2

TEACHING TODAY'S STUDENTS

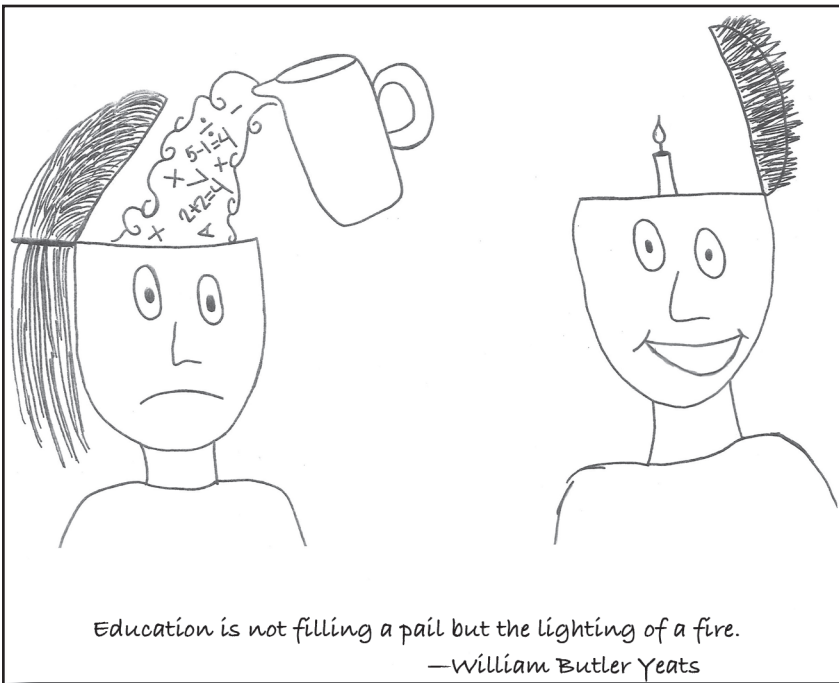

Education is not filling a pail but the lighting of a fire.
—William Butler Yeats

Consider…

◆ *No matter how well planned, how interesting, stimulating, colorful or relevant the lesson, if the teacher does all the interacting with the material, the teacher's, not the student's, brain will grow.—<u>Pat Wolfe</u>*

◆ *I like a teacher who gives you something to take home to think about besides homework.—<u>Lily Tomlin as "Edith Ann"</u>*

◆ *The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires.—<u>William Arthur Ward</u>*

◆ *A good teacher is like a candle—it consumes itself to light the way for others. —<u>Author unknown</u>*

◆ *The task of the excellent teacher is to stimulate "apparently ordinary" people to unusual effort. The tough problem is not in identifying winners: it is in making winners out of ordinary people.—<u>Patricia Cross</u>*

◆ *A teacher affects generations yet unborn.—<u>Author unknown</u>*

Understanding Today's Learners

The world has radically changed, and technology is driving much of the change that we see. When many of today's teachers were schoolchildren, the primary sources of information were encyclopedias and libraries. Today the Internet is the major source of information. With the Internet and other new technologies, many questions can be answered in just a matter of seconds. Today's students visit Google more often than the library. Just as modern technology has already altered our world drastically, it is certain that there are many more changes to come in the future. These changes have major implications for the teaching profession. Current educational practices and strategies must keep up with our evolving world.

Today's learners are often referred to as "digital natives." Digital natives process and deal with information differently from how previous generations do.[1] Rather than having a linear thought process, they tend to piece information together from different sources in a "hypertext" fashion, jumping around between multiple sources. Digital natives also tend to be more visual and interpret and develop images with ease. Their visual–spatial skills seem to be well developed because of experience with video and virtual games. Digital natives learn better through discovery than simply being told information. Other key characteristics of digital natives are their ability to shift their attention rapidly from one task to another and how they often choose not to pay attention to things that don't interest them.

Children's media and technology exposure affects how their brain works. A brain's wiring is structured according to the stimuli it is exposed to. Today's young people are literally "wired" differently from previous generations because they have been exposed to different kinds of stimuli. This evolution of brain wiring changes will likely continue as new generations become exposed to different forms of digital media at even younger ages. Diana Oblinger[2] describes how today's learners generally are comfortable using new technology; being constantly connected to information and other people; prefer experiential or "hands-on learning"; expect immediate results; and are very social. She makes the point that today's learners feel comfortable connecting and socializing in ways that earlier generations would never have considered (e.g., MySpace, Facebook, Bebo, other social network websites). Earlier generations were educated through a very hierarchical method of learning in which a teacher taught (told) students the information that they were to learn. Today's learners, instead, prefer a more lateral approach to learning. This means that the learners learn from peers and nontraditional sources such as the Internet and other media. According to Oblinger, many of today's kids prefer to get their hands on things, figure out problems and processes on their own, and go through the "messy" process of learning from experience.

As a result of brain-imaging studies conducted by Jay Giedd of the National Institute of Mental Health, much has been learned in recent years about how children's brains develop.[3] This research is the culmination of the examination

Digital natives learn best through discovery, and the brain learns better through social interaction.

of the brains of thousands of children and teenagers using high-powered magnetic resonance imaging (MRI) taken at 2-year intervals. The MRI studies counter a belief previously held by most scientists that, because the brain reaches adult size by age 11 or 12 (a 6-year-old's brain is 90% to 95% of its adult size), the brain is fully developed by age 12.[4] We now know that extensive structural changes in the brain take place throughout the adolescent years and the brain does not become fully mature until individuals are in their 20s. The brain's gray matter thickens until about age 11 in girls and age 12½ in boys, and then begins thinning out until the early 20s. The **gray matter** contains nerve cells and dendrites that branch out and form connections with other nerve cells to send nerve signals (messages) throughout the brain. On the other hand, the white matter in the brain thickens. The **white matter** is made up of myelin sheaths, which cover and insulate the axons and make nerve signal transmissions faster and more efficient. Thus, the "pruning away" of gray matter and proliferation of white matter during the adolescent years means fewer but faster nerve connections in the brain, or a more efficient brain. Later in this chapter, you learn how neural connections or synapses that are exercised are retained, whereas those that aren't are lost.

It is important for teachers to realize that the brains of teenage students are immature and not fully developed. The last region of the brain to undergo the maturation process of proliferation and pruning of neural pathways is the prefrontal cortex. The **prefrontal cortex** is the region of the brain, located behind the forehead, where reasoning, planning, organization of thoughts, weighing the consequences of actions, suppressing impulses, and other "executive" functions take place. Adolescent specialist Laurence Steinberg stresses that some of these functions in the prefrontal cortex mature ahead of others. In the teen brain, the systems that regulate logic and reasoning develop ahead of those regulating impulse and emotions.[5] He points out that as a result, adolescents are vulnerable to risky and dangerous behaviors because developmentally they lack the full capacity to control themselves. The prefrontal cortex of the adult brain, unlike the teenage brain, is able to perceive that the negative outcomes of a risky behavior outweigh any potential thrill. These developmental characteristics make teens prone to poor decision making.

Twenty-First-Century Skills

Success in the 21st century requires different skills than were required for successful living in previous centuries. The Partnership for the 21st Century Skills was formed in 2002 to create a model of learning for this millennium that incorporates 21st-century skills into our systems of education. The partnership is a public–private collaboration of business, education, community, and government that serves as a catalyst to position 21st-century skills at the center of the U.S. K–12 education. The partnership recognizes that there is a gap between the knowledge and skills that students learn in school and the knowledge and skills that they need to succeed as effective citizens and workers in the 21st century.

