CHAPTER 1

A Brain Primer—Major Structures and Their Functions

Education is discovering the brain and that's about the best news there could be . . . anyone who does not have a thorough, holistic grasp of the brain's architecture, purposes, and main ways of operating is as far behind the times as an automobile designer without a full understanding of engines.

—Leslie Hart (1983)

- *Have you ever wondered how the brain works?*
- *Have you ever wondered what the different parts of the brain do?*
- *Have you ever wondered why some see effort as futile and others see it as imperative?*

The brain is a complex organ whose relationship with learning is undeniable. The primary charge of an instructional leader is to increase learning. Analyze the learning organ and begin to understand how we learn. To develop understanding, it is critical to have anchors of information from which to build upon.

This chapter will act as that anchor. Because the remaining chapters in the book may assume knowledge of this chapter, it will serve as a foundation for greater comprehension throughout the remainder of the book. This chapter will discuss the major structures and functions of the brain, what the brain looks and feels like, and how those structures differ in their functions. Readers will explore deep inside the brain to discover the mysteries of this miraculous organ.

Does not understanding how the brain works preclude being an effective instructional leader? Probably not, especially for those who have already enjoyed years of success as an instructional leader. The truth is that brain-compatible methods have been used forever, because they work well, and some people instinctively employ these methods naturally. For those who would benefit from a more deliberate, analytical approach, this book codifies these methods, so instead of relying on experience as the only teacher, an instructional leader can enlist the help of science as well.

An unusually fitting analogy for the workings of the human brain was written by Thomas Armstrong in his book, *Neurodiversity* (2010). Instead of comparing the brain to computers or control towers, which seems to be common, he compares it to a complex ecosystem. In response to comparisons to the brain being like a machine, he writes as follows:

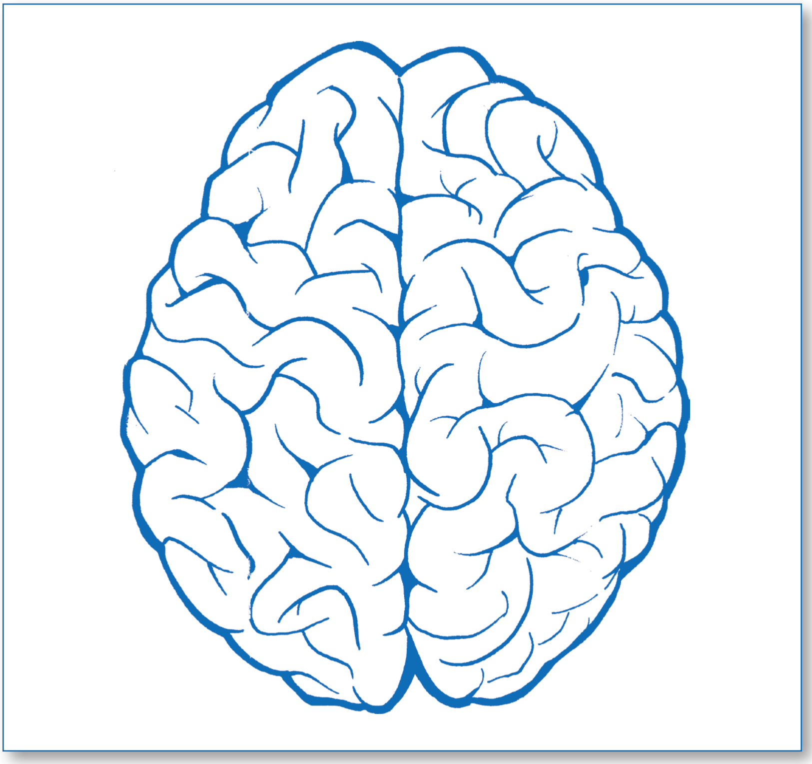
> It isn't characterized by levers and gears, wires and sockets, or even the simple binary codes of computers. It isn't hardware or software. It's wetware. And it's messy . . . . The body of a neuron, or brain cell, looks like an exotic tropical tree with numerous branches. The electric crackling of neuronal networks mimics heat lightning in a forest. The undulations of neurotransmitters moving between neurons resemble the ocean tides. (pp. 9–10)

Aside from the beautifully descriptive imagery of this writing, I think this analogy serves as a reminder that understanding the brain is something within everyone's reach. Although it might be complex, it is an integral part of our world and our lives. Some educators I have worked with have expressed the notion that the brain is somehow too complex to understand. They shy away from the topic in an effort to "leave it to the experts." Some might even argue that understanding how the brain works is not a good use of an educator's time. I would argue that the instructional leaders who understand how the brain works gain exponential understandings in every role and responsibility embedded in their charge. When I understand how the brain works, I better understand learning, teaching, responses, behaviors, communication, and motivation. I'd say that's a pretty good bang for the buck (see Figure 1.1).

