and social skills.
Mentoring. Formal and informal relationships between a beginning teacher and an experienced teacher that are sources of information and support for the beginning teacher.
Metacognition. Knowledge and beliefs about one's own cognitive processes, as well as conscious attempts to engage in behaviors and thought processes that increase learning and memory.
Mnemonic. Memory aid or trick designed to help students learn and remember a specific piece of information.
Mode. Most frequently occurring score.
Model. Person who demonstrates a behavior for someone else.
Modeling. Demonstrating a behavior for another; also, observing and imitating another's behavior.
Motivation. Inner state that energizes, directs, and sustains behavior.
Multicultural curriculum. Instructional concepts that integrate perspectives and experiences of numerous diverse groups and representing various cultures, ethnicities, ages, gender, and religions.
Multiple Intelligences, Theory of. A theory that claims people are "intelligent" in many different areas, including cognitive, emotional, and social domains.

Need for autonomy. Basic need for independence.

Need for arousal. Ongoing need for either physical or cognitive stimulation.
Need for competence. Basic need to believe that one can deal effectively with the overall environment.
Need for relatedness. Basic need to feel socially connected to others and to secure others' love and respect.
Need for self-determination. Basic need to believe that one has some autonomy and control regarding the course of one's life.
Negative reinforcement. Phenomenon in which a response increases as a result of the removal (rather than presentation) of a stimulus.
Normal distribution (normal curve). Theoretical pattern of educational and psychological characteristics in which most individuals lie somewhere in the middle range and only a few lie at either extreme.
Norm-referenced score. Assessment score that indicates how a student's performance on an assessment compares with the average performance of others.
Norms. In assessment, data regarding the typical performance of various groups of students on a standardized test or other norm-referenced measure of a particular characteristic or ability.

Objective testing. Multiple-choice, matching, true/false, short-answer, and fill-in tests; scoring answers does not require interpretation.
Operant conditioning. Form of learning in which a response increases in frequency as a result of its being followed by reinforcement.
Overgeneralization. Overly broad view of the objects or events that a concept includes.

Paper-pencil assessment. Assessment in which students provide written responses to written items.
Para-educator. Also known as a paraprofessional educator, a person who is trained to serve as an instructional assistant or teacher aide and is responsible for specialized assistance to classroom teachers or students.
Paraprofessionals. Trained (training may vary from state to state) classroom aides who assist teachers; may include parents.
Pedagogical content knowledge. Knowledge about effective methods of teaching a specific content area.
Pedagogical knowledge. Knowledge about effective methods of teaching.
Peer tutoring. Approach to instruction in which one student provides instruction to help another student master a classroom topic.
Percentile ranking. Test score indicating the percentage of people in the norm group getting a raw score less than or equal to a particular student's raw score.
Performance-approach goal. Desire to look good and receive favorable judgments from others.

Performance assessment. Assessment in which students demonstrate their knowledge and skills in a nonwritten fashion.

Performance-avoidance goal. Desire not to look bad or receive unfavorable judgments from others.

Portfolio. Collection of a student's work systematically compiled over a lengthy time period.

Positive behavioral support (PBS). Systematic intervention that addresses chronic misbehaviors by (a) identifying the purposes those behaviors might serve for a student and (b) providing more appropriate ways for a student to achieve the same ends.

Positive psychology. Theoretical perspective that portrays people as having many unique qualities that propel them to engage in productive, worthwhile activities; it shares early humanists' belief that people strive to fulfill their potential but also shares contemporary psychologists' belief that theories of motivation must be research-based.

Positive reinforcement. Phenomenon in which a response increases as a result of the presentation (rather than removal) of a stimulus.

Practicality. Extent to which an assessment instrument or procedure is inexpensive and easy to use and takes only a small amount of time to administer and score.

Preoperational stage. Piaget's second stage of cognitive development, in which children can think about objects beyond their immediate view but do not yet reason in logical, adult-like ways.