The partnership pushes schools to infuse 21st-century skills into their teaching and learning to prepare children for effective living in this century.

The partnership presents a framework of 21st-century teaching and learning that focuses on student outcomes and support systems to help students master these outcomes.[6] The outcomes are a blending of specific skills, content knowledge, expertise, and literacies that students will need to succeed in work and life in the 21st century. The framework includes a wide range of outcomes such as thinking critically, problem solving, communicating clearly, collaborating with others, thinking creatively, working collaboratively with others, adapting to change, managing goals and time, being self-directed learners, practicing information literacy and media literacy, and applying technology. The partnership also identifies the following core subjects and 21st-century themes as essential for students in this century: English, reading, or language arts; mathematics; science; foreign languages; civics; government; economics; arts; history; and geography. The partnership also advocates that schools go beyond "a focus on basic competency in core subjects to promoting understanding of academic content at much higher levels" by weaving the following 21st-century interdisciplinary themes into core subjects: global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; and health literacy.[6] According to the partnership, **health literacy** involves the following:

❖ Obtaining, interpreting, and understanding basic health information and services and using such information and services in ways that are health enhancing

❖ Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance, and stress reduction

❖ Using available information to make appropriate health-related decisions

❖ Establishing and monitoring personal and family health goals

❖ Understanding national and international public health and safety issues

This book supports teachers in helping their students achieve many of the 21st-century skills. For example, we emphasize problem solving, goal setting, and communication skills in Chapter 3, and then again in later chapters. Media and information literacy is the focus of Chapter 5 and is again highlighted in later chapters. Further, you should recognize that the interdisciplinary theme of health literacy is a major focus of this book.

Teaching in the Twenty-First Century   It is time to abandon the notion that a lecture and reading assignment are enough for students to learn. The role of today's teacher is much more than that of being an expert dispensing facts and information. Teachers need to be co-participants with students in the learning process and take into account the characteristics of today's students as they plan and deliver learning activities. Some describe that the role of the teacher is changing from being a "sage on a stage" to more of a "guide on the side."

Twenty-first-century teachers need to realize that significant learning does not result from absorbing specific information that is delivered (told) to them. Instead, it is more about facilitating students' involvement in learning through exploration and firsthand experience. Teaching approaches need to emphasize less memorizing of material and emphasize more on making connections, thinking through issues, and solving problems. Rodgers et al.[7] describe that 21st-century learners prefer working in teams in peer-to-peer situations, performing visual and kinesthetic activities over reading and listening activities, learning things that matter, and being challenged to reach their own results and conclusion.

Innovative teachers are savvy about technological devices and how they pervade the lives of today's youth, and they use technology and multimedia in ways that enhance student learning. When it comes to technology, teachers can creatively apply numerous possibilities in classroom learning activities including blogs, wikis, threaded discussion boards, chats, videoconferencing, cell phones, and new technologies that will continue to emerge. New and emerging technology creates exciting possibilities for student learning. It provides for almost infinite and rapid access to information and also allows for students to be connected inside and outside of the classroom, to develop multimedia projects, and to learn experientially.

Learning Styles

Effective teachers strive to understand how their students learn best. They teach with the brain in mind (see the next section) and take into account their students' learning styles and multiple intelligences. All students do not learn best in the same ways. One type of learning style relates to one's preference for taking in information. There are visual, auditory, and kinesthetic learning styles that relate to this preference. A **visual learning style** means that a person has a preference for information presented in visual format or through observation such as pictures, diagrams, demonstrations, displays, handouts, video, and flipcharts. An **auditory learning style** means a preference for receiving information through listening to speech and sound such as spoken instructions and songs. A **kinesthetic learning style** means a preference for learning through touching or manipulating things, through physical movement or practical hands-on experiences. Some students have a very strong preferred learning style for taking in information, but many people are multimodal, meaning they use a blend of two or all three of these learning styles. It is important for students to understand that there is no best learning style and that there are different types of learning that are best for one's preferences.

Other types of learning styles relate to the manner in which individuals process the information that they receive. One dimension of processing information is global versus sequential. A **global learning style** is a preference or tendency for seeing the "big picture" before "putting all the pieces together." Once global learners have an overview or holistic sense of what is being learned and

its relevance, they are then able to focus on details or smaller concepts related to the whole. A **sequential learning style** is a preference for "putting together the pieces" to understand the "big picture." Learning sequentially is taking small steps and focusing on one task at a time. These learners are sometimes called linear learners.

Another dimension of processing information is abstract versus concrete. An **abstract learning style** is a preference for visualizing or conceptualizing ideas, which are intangible (cannot actually be seen). A **concrete learning style** is a preference for understanding things that can be seen, heard, or touched. A concrete learner is often excellent in processing factual information but may have difficulty understanding abstract ideas.

What we mention about learning styles in this section represents only a small portion of all of the various learning styles that have been identified. What is most important is for teachers to use a wide variety of instructional strategies to address the diverse learning styles of learners. Whenever possible, offer students choices about how to learn.

Howard Gardner's theory of multiple intelligences[8] provides teachers with a framework that can help them avoid focusing too much on teaching only to students with high linguistic and mathematical abilities. Gardner notes that students who are not good at either linguistic or mathematical abilities have not traditionally received much attention from teachers, have been left behind, and have lost interest in learning. His theory is that people have different intelligences or abilities, in addition to linguistic and mathematical intelligences, and that these unique ways of thinking and learning need to be given equal attention. The eight intelligences that should be given attention by teachers are listed here:

❖ *Linguistic intelligence*. The ability to read, write, and communicate with words

❖ *Logical-mathematical intelligence*. The ability to reason and calculate, to think things through in a logical, systematic manner

❖ *Visual-spatial intelligence*. The ability to think in pictures and visualize future results

❖ *Musical intelligence*. The ability to make or compose music, to sing well, or understand and appreciate music

❖ *Bodily-kinesthetic intelligence*. The ability to use one's body skillfully to solve problems, create products, or present ideas and emotions

❖ *Interpersonal (social) intelligence*. The ability to work effectively with others, to relate to other people, and to display empathy and understanding

❖ *Intrapersonal intelligence*. The ability to self-analyze and reflect, or, in actuality, the capacity to know one's self. In other words, to be able to con-

template and assess strengths and weaknesses, to review behavior and feelings, and to make plans and set goals

❖ *Naturalist intelligence*. The ability to find meanings and patterns in nature and the world

Armstrong explains how to plan for teaching for the eight intelligences:

> To get started, put the topic of whatever you're interested in teaching or learning about in the center of a blank sheet of paper, and draw eight straight lines or "spokes" radiating out from this topic. Label each line with a different intelligence. Then start brainstorming ideas for teaching or learning that topic and write down ideas next to each intelligence (this is a spatial-linguistic approach of brainstorming; you might want to do this in other ways as well, using a tape-recorder, having a group brainstorming session, etc.).[9]

Teaching with the Brain in Mind

Until recently, little was known about the workings of the brain and how people learn. Knowledge about the brain and how it learns is rapidly accumulating. Scientific tools such as magnetic resonance imaging (MRI), computerized axial tomography (CAT), and positron emission tomography (PET) have led to important discoveries about the human brain.

Research from several scientific disciplines has contributed to a virtual revolution of knowledge about the human brain and human learning. Findings from this research create exciting opportunities for educators to apply this information in ways that best help students learn.