BRAIN HEMISPHERES

The human brain weighs about 3 pounds, is about the size of a grapefruit, and is composed of two hemispheres. The consistency of a live brain inside the skull is about that of toothpaste, fresh out of a tube (but wouldn't stick like toothpaste). Taking both hands and making fists, then placing them, touching each other, knuckles

Figure 1.1 A Bird's Eye View of the Brain's Two Hemispheres



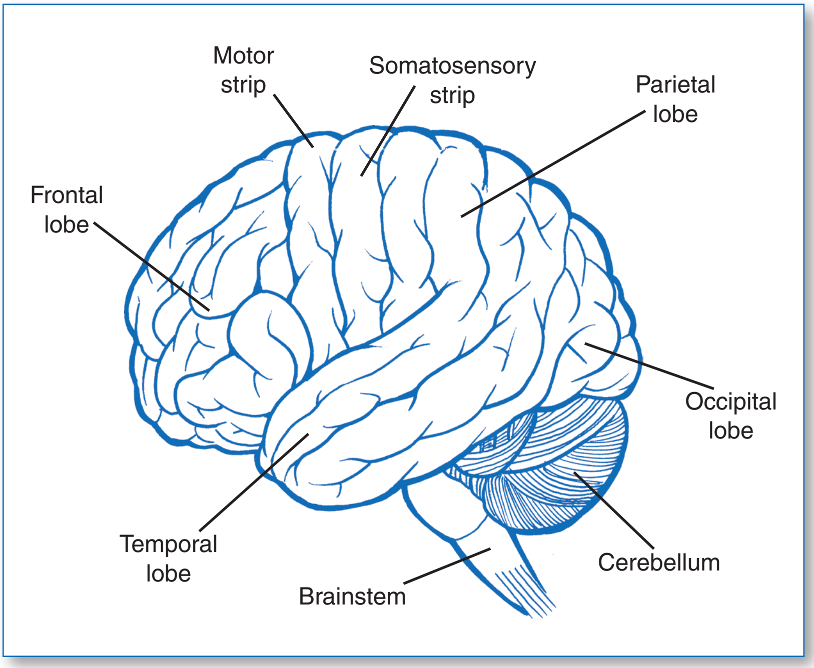
to knuckles, will create a decent model of the human brain. Like the two hands have matching elements (two index fingers, two palms, etc.), the brain's hemispheres also have matching elements. For almost every structure in one hemisphere, a matching structure in its twin exists. The right hemisphere controls the left side of your body, while the left hemisphere controls the right side. Although these hemispheres are similar in structure, there are a few differences in general function. The hemispheres of the brain excel at different kinds of thinking, which provides the benefit of various ways of sensing and perceiving. The right hemisphere tends to excel at nonverbal, spatial tasks; it helps with things like awareness, sociability, intuition, holistic thinking, estimation, intonation of speech, and visual memories, among other things. The left hemisphere excels in language and verbal and logical tasks, including things like writing and speaking, calculating, analyzing, tending to grammar and literal meaning of speech, and thinking linearly. The two hemispheres appear nearly separate (due to a large fissure down the middle of the brain), but they are connected by a band of fibers called the corpus callosum. The corpus callosum is made up of a band of axons, the part of a neuron that is in charge of sending information to other brain cells. Like a bridge of sorts, the corpus callosum is what allows the left hemisphere to communicate with the right hemisphere.

Although the idea of being "right-brained" or "left-brained" is antiquated, the two hemispheres *do* specialize in different ways of thinking. This idea might serve as a good reminder for teachers—that the unique brains in their classroom specialize in different ways of thinking too. There are students who need a holistic grasp of the big picture (right hemisphere) before hanging onto the parts, just as there are students whose need for linear, sequential (left hemisphere) instruction trumps other methods (see Figure 1.2).