Presentation punishment. Punishment involving presentation of a new stimulus, presumably one a learner finds unpleasant.

Primary reinforcer. Consequence that satisfies a biologically built-in need.

Prior knowledge activation. Process of reminding learners of things they have already learned relative to a new topic.

Problem-based learning. Classroom activity in which students acquire new knowledge and skills while working on a complex problem similar to those in the outside world.

Problem solving. Going beyond the simple application of previously learned rules to formulate new answers and achieve a goal.

Procedural knowledge. Knowledge concerning how to do something (e.g., a skill).

Project-based learning. Classroom activity in which students acquire new knowledge and skills while working on a complex, multifaceted project that yields a concrete end product.

Prompting. Questions that help students change a wrong provisional answer into the right final answer.

Proximal goal. A concrete goal that can be accomplished within a short time period; it may be a stepping stone toward a longer-term goal.

Punishment. Consequence that decreases the frequency of the response it follows.

Rating scale. Assessment tool with which a teacher evaluates student performance by rating aspects of the performance on one or more continua.

Raw score. Assessment score based solely on the number or point value of correctly answered items.

Reciprocal causation. Mutual cause-and-effect relationships among environment, behavior, and personal variables as these three factors influence learning and development.

Reciprocal teaching. Approach to teaching reading and listening comprehension in which students take turns asking teacher-like questions of classmates.

Reflections. Students' own evaluations and descriptions of their work and their feelings about their achievements

Reflective listening. A form of communication in which the listener paraphrases what the speaker has said, to check for understanding of content and emotional tone.

Reflective practice. The process of teachers' thinking about and analyzing their work to assess its effectiveness.

Rehearsal. Cognitive process in which information is repeated over and over as a possible way of learning and remembering it.

Reinforcement. Act of following a response with a reinforcer.

Reinforcer. Consequence of a response that leads to increased frequency of the response.

Reliability. Extent to which an assessment instrument yields consistent information about the knowledge, skills, or characteristics being assessed.

Removal punishment. Punishment involving removal of an existing stimulus, presumably one a learner finds desirable and doesn't want to lose.

Retrieval. Process of "finding" information previously stored in memory.

Rote learning. Learning information in a relatively uninterpreted form, without making sense of it or attaching much meaning to it.

Rubric. List of components that a student's performance on an assessment task should ideally include.

Running record. Narrative records of a child's activities during a single period of time.

Scaffolding. Support mechanism that helps a learner successfully perform a task within his or her zone of proximal development.

Schema. General understanding of what an object or event is typically like.

Scheme. In Piaget's theory, organized group of similar actions or thoughts that are used repeatedly in response to the environment.

Scope. The breadth and depth of content to be covered in a curriculum over a certain period of time, e.g. week, grading period, year, or K-12.

Secondary reinforcer. Consequence that becomes reinforcing over time through its association with another reinforcer.

Section 504 of the Vocational Rehabilitation Act of 1973. A federal law that prohibits the denial of participation in, benefits of, or discrimination in any program or activity receiving federal financial assistance because of a documented disability, history of a disability, or the appearance of having a disability.

Sequence. The order in which content is delivered to learners over time.

Self-determination theory. Theoretical perspective proposing that human beings have a basic need for autonomy (*self-determination*) about the courses that their lives take; it further

proposes that humans also have basic needs to feel competent and to have close, affectionate relationships with others. Also see *need for self-determination*.

Self-efficacy. Belief that one is capable of executing certain behaviors or reaching certain goals.

Self-handicapping. Behavior that undermines one's success as a way of protecting self-worth during difficult tasks.

Semantic knowledge. Knowledge of the meanings of words and word combinations.

Sensitive period. Genetically determined age range during which a certain aspect of a child's development is especially susceptible to environmental conditions.

Sensorimotor stage. Piaget's first stage of cognitive development, in which schemes are based largely on behaviors and perceptions.

Sensory register. Component of memory that holds incoming information in an unanalyzed form for a very brief time (perhaps one to two seconds).