One of the most interesting findings from brain research is that learning changes the structure of the brain. In essence, the brain "rewires" itself in response to new stimulation and experiences. Learning experiences cause nerve cells in the brain to create new synapses or junctions through which information passes from one nerve cell (neuron) to another. A baby is born with only a small proportion of the trillions of synapses that he or she will eventually have. Many of the synapses that will eventually be formed after birth are the result of what is learned. Other changes in the brain, such as increased capillary (tiny blood vessel) development and neuron-supported cell growth, are associated with learning.[10]

Our brains are designed to take in a large variety of stimuli from our five senses—sight, hearing, smell, touch, and taste. In response to the stimuli we experience, we develop neural networks or connections among neurons through which the neurons communicate with each other. This communication allows our brains to interpret and respond to sensory stimuli. These neural connections, often described as neural pathways, are strengthened when they are frequently used or stimulated. New experiences (learning) cause new neural pathways to form—a process known as **neural branching**. However, when neural pathways are not stimulated or are infrequently used, they atrophy and cease to function. Neuroscientists call the process of the withering away of neural pathways **neural**

pruning. Another important term is **brain plasticity**. Scientists use this term to describe the ability of neural networks to continue to generate and to modify themselves throughout life.[11]

The important point here is that the brain's capacity to develop neural pathways (plasticity) depends critically on how much it is used. The brain adapts continually whenever something new is learned. Changes in the brain occur as a function of use—use it or lose it, so to speak. Experiences early in life, when the number of connections between brain cells starts to increase rapidly, are important to optimal brain development.[12] In the early years of life, it is important that the brain be adequately stimulated through interactions with both people and the environment. Children with stronger and more connected neural pathways are more likely to have greater learning ability, higher levels of motivation, and accelerated readiness to begin school.[11] Learning occurs at all ages, and the brain appears to maintain its plasticity for life.[12]

The physical structure of the brain changes spontaneously and automatically in response to learning. We do not need to be taught to learn; learning is a natural and innate response to experience. Our brains are continually searching for meaning. The brain's craving for meaning is automatic. The search for meaning occurs through patterning as the brain attempts to discern and understand events in its environment. The brain creates neural connections or associations with what is already known to be personally meaningful. Unless new information carries meaning for us, we are unlikely to make use of it.[13]

Relaxed Alertness

Emotions profoundly affect the brain's ability to learn. Positive emotions such as happiness, enthusiasm, hope, and optimism can facilitate children's learning. Learning in a pleasant environment may stimulate the flow of chemicals in the brain that stimulate the areas of the brain most responsible for learning.

An optimal emotional state for student learning has been described as **relaxed alertness.** According to Caine and associates:

> Relaxed alertness is a state of mind where a student feels competent and confident and is interested or intrinsically motivated. Relaxed alertness is also a state that is present in classrooms and learning environments in which emotional and social competence is the goal. Such an environment allows all students ongoing opportunities to experience competence and confidence accompanied by motivation linked to personal goals and motivation.[14(p.5)]

On the other hand, when students feel threatened, chemicals released in the brain cause the brain to **downshift** so that students are less able to engage in intellectual tasks or form memories. The term *downshift* in this context means that the more primitive and emotional parts of the brain begin to dominate when a threat is perceived. Teachers should understand that situations that create anxiety or threat in the lives of students create downshifting and decrease the students' ability to learn. With this in mind, you should pay special attention to building a classroom environment and relationships with your students that

minimize threat and anxiety so that your students can feel a sense of relaxed alertness.

Your classroom should be a place where students feel safe and secure. Pay special attention to the way that you manage your classroom and consider whether there are things that you do that might create threat or anxiety. Seek to eliminate those things that might create such feelings. Help students who appear anxious or threatened to deal with their feelings. Realize that a student cannot simply shut off or turn on emotions to learn better. Many live in situations that are highly stressful. Some are affected by major threats, such as the illness of a family member, poverty, child abuse, or community violence, which can take a toll on learning ability. Children with such major threats need help, and you can be instrumental in linking them with needed assistance and resources. As a school teacher, you can consult counselors, school nurses, and other available professional resources. Follow school and district policies in seeking help for children suffering from serious threatening conditions.

"So What?"

We have described how the brain innately searches for and constructs meaning. The brain responds differently to what it considers to be meaningless versus meaningful information.[9] Facts about various topics that are learned in isolation are usually soon forgotten by students. However, information that has meaning is retained. We have found in our experience that when we can help students answer the question "So what?" concerning a particular topic, student learning is better. It is our responsibility to help our students understand why what we are discussing in class is personally relevant and meaningful. Both teachers and students should be able to answer the "So what?" question. Our lessons and learning activities should strive to relate material to students in a personal way and to connect to prior learning and experiences. There should be more focus on the quality of the information that is taught and less focus on covering large amounts of material that may be meaningless to students.

Active Learning

The notion that the brain is an empty vessel waiting to sponge up information or have informative material poured into it is false. Learners are not passive recipients of information. Learning requires more than the efficient delivery and dissemination of information into students' minds (passive learning).

The human brain is an information-processing organ, and it learns best through experience. It is able to learn more and retain learning longer if the learner acquires the learning in an active rather than passive manner. Active learning engages students in doing things and thinking about the things that they are doing. You can use many active learning strategies in your teaching to engage students actively. Examples of in-class active learning strategies are debates, role-playing, simulations, dramatizations, and learning centers. Outside of class, active learning examples include service learning, health fairs, and

several types of creative projects. An important and frequently neglected ingredient of active learning is giving students time and encouragement to process and think about the meaning of their learning experiences. Give students opportunities to reflect on what they are learning, the value of what they are learning, how they are learning, and what else needs to be learned. You can do this by creating opportunities for students to engage in self-reflection, such as writing in a journal, or to engage with a teacher or others. Reflection and active processing of learning allow for deeper understanding and meaningfulness of learning experiences.

Individuals learn best when they are immersed in meaningful, compelling experiences. Some schools believe that the teacher's job is to create multisensory real-life learning environments that fully immerse students in learning experiences. This active learning approach is often referred to as **orchestrated immersion**.[14] The key is for students to be "immersed" in rich and complex environments as a way of life, not just for a short time a day per subject. Orchestrated immersion implies that the teacher becomes the conductor or the architect, designing experiences that will lead students to make meaningful connections. The teacher then helps students with the active processing of the experiences as a basis for making them a meaningful learning event. The teacher's role here is much different from the traditional scenario in which the teacher dominates by talking and holding the students' attention. Students who become immersed in learning experiences often become engrossed in learning without regard for time.

The optimal tension level for learning is high challenge and low threat.

RAD Teaching

Judy Willis, a teacher and neuroscientist, proposes that we take into account three main brain systems when preparing lessons and planning for instruction. She identifies the three systems with the acronym **RAD**, which stands for reticular activating system (RAS), amygdala, and dopamine. The **reticular activating system (RAS)** is located in the brainstem and has the job of filtering stimuli (sensory messages) coming into the brain. It determines which information gains entry to the conscious, thinking brain or instead is relayed to automatic response centers. According to Willis, there are billions of bits of sensory information available every second, but only a few thousand can pass through this unconscious RAS filter. The RAS gives priority to stimuli that is novel. From a survival standpoint this makes sense: the brain needs to know what has changed in the environment in case it represents a threat. For example, a quick change in the environment rapidly gets our attention—lights turned off and on, a person entering a classroom when everyone is seated. Because the RAS is geared to let things that are novel and surprising capture our attention, novelty and surprise should be incorporated into teaching strategies. Willis points out that listening to lectures and doing drills and worksheets are not novel experiences, so "do not have the sensory excitement to power through the RAS brain filters."[15] In addition to novelty and surprise, multisensory learning experiences are a good way to get and maintain students' attention.