CORTEX

The covering over the hemispheres looks like a wrinkled blanket. These folds and undulations are called sulci (the grooves) and gyri (the bumps) and the covering is the cortex. The cortex is six layers thick and packed with nerve cells called neurons (a kind of brain cell). These neurons represent the grayish appearance of the cortex and

Figure 1.2 Structures of the Brain



are referred to as gray matter. The cortex is wrinkled because the wrinkles allow for more surface area. If the cortex were removed and smoothed out, it would be about the size of an extra-large pizza. This allowance is needed because our brains actually grow as we learn. This information is news to many, and when it is shared, it can impact students' views of their intelligence regarding whether it is fixed or malleable.

CEREBELLUM

In the back of the brain, tucked underneath the cortex, is the cerebellum. Instead of folds and wrinkles, the cerebellum has striated tissue that looks more like muscle. It has more neurons than any other part of the brain, and it supports motor and mental dexterity. It influences our ability to balance and move, as well as different kinds of learning and memory. The cerebellum receives an enormous amount of information from other parts of the brain, and its ability to sort and process information from the cortex is as important as it is impressive. Research regarding the cerebellum playing a larger role in cognition than previously thought might be reason to view activities in school, such as physical education, with careful consideration.

BRAIN STEM

The brain stem is located in the middle of the base of the brain. It is the structure that connects the brain to the spinal cord. Functions of the brain stem include automatic functions, like breathing, the beating of the heart, and blood pressure. The functions of the brain stem are absolutely necessary to sustain life.

LOBES OF THE BRAIN

Now that I have provided a big picture (right hemispheric) of the external structures of the brain, I would like to go into a little more detail. When looking at an image of a human brain, we see certain regions, some more clearly demarcated than others. These different regions of the brain have specialized functions, and they are referred to as lobes. The different structures have different functions, from thinking skills to motor skills, from meaning making to memory retrieving. The part that is active while a person is solving an algebra problem might be different than the part that is working while a person is jogging around a track. This doesn't mean that only certain sections of the brain work at any one time. Many different areas of the brain work in concert all the time. When thoughts are occurring, a virtual constellation of pathways are involved, with several different regions lending their input. This is why, as will be discussed more later, instruction that includes visual, auditory, and kinesthetic input may be more effective.

There are four main lobes of the brain: the frontal lobes, the temporal lobes, the parietal lobes, and the occipital lobes. The motor strip and somatosensory strip are located between the parietal lobes and the frontal lobes. When we understand the functions of each lobe, we better understand why input that includes different modalities can be so effective—it is co-opting various parts of the brain, which in turn, may create more pathways of thought or recall.

FRONTAL LOBES

The location of the frontal lobes is easy to remember because they are in the front of the head, right behind the forehead. These two lobes represent about a third of the cortex and contain the prefrontal cortex, an area in charge of executive functions. That means the frontal lobes help people think in ways that include setting goals, delaying gratification, recognizing future consequences from current actions, overriding or suppressing inappropriate responses, recalling memories that are not task based, synthesizing information, and making sense of emotions. This area of the brain is the mecca of problem solving, critical thinking, and creativity.

The frontal lobes reach full maturity somewhere in the second decade. This means that many of our students in a K–12 system are not operating with a fully matured brain. This does *not* mean that children from preschool through high school don't use their frontal lobes for higher level thinking. What it does mean, however, is that the kinds of executive thinking we can depend on from adults are not always accessible to our students. There are things we can do in schools to act as surrogate frontal lobes for children. For instance, incorporating protocols for goal setting (a function of the prefrontal cortex) in classrooms can act as a scaffold for frontal lobe use. Helping students delay gratification (another function of the prefrontal cortex) by implementing routines in the classroom where students listen to peers without interruption, or take turns, is another way to assist and enlist and guide frontal lobe use.

Because the frontal lobes play such a large role in learning, memory, and higher-level thinking, educators must do what is necessary to protect these precious areas from damage, either physically or psychologically.

PARIETAL LOBES

The parietal lobes are located behind the frontal lobes and in front of the occipital lobes, across the top of the head. The parietal lobes help people integrate sensory information from their environment.