Service learning. Activity that promotes learning and development through participation in a meaningful community service project.

Situated learning and cognition. Knowledge, behaviors, and thinking skills acquired and used primarily within certain contexts, with limited if any use in other contexts.

Situated motivation. Motivation that emerges at least partly from conditions in a learner's immediate environment.

Situational interest. Interest evoked temporarily by something in the environment.

Spiral curriculum. Bruner's design for teaching that introduces the fundamental structure of all subjects early in the school years, then revisits the subjects in more and more complex forms over time.

Standard deviation (SD). Statistic that reflects how close together or far apart a set of scores is and thereby indicates the variability of the scores.

Standard English. Form of English generally considered acceptable at school, as reflected in textbooks and grammar instruction.

Standard score. Test score indicating how far a student's performance is from the mean with respect to standard deviation units.

Standardization. Extent to which assessments involve similar content and format and are administered and scored similarly for everyone.

Standardized test. Test developed by test-construction experts and published for use in many different schools and classrooms.

Stanine. Standard score with a mean of 5 and a standard deviation of 2; it is always reported as a whole number.

Student at risk. Student who has a high probability of failing to acquire the minimum academic skills necessary for success in the adult world.

Student with special needs. Student who is different enough from peers that he or she requires specially adapted instructional materials and practices.

Social learning theory. Theoretical perspective in which learning by observing others is the focus of study. Initially, this perspective focused largely on stimulus-response relationships. More recently, it has come to incorporate cognitive processes as well, hence its alternative name social cognitive theory.

Social constructivism. Theoretical perspective that focuses on people's collective efforts to impose meaning on the world.

Social negotiation. Aspect of learning process that relies on collaboration with others to co-construct meaning while respecting different perspectives.

Stage theory. Theory that depicts development as a series of relatively discrete periods (*stages*).

Subculture. Group that resists the ways of the dominant culture and adopts its own norms for behavior.

Summative evaluation. Evaluation conducted after instruction to assess students' final achievement.

Task analysis. The process of identifying specific knowledge, behaviors, or cognitive processes necessary to master a particular subject area or skill.

Teacher-directed instruction. Approach to instruction in which the teacher is largely in control of the content and course of the lesson.

Team teaching. Teachers share the responsibility for two or more classes, dividing up the subject areas between them.

Temperament. Genetic predisposition to respond in particular ways to one's physical and social environments.

Transfer. Phenomenon in which something a person has learned at one time affects how the person learns or performs in a later situation.

Triarchic theory of intelligence. View of intelligence; proponents argue that that intelligent behavior arises from a balance between analytical, creative, and practical abilities.

Unconditioned response (UCR). Response that is elicited by a particular (unconditioned) stimulus without prior learning.

Unconditioned stimulus (UCS). Stimulus that elicits a particular response without prior learning.

Undergeneralization. Overly narrow view of the objects or events that a concept includes.

Unit plan. A long-range plan covering one topic through multiple lessons and integrating the learning of skills and concepts for various subject areas including reading, writing, mathematics, science, social studies and the arts.

Validity. Extent to which an assessment instrument actually measures what it is intended to measure and allows appropriate inferences about the characteristic or ability in question.

Variability or **variance**. Degree of difference or deviation from mean.
Vicarious punishment. Phenomenon in which a response decreases in frequency when another person is observed being punished for that response.
Vicarious reinforcement. Phenomenon in which a response increases in frequency when another person is observed being reinforced for that response.
Visual imagery. Process of forming mental pictures of objects or ideas.
Visual-spatial ability. Ability to imagine and mentally manipulate two-and three-dimensional figures.

Wait time. Length of time a teacher pauses, after either asking a question or hearing a student's comment, before saying something.
Working memory. Component of memory that holds and actively thinks about and processes a limited amount of information.

***z*-score**. Standard score with a mean of 0 and a standard deviation of 1.
Zone of proximal development (ZPD). Range of tasks that a child can perform with the help and guidance of others but cannot yet perform independently.

All The Best