The **amygdala** has been likened to a switch because it determines whether information is sent to the thinking areas of the brain or instead is sent to

The brain's natural way of learning is through problem solving.

reactive areas of the brain. When a student is relaxed, the information can flow more easily to the higher cognitive areas of the brain for processing and reflection. The optimum state for this flow of information is relaxed alertness, as discussed earlier in the chapter. However, Willis explains, if students are stressed, bored, or frustrated "by lessons beyond their level of understanding or by lessons about things they have already mastered, the amygdala directs the input to the unconscious, involuntary, reactive brain." In this emotional state, the brain is in survival mode and is ready to react with "fight, flight, or freeze so no long-term memories are created."[15]

Dopamine is a brain chemical (neurotransmitter) that is released during pleasurable experiences. Dopamine increases the brain's attention to the pleasurable activity and builds strong memories of the experience. The implication here is that when you incorporate pleasurable, joyful learning activities, dopamine may be released in students' brains and help them pay attention and create long-term memories of what they learn.[15]

Other Considerations

You must consider many things when teaching with the brain in mind; because of space constraints, we mention only a few more. One of these is that the brain learns better through social interaction than it does when working alone. Yet, in many classrooms we see the students sitting quietly in rows, working independently with little or no social interaction. Teachers can offer students learning activities that allow students to work together toward a common goal. Cooperative learning activities can help students learn communication and social skills at the same time that they are working toward a learning goal. Cooperative learning activities also foster a sense of being a member of a learning community and encourage meaningful discussion and reflection. Many students find that learning is more enjoyable when they have the opportunity to learn through social interaction.

The brain is poor at nonstop attention. It takes a high level of neural energy for students to concentrate and focus intensely. This is particularly true for direct instruction. The attention spans of most students are brief. According to Jensen, author of *Teaching with the Brain in Mind*, the appropriate amount of direct instruction for children in grades 3 to 5 is 8 to 12 minutes; for those in grades 6 to 8, 12 to 15 minutes; and for those in grades 9 to 12, 12 to 15 minutes.[16] The brain's store of neural energy is quickly depleted by episodes of paying attention. If not given time for rest or diversion, the brain loses the ability to focus and concentrate. For this reason, provide students with breaks, alternative learning strategies, and changes in topics to shift the emphasis of concentration.

Jensen asserts that one of the smartest things that teachers can do is to keep students active.[13] He explains that activity keeps their energy levels up and provides the brain with the oxygen-rich blood needed for highest performance. Physical activity either before or after learning also releases chemicals that

Being physically active keeps energy levels up and enhances long-term memory.

enhance long-term memory. He warns that teachers who insist that students remain seated during the entire class period are not promoting optimal conditions for learning. He suggests using drama and role-plays, energizers, quick games, and stretching to physically invigorate students during learning. If students feel drowsy, they should be allowed to stand at the back of the room for a few minutes and do some stretching in a manner that does not distract other class members. Jensen encourages teachers to give students settling time and rest after a learning session.[16] This affords students a chance for the information to settle and for learning to take root.

Teaching Health Effectively

Health education is integral to the primary mission of schools. It provides young people with the knowledge and skills they need to become successful learners and healthy and productive adults. Health education is a fundamental part of an overall school health program. A critical objective for improving our nation's health is increasing the number of schools that provide health education on key health problems facing young people.[17]

Traditionally health education has been organized around 10 content areas: mental/emotional health; substance use and abuse; healthy eating and physical activity; personal health; safety and first aid; consumer health; community health; disease prevention and control; family life/human sexuality; and

environmental health. Time constraints make it impossible, at both the elementary and secondary levels, for teachers to address all of these areas effectively. Another problem with this organization is that it usually creates a focus on content with an emphasis on knowledge rather than on skills acquisition and healthy behavior. For these reasons we designed this text using a different approach for health instruction that emphasizes the National Health Education Standards with life skills and the **Centers for Disease Control and Prevention (CDC)** categories of risk behaviors. This text correlates all of these elements and makes it possible for teachers to focus on the critical areas and teach protective life skills that research has shown to be effective. This section discusses the National Health Education Standards (NHES) and the CDC's six categories of risk behaviors. Being familiar with this information can help you prioritize what you address in your health education teaching and teach for impact. This section also discusses other topics important to teaching health education including state and district guidelines, the Health Education Curriculum Analysis Tool (NECAT), and the coordinated school health program (CSHP).

National Health Education Standards and Life Skills

The **National Health Education Standards (NHES)** are written expectations for what students should know and be able to do by grades 2, 5, 8, and 12 to promote personal, family, and community health. The standards provide a framework for curriculum development and selection, instruction, and student assessment in health education. The standards with performance indicators for each standard and grade can be accessed at http://www.cdc.gov/HealthyYouth/SHER/standards/index.htm.

The National Health Education Standards help school systems move toward a more skills-based rather than content-based approach to health education. Many contemporary health education programs strive to empower students with life skills that they can take away from the classroom and apply in real-life settings. For example, they focus on teaching young people decision-making skills and strengthening the ability to communicate these decisions to others who might try to influence them to engage in a risky health behavior. Here are the eight national health education standards with key words in italic type that indicate life skills:

❖ *Standard 1.* Students will comprehend concepts related to health promotion and disease prevention to enhance health.

❖ *Standard 2.* Students will *analyze* the influence of family, peers, culture, media, technology, and other factors on health behaviors.

❖ *Standard 3.* Students will demonstrate the ability to *access* valid information and products and services to enhance health.

❖ *Standard 4.* Students will demonstrate the ability to use *interpersonal communication* skills to enhance health and avoid or reduce health risks.

❖ *Standard 5.* Students will demonstrate the ability to use *decision-making skills* to enhance health.

❖ *Standard 6.* Students will demonstrate the ability to use *goal setting skills* to enhance health.

❖ *Standard 7.* Students will demonstrate the ability to *practice* health-enhancing behaviors and avoid or reduce risks.

❖ *Standard 8.* Students will demonstrate the ability to *advocate* for personal, family, and community health.

The **World Health Organization (WHO)** also advocates skill-based health education. Individuals who possess these skills are likely to adopt and sustain a healthy lifestyle during their school years and throughout the rest of their lives. The WHO stresses that skill-based health education has been shown by research to reduce the chances of young people engaging in delinquent behavior and interpersonal violence; delay the onset of using alcohol, tobacco, and other drugs; prevent peer rejection and bullying; and improve academic performance.[18]

Three entire chapters of this book are devoted to helping you understand and know how to teach your students essential life skills that will protect them from risk behaviors. Chapter 3 looks at four groups of skills: self-awareness and self-evaluation skills; communication and interpersonal skills; goal setting and self-management skills; and decision-making and problem-solving skills. Chapter 4 addresses stress reduction and stress management skills. Chapter 5 is devoted to media and information literacy skills. We placed these skill-based chapters at the beginning of the text so that you are familiar with key life skills and can incorporate them into your instructional plans for the risk behaviors that are addressed in later chapters.