Portions of the parietal lobes are involved in visual-spatial processing, known as the "where" and "how" stream. They help people know where they are in space relative to objects that surround them, and they allow us to manipulate our bodies and objects in an effective way. This is what enables people to move through a crowded room without bumping into others along the way or to know approximately how much further one has to walk to get to the coffee shop in sight. Students who display a lack of orienting or integrating information about where their body is in space might, on the surface, simply appear to be clumsy or not "with it" in a classroom. A teacher who understands there is a specific structure in the brain related to this ability might better understand or find ways to help a student with balance or estimation by using strategies that integrate such skills, like practicing routines and procedures physically.

MOTOR STRIP

The motor cortex is located like a headband in between the frontal and parietal lobes. The motor cortex contains different sections that are responsible for various kinds of differentiated movements. Think of all the diverse ways that you move, as well as all the specific purposes for moving. It's no wonder the motor strip differentiates movement. Compare how someone might move when he or she is learning to play a game like tennis to how an avid swimmer might move. On the surface, those two activities might seem very similar, but from a motor cortex viewpoint, differentiation is critical.

Practice is one of the most effective ways to help students acquire motor skills. This is why a coach can be such an asset to someone learning how to throw a fastball or execute a double backflip. Masterful teachers know the importance of creating muscle memories, which might manifest itself by adding movement to words or phrases to help students remember, or practicing procedures in the classroom before expecting students to seamlessly apply them.

SOMATOSENSORY STRIP

The somatosensory cortex is an area of the brain that receives and processes sensations, like pain, heat, and touch. It lies just behind the motor cortex in a headband-like shape. A map exists on the somatosensory cortex, which includes touch receptors for each part of the body. This map has touch receptors that are unevenly distributed across the cortex. In certain parts, where a great deal of sensitivity to touch exists, there is a greater proportion of receptors, which means a person can feel even subtle differences in texture or vibration, like on the fingertips. Other less sensitive parts of the body show a much greater distance between touch receptors, like on the back.

TEMPORAL LOBES

The location of the temporal lobes is easy to remember because they are near our temples. The temporal lobes are extraordinarily important with regard to language, auditory processing, and memory. With regard to language, the temporal lobes help us to verbalize language as well as comprehend it. In most people, the verbalization skills, comprehension, syntax, and processing of language are positioned in the left temporal lobe, while the ability to understand tone of voice, prosody, and vocal subtleties occurs in the right temporal lobe.

When Jill Bolte Taylor, author of *Stroke of Insight* (2006), describes the morning she experienced her stroke (which affected her left hemisphere), she describes a conversation on the phone with her secretary in which she said the secretary sounded to her just like a golden retriever. She comprehended none of the meaning, grammar, or syntax of the words in the conversation, but she did pick up on the tone and prosody (her undamaged right temporal lobe at work) and was somehow able to communicate that she needed help.

Certain kinds of memory are also a specialty of the temporal lobes. Episodic memory, the kind that enables someone to remember an event or "episode"; declarative memory, the kind that enables someone to remember facts and figures; and the movement from short term to working memory are assisted by the temporal lobes. A structure called the hippocampus sits deep within the temporal lobes and plays a large role in short-term and working memory formation. There have been cases where people have had the hippocampus surgically removed, due to persistent and violent epileptic seizures, and the result was a major deficit in the ability to form new memories. Memory is discussed further in a subsequent chapter.

OCCIPITAL LOBES

The occipital lobes are the visual processing center of your brain and they enable you to see all the different shapes and colors in the world. Images and visuals are also stored as memories in the occipital lobe. The word occipital comes from the Latin words meaning "back of the head," which is a way to remember the location of these lobes. They rest right under the occipital bone of the skull.

The occipital lobes represent about a fourth of the cortex, and they are extremely efficient visual processors. When we use images along with speech, we not only enhance our audience's understanding, we enhance their recall as well. In fact, in a famous study by a man named Lionel Standing (1973) in the 1970s, participants were shown 10,000 images in a five-day period. After the five days, participants were again shown some of the originally viewed pictures, with some new pictures thrown into the mix. Subjects were able to discriminate the ones they had seen earlier from the new images about 80% of the time. The more vivid the image, the more likely they were able to recall it later. Ability to recall images in the short term averages about 90%, while the ability to recall images in the long term (months later) is about 75%. That's an incredibly effective system.

Teachers can take advantage of our highly efficient visual system by using visuals before and during instruction to help students make quick connections. For instance, when teaching a vocabulary word, finding a