CDC's Categories of Risk Behavior

Looking at national statistics and trends can also help us prioritize what we take time to teach in our classrooms. More than two-thirds of all deaths among youth and young adults ages 10 to 24 years result from only four causes. Can you name those causes? If you said motor vehicle crashes, other unintentional injuries, homicide, and suicide, you would be correct. But these deaths are only part of the picture we should be examining. Almost two-thirds of deaths of those older than age 25 occur from cardiovascular disease and cancer. Many of these diseases are the result of behaviors, such as poor diet, lack of physical activity, and cigarette smoking, that are established early in life. In addition to these deaths, many school-age youth suffer from nonfatal illness or injury, social problems, and lower quality of life as a result of health risk behavior choices. Unfortunately, many school-age youth experience unintended pregnancy, sexually transmitted infections (STIs), and type 2 diabetes.

The CDC has identified that a high proportion of deaths, illnesses, and injuries in the United States result from six categories of risk behavior (see **Figure 2-1**).
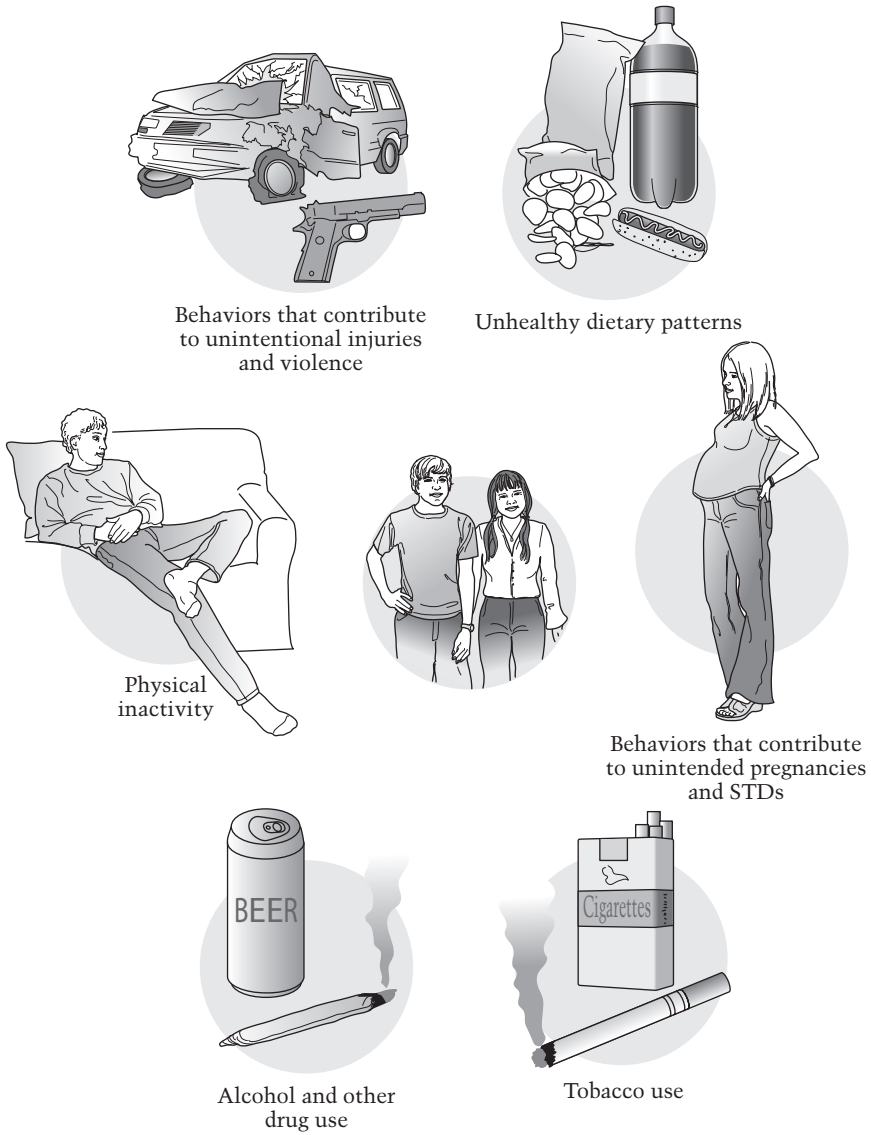
Behaviors that contribute
to unintentional injuries
and violence

Unhealthy dietary patterns

Physical
inactivity

Behaviors that contribute
to unintended pregnancies
and STDs

BEER

Alcohol and other
drug use

Cigarettes

Tobacco use

FIGURE 2-1   Six categories of risk behavior.

2–1
Application Exercise

Web Tools

This exercise helps you become familiar with tools you can use in planning your health instruction. The Youth Risk Behavior Survey is a biannual school survey in grades 9 through 12 conducted by the CDC. Becoming familiar with your state's data and how they compare to national averages can help you identify what you need to emphasize in your classroom. Go to http://www.cdc.gov/HealthyYouth. On the HealthyYouth website under the Data & Statistics heading, click YRBBS. Under Fact Sheets, click Comparisons Between State & National Results. Click a state of your choice. Consider the various risk behaviors and data. Answer these questions:

1. What data surprised you the most?
2. How did your state compare to national data?
3. How can you use the Youth Risk Behavior Survey in your teaching?

Snoop around the Healthy Youth website some more and identify at least five additional documents or resources that could help you teach health concepts.

We believe that every teacher, regardless of teaching discipline and grade level, should understand how these risk behaviors adversely affect the lives of youth (see **Box 2-1**). It is our conviction that every teacher can be a part of their school's effort to educate youth about these risks and participate in school-based efforts to promote healthy lifestyles among students. Success in these endeavors requires participation from educators representing all disciplines and all grade levels. Chapters 6, 7, 8, and 9 of this text address the CDC's risk factors in detail. Unhealthy dietary patterns and physical inactivity are addressed in Chapter 6. Tobacco, alcohol, and other drug use are examined in Chapter 7. The behaviors that contribute to unintended pregnancy and STIs, including HIV infection, are the focus of Chapter 8. Behaviors that contribute to unintentional injuries and violence are addressed in Chapter 9.

State and District Guidelines

In addition to taking into consideration the NHES and the CDC's risk behaviors, it is important that you look at available state and district guidelines. These guidelines are often created with an awareness of the particular needs of the students in an area. Community attitudes and problems can also play a part in the development of these guidelines. Many states and school districts provide health education scope and sequence plans that identify the concepts that are to be emphasized at each grade level. A teacher can better judge what students

have already been exposed to when these guides are followed. Scope and sequence guides also help teachers identify what they need to address in their class and how their instruction might be reemphasized in coming years. You can find examples of state health education standards, curricula, and guidelines by using Google to search these topics for the locations where you plan to teach.

Health Education Curriculum Analysis Tool

The **Health Education Curriculum Analysis Tool (HECAT)** is an assessment tool you can use to examine or plan your school health education curricula.[*] It was developed by CDC and is based on the National Health Education Standards, the CDC's categories of risk behavior, and Characteristics of Effective Health Education Curricula. The HECAT can help schools select or develop effective health education curricula and improve the delivery of health education (**Box 2-2**). Modules are available to help you analyze curricula that address alcohol and other drugs, healthy eating, mental and emotional health, personal health and wellness, physical activity, safety, sexual health, tobacco, and violence prevention. The HECAT is customizable to meet local community needs and conform to the curriculum requirements of a state or school district.

2-2
In the Classroom

Health Education Curriculum

The Health Education Curriculum Analysis Tool (HECAT) can help you plan for health instruction at various grade levels. The following content areas have been identified as essential parts of health education by HECAT. You can see where this text emphasizes each area. You can access grade-specific modules on topic areas at http://www.cdc.gov/HealthyYouth/HECAT/index.htm.

Promoting mental and emotional health	Chapters 3, 4, and 5
Promoting personal health and wellness	Chapters 3, 4, and 5
Promoting healthy eating	Chapter 6
Promoting physical activity	Chapter 6
Promoting a tobacco-free lifestyle	Chapter 7
Promoting an alcohol- and other drug-free lifestyle	Chapter 7
Promoting sexual health	Chapter 8
Promoting safety	Chapter 9
Preventing violence	Chapter 9

---

[*] This section is taken from a prepublication document of *National Health Education Standards, PreK–12.* American Cancer Society. December 2005–April 2006: 25, msp. 30.

You can use the HECAT to benefit your schools, school districts, and states in the following ways:

❖ Ensure a complete, thorough, and consistent review of a health education curriculum is performed.

❖ Clarify what should be included in a health education curriculum.

❖ Ensure that the curriculum is aligned with research-based practices, the National Health Education Standards, and CDC's Characteristics of Effective Health Education Curricula.

❖ Identify instructional strategies that improve teaching and student learning.

❖ Implement a high-quality curriculum that is affordable and feasible in your schools.

❖ Provide sound and defensible justification for curriculum decisions to parents, school board members, and other people interested in health education in your community or state.

Characteristics of Effective Health Education Curricula

Reviews of effective programs and curricula and input from experts in the field of health education have identified characteristics of effective health education curricula. The HECAT was designed to be consistent with the characteristics that emanate from this research. An effective health education curriculum includes the following 14 characteristics:

❖ Focuses on clear health goals and related behavioral outcomes

❖ Is research-based and theory-driven

❖ Addresses individual values and group norms that support health-enhancing behaviors

❖ Focuses on increasing personal perceptions of risk and harmfulness of engaging in specific health-risk behaviors and reinforcing protective factors

❖ Addresses social pressures and influences

❖ Builds personal competence, social competence, and self-efficacy by addressing skills

❖ Provides functional health knowledge that is basic, accurate, and directly contributes to health-promoting decisions and behaviors

❖ Uses strategies designed to personalize information and engage students

❖ Provides age-appropriate and developmentally appropriate information, learning strategies, teaching methods, and materials

❖ Incorporates learning strategies, teaching methods, and materials that are culturally inclusive

❖ Provides adequate time for instruction and learning

❖ Provides opportunities to reinforce skills and positive health behaviors

❖ Provides opportunities to make positive connections with influential others

❖ Includes teacher information and plans for professional development and training that enhance effectiveness of instruction and student learning

Coordinated School Health Program

For your health education to reach its maximum effectiveness, it needs to be supported by others. It is important for you to consider who you can get to help you (fellow faculty members, cafeteria workers, parents, local church groups) and how you can motivate them to action. The CDC advises that schools by themselves cannot, and should not be expected to, address the serious health and social problems that affect our nation and communities. Families, health care workers, the media, religious organizations, community organizations that serve youth, and young people themselves also must be systematically involved. However, schools can provide a critical facility in which many agencies can work together to maintain the well-being of young people. Health education is an integral part of the **coordinated school health program (CSHP)**. The CDC describes each of the seven other interactive components of the CSHP as follows (see **Figure 2-2**):[14]

❖ *Physical education*. A planned, sequential K–12 curriculum that provides cognitive content and learning experiences in a variety of activity areas such as basic movement skills; physical fitness; rhythms and dance; games; team, dual, and individual sports; tumbling and gymnastics; and aquatics. Quality physical education should promote, through a variety of planned physical activities, each student's optimal physical, mental, emotional, and social development and should promote activities and sports that all students enjoy and can pursue throughout their lives. Qualified, trained teachers teach physical activity.

❖ *Health services.* Services provided for students to appraise, protect, and promote health. These services are designed to ensure access and/or referral to primary health care services, foster appropriate use of primary health care services, prevent and control communicable disease and other health problems, provide emergency care for illness or injury, promote and provide optimum sanitary conditions for a safe school facility and school environment, and provide educational and counseling opportunities for promoting and maintaining individual, family, and community health. Qualified professionals such as physicians, nurses, dentists, health educators, and other allied health personnel provide these services.

FIGURE 2-2   Eight interactive components of the coordinated school health program.

❖ *Nutrition services.* Access to a variety of nutritious and appealing meals that accommodate the health and nutrition needs of all students. School nutrition programs reflect the U.S. Dietary Guidelines for Americans and other criteria to achieve nutrition integrity. The school nutrition services offer students a learning laboratory for classroom nutrition and health education, and serve as a resource for linkages with nutrition-related community services. Qualified child nutrition professionals provide these services.

❖ *Counseling and psychological services.* Services provided to improve students' mental, emotional, and social health. These services include individual and group assessments, interventions, and referrals. Organizational assessment and consultation skills of counselors and psychologists contribute not only to the health of students but also to the health of the school environment. Professionals such as certified school counselors, psychologists, and social workers provide these services.

❖ *Healthy school environment.* The physical and aesthetic surroundings and the psychosocial climate and culture of the school. Factors that influence the physical environment include the school building and the area surrounding it, any biological or chemical agents that are detrimental to health, and

physical conditions such as temperature, noise, and lighting. The psychological environment includes the physical, emotional, and social conditions that affect the well-being of students and staff.

❖ *Health promotion for staff.* Opportunities for school staff to improve their health status through activities such as health assessments, health education, and health-related fitness activities. These opportunities encourage school staff to pursue a healthy lifestyle that contributes to their improved health status, improved morale, and a greater personal commitment to the school's overall coordinated health program. This personal commitment often transfers into greater commitment to the health of students and creates positive role modeling. Health promotion activities have improved productivity, decreased absenteeism, and reduced health insurance costs.

❖ *Family/community involvement.* An integrated school, parent, and community approach for enhancing the health and well-being of students. School health advisory councils, coalitions, and broadly based constituencies for school health can build support for school health program efforts. Schools actively solicit parent involvement and engage community resources and services to respond more effectively to the health-related needs of students.

You might find yourself in a school where there is either no coordinated school health program or where a program is only minimally established. Understanding the interactive components of the CSHP can help you see the possibilities for your school and also help you to enlist others in your school and community to become involved in organizing to support your students to make healthy behavior choices.

School Health Advisory Councils

A **School Health Advisory Council (SHAC)** is a group of individuals selected from segments of the community who act collectively in advising the school district about aspects of the coordinated school health program. Members of a SHAC are usually appointed by the school district to advise the school district. The members of a SHAC are usually drawn from the following groups of people: parents, school teachers, school administrators, students, health care professionals, members of the business community, law enforcement representatives, and representatives of nonprofit health organizations or other community organizations. The School Health Program of the Texas Department of State Health Services has produced a guide for building a successful SHAC that is available at http://www.dshs.state.tx.us/schoolhealth/SHACGuide2007.pdf.

Teaching for Behavior Change

Health education that provides information for the sole purpose of improving knowledge of factual information is incomplete and inadequate. It is important

in health education to go beyond the cognitive level and address health determinants, social factors, attitudes, values, norms, and skills that influence specific health-related behaviors. Instruction that addresses the determinants of behavior is more likely to achieve longer lasting results.[19]

The following sections briefly introduce some of the key health behavior theories and models that explain determinants of and influences on health-related behaviors among youth. Reviewing each of these models can give you great insights into how to help your students make needed health behavior changes.

Health Belief Model

The **Health Belief Model** is one of the first theories of health behavior and has been used extensively in public health practice. It was developed by social psychologists originally to understand why individuals failed to take advantage of public health services such as immunizations and screenings for tuberculosis. The model identifies six factors that influence individuals to act in ways that help improve their health:

❖ **Perceived susceptibility.** Belief that he or she is susceptible to a disease, injury, or other poor health condition (e.g., lung cancer, motor vehicle injury, loss of teeth).

❖ **Perceived severity.** Belief that the condition has serious consequences (e.g., death, bodily injury, pain, suffering, loss of job, embarrassment or shame).

❖ **Perceived benefits.** Belief that taking an action (e.g., not smoking, participating in physical activity) will reduce personal susceptibility to the condition or its severity.

❖ **Perceived barriers.** The obstacles that get in a person's way of taking an action (e.g., not smoking, participating in physical activity).

❖ **Cues to action.** Factors that prompt action (e.g., seeing an anti-smoking television spot, an invitation from a friend to exercise).

❖ **Self-efficacy.** This sixth factor was later added to the model and is discussed in the following section on social cognitive theory.

You can design health education lessons to address each of these six factors. Lessons can help students to realize the seriousness of prevalent health conditions and the connection between the condition and personal behavior (perceived susceptibility and perceived severity). Lessons can also stress the perceived benefits of various health behaviors. It is important to stress that the benefits often go beyond reduction of disease or injury risk. For example, you can stress the social and personal appearance benefits of not smoking cigarettes when discussing tobacco smoking. Young people who do not smoke are not subject to yellow stains on their teeth or bad breath and stinky clothing from cigarette

smoke. Health lessons that address perceived benefits and cues to action are helpful because they address important influences on health behavior.

Social Cognitive Theory

Social cognitive theory (SCT) is particularly valuable in explaining health behavior in youth because it emphasizes the important influence of the social environment on personal behavior. SCT identifies that people learn and are influenced by watching what others do. Observational learning (modeling) helps individuals acquire specific behaviors. Modeling, of course, can either be positive or negative. The modeling of health-enhancing behaviors by teachers, other adults, and peers is a positive force in young people's lives. On the other hand, the modeling of health risky behaviors such as cigarette smoking or weapon-carrying can exert a strong negative influence on behavior.

SCT introduces the concept that reinforcements (rewards) affect whether or not a person will repeat a behavior. Positive reinforcements increase a person's likelihood of repeating the behavior, while negative reinforcements motivate a person to stop a behavior to eliminate the negative stimulus. A good example of this is when the driver of an automobile hears a beeping alarm as a reminder to fasten a seat belt. An important point is that reinforcements can be either internal or external. Internal rewards are things that people do to reward themselves whereas external rewards are provided by other people or the environment.

Children learn from watching and imitating others. The importance of adults modeling healthy behaviors cannot be overemphasized.

Self-efficacy is a component of many health behavior theories and is, according to SCT, the most important personal factor in behavior change. **Self-efficacy** is confidence in one's ability to perform a health action or behavior and to overcome barriers resistant to taking the action. Research shows that health behaviors such as not smoking, physical exercise, dieting, condom use, dental hygiene, seat belt use, breast self-examination, and others are highly associated with a person's level of perceived self-efficacy.[20] Self-efficacy is important to behavior change because it indicates the amount of effort an individual is willing to make to change a health behavior and the person's persistence in continuing to strive for health despite obstacles, barriers, and setbacks.

Given the importance of self-efficacy in determining health behavior, you might ask, "What can teachers do to help boost their students' self-efficacy to engage and perform certain health behaviors?" Margolis and McCabe[21] suggest that teachers focus on the following four areas to help their students develop high-perceived self-efficacy:

❖ Provide *mastery experiences* in which students experience success. Success boosts self-efficacy, whereas failures can destroy self-efficacy.

❖ Provide *vicarious experiences* for students to observe a peer succeed in performing an action or behavior. By observing a peer succeed, students can strengthen their belief in their own abilities.

❖ Provide *verbal persuasion* to encourage students to make their best effort while guiding the student in performing the behavior.

❖ Foster a *positive emotional state* for encouraging self-efficacy. Teachers can exude enthusiasm about engaging in health behaviors and help to reduce stress and anxiety surrounding the practice of these behaviors.

Theory of Planned Behavior

The **theory of planned behavior** examines the relationship between health behavior and beliefs, attitudes, and intentions. It is very similar to the theory of reasoned action. In both of these theories, behavioral intention is the most important determinant of health behavior. **Behavioral intention** is the perceived likelihood of performing a behavior. Behavioral intention is influenced by a person's *attitude* toward performing a behavior and by the *subjective norm*. **Attitude** is a person's evaluation of the health behavior. The **subjective norm** consists of beliefs about whether key people approve or disapprove of the behavior. According to the theory, individuals behave in a way that gains approval from these key people. The theory of planned behavior also includes a factor called perceived behavioral control. **Perceived behavioral control** is similar to self-efficacy and is the belief that one has, and can exercise, control over performing the behavior.

It is important to provide students with lessons that examine their subjective norms about various health behaviors. Subjective norms are largely

determined by normative beliefs. **Normative beliefs** are an individual's perception of a particular behavior. Research shows that young people who simply overestimate the prevalence of smoking among their peers, as with other health risk behaviors such as alcohol and drug use, are more likely to engage in these behaviors.[22,23] Research also shows that media portrayals of smoking, often shown in a glamorous and positive light, contribute to false impressions of high smoking prevalence.[24] Teachers need to address normative beliefs to correct the belief that many students have that risky behaviors, such as smoking, drug use, and early sexual activity, among their peers are normal and frequent. You can do this by providing feedback of survey data showing actual prevalence rates. Correcting misperceptions (e.g., overestimations) of the prevalence of risky behaviors is an important preventive strategy that teachers can implement in most classrooms.

Stages of Change Model

The basic premise of the **Stages of Change Model** is that behavior change is a process, not an event. As a person attempts to change a behavior, he or she moves through the following five stages:

- ❖ **Precontemplation.** A person has no intention of taking action or making a behavior change within the next 6 months.

- ❖ **Contemplation.** A person intends to take action in the next 6 months.

- ❖ **Preparation.** A person intends to take action within the next 30 days and has taken some steps in that direction.

- ❖ **Action.** A person has changed behavior for less than 6 months.

- ❖ **Maintenance.** A person has changed behavior for more than 6 months.

The Stages of Change Model has been applied to a variety of individual health behaviors. The model is circular, not linear. This means that people do not systematically progress from one stage to the next. Instead, they may enter the change process at any stage, relapse to an earlier stage, and begin the process once more. They may cycle through this process repeatedly, and the process can stop at any point.

A key concept of this model is that people in the different stages have different health education needs and benefit from different messages and interventions depending on which stage they are currently in. When planning health education lessons about physical activity, for example, it is important to consider different messages and strategies for students who have no intention of becoming physically active (precontemplation), are considering becoming active soon (contemplation), are preparing to become active (preparation), have recently become physically active (action), and have been active long periods of time (maintenance). Design lessons should take into consideration students who have attempted to be physically active but whose efforts have failed (relapse).

These students need support to work through relapse and again move into action.

An example of a strategy based on the Stages of Change Model was developed by Brinley, Barrar, and Cotugna[25] for encouraging high school students to increase fruit and vegetable consumption. Classroom teachers distributed a "staging questionnaire" to determine students' stage of change in terms of eating the recommended intake of five or more servings of fruits and vegetables daily. Students were then assigned to a group based on their stage of change classification. Each group of students attended a stage-appropriate program on increasing fruit and vegetable consumption that was tailored to that group. For example, the focus for students in the precontemplation stage was "consciousness raising" in which the benefits and reasons for eating fruits and vegetables were explained and obstacles to this behavior were explored. Those in the preparation stage were asked to make the commitment to change and were guided with tips, tools, and techniques to begin changing their behavior. Stage-specific action sheets were also created for the students to complete during these health education lessons. This example reminds us that often it is a good idea to take into account the various stages of change in our health education instruction.

Key Terms

gray matter   34
white matter   34
prefrontal cortex   34
health literacy   35
visual learning style   36
auditory learning style   36
kinesthetic learning style   36
global learning style   36
sequential learning style   37
abstract learning style   37
concrete learning style   37
neural branching   38
neural pruning   38
brain plasticity   39
relaxed alertness   39
downshift   39
orchestrated immersion   41
RAD   42
reticular activating system (RAS)   42
amygdala   42
dopamine   43
Centers for Disease Control and
   Prevention (CDC)   45

National Health Education Standards
   (NHES)   45
World Health Organization
   (WHO)   46
Health Education Curriculum
   Analysis Tool (HECAT)   49
coordinated school health program
   (CSHP)   51
School Health Advisory Council
   (SHAC)   53
Health Belief Model   54
perceived susceptibility   54
perceived severity   54
perceived benefits   54
perceived barriers   54
cues to action   54
self-efficacy   54
social cognitive theory (SCT)   55
self-efficacy   56
theory of planned behavior   56
behavioral intention   56
attitude   56
subjective norm   56

Review Exercise

1. Define and explain the relative importance of each of the key terms in the context of this chapter.
2. Identify the various characteristics of today's learners and explain how digital natives differ from previous generations.
3. Describe the wide range of student outcomes that are part of the Partnership for the 21st Century Skills.
4. Illustrate how the role of the teacher is changing and how savvy 21st-century instructors use technology and multimedia.
5. Differentiate the various learning styles, including styles for taking in information and processing information.
6. Identify Gardner's eight intelligences and provide examples of each.
7. Describe how our brains respond to stimuli (and lack of stimuli) and the practices teachers can do to best facilitate learning in the brain.
8. Explain the RAD system and the implications it has for preparing lessons and planning for instruction.
9. Discuss cooperative learning, nonstop attention, and quietly sitting in desks as they relate to brain learning.
10. Describe how health education has been traditionally organized, and how and why it is organized as it is in this textbook.
11. State the various skills that are in the National Health Education Standards and explain why skill-based health education is so important.
12. Name the CDC's categories of risk behaviors and explain the relative importance of each category.
13. Identify the characteristics of an effective health education curriculum.
14. Name and discuss the eight categories of the coordinated school health program.
15. Differentiate the various key health theories and models. Identify the health education implications of each.

References

1. Oblinger DG, Oblinger JL. Educating the Net generation. EDUCAUSE. 2005. Available at http://www.educause.edu/educatingthenetgen. Accessed July 20, 2009.
2. National Association of Student Financial Administrators. News from NASFAA: "Diana Oblinger Details Today's Learners." NASFAA. 2006. Available at http://www.nasfaa.org/publications/2006/rnoblinger051206.html. Accessed July 20, 2009.
3. Giedd JN. The teen brain: insights from neuroimaging. *J Adolesc Health*. 2008; 42:335–343.

4. Wallis C. What makes teens tick. *Time*. September 26, 2008. Available at http://www.time.com/time/magazine/article/0,9171,994126,00.html. Accessed July 20, 2009.

5. Steinberg L. Adolescent development and juvenile justice. *Ann Rev Clin Psychol*. 2009;5:459–485.

6. Partnership for 21st Century Learning Skills. *Framework for 21st Century Learning*. 2009. Available at http://www.21stcenturyskills.org/index.php?option=com_content&task=view&id=254&Itemid=120. Accessed July 20, 2009.

7. Rodgers M, Runyon D, Starrett D, Von Holzen R. *Teaching the 21st Century Learner.* Paper presented at the 22nd Annual Conference on Distance Teaching and Learning. 2006. Available at http://depd.wisc.edu/series/06_4168.pdf. Accessed July 20, 2009.

8. Gardner H. *Intelligence Reframed: Multiple Intelligences for the 21st Century*. New York: Basic; 2000.

9. Armstrong T. Multiple intelligences. 2000. Available at http://www.thomasarmstrong.com/multiple_intelligences.htm. Accessed July 20, 2009.

10. Bransford J, Brown AL, Cocking RR. *Brain, Mind, Experience, and School*. Washington, DC: National Academy Press; 1999.

11. Cram HG, Germinaro V. *Leading and Learning in Schools*. Lanham, Md: Technomic Books; 2000.

12. Blakemore SJ, Frith U. *The Learning Brain: Lessons for Education*. Malden, Mass: Blackwell; 2005.

13. Christison M. Brain-based research and language teaching. *English Teaching Forum.* April 2002;40(2):2–7.

14. Caine RN, Caine G, McClintic C, Klimek K. *Twelve Brain/Mind Learning Principles in Action*. Thousand Oaks, Calif: Corwin Press; 2005.

15. Willis JA. Information into knowledge: teacher and neuroscientist shares her RAD teaching strategies for bypassing the brain filters to increase student engagement, motivation, and memory as they turn information into knowledge. *CAIS Faculty Newsletter.* Spring 2008:P 4–7.

16. Jensen E. *Teaching with the Brain in Mind.* 2nd ed. Alexandria, Va: Association for Supervision and Curriculum Development; 2005.

17. US Department of Health and Human Services. *Healthy People 2010* (2 vol). 2nd ed. Washington, DC: US Government Printing Office; 2000. Available at http://www.healthypeople.gov. Accessed July 20, 2009.

18. World Health Organization. *Skills for Health* (Information Series on School Health Document 9). Geneva, Switzerland: WHO; 2003.

19. Centers for Disease Control and Prevention. *Characteristics of an Effective Health Education Curriculum*. 2008. Available at http://www.cdc.gov/healthyyouth/SHER/characteristics/index.htm. Accessed July 20, 2009.

20. Conner M, Norman P, eds. *Predicting Health Behaviour.* 2nd ed. rev. Buckingham, England: Open University Press; 2005.

21. Margolis H, McCabe P. Improving self-efficacy and motivation: what to do, what to say. *Interventions in School and Clinic*. 2006;41(4):218–227.

22. Juvonen SC, Martino PL, Ellickson DL. "But others do it!": do misperceptions of schoolmate alcohol and marijuana use predict subsequent drug use among young adolescents? *J Appl Soc Psychol.* 2007;37:740–758.

23. Moodie C, MacKintosh AM, Brown A, Hastings GB. Tobacco marketing awareness on youth smoking susceptibility and perceived prevalence before and after an advertising ban. *Eur J Public Health.* 2008;18(5):484–490.

24. Primack BA, Switzer GE, Dalton MA. Improving measurement of smoking normative beliefs in adolescents. *Arch Pediatr Adolesc Med.* 2007;161:434–439.

25. Brinley C, Barrar C, Cotugna N. Stages of Change: tools to increase fruit and vegetable consumption in high school students. *J Nutr Ed.* 2001;33(1):57–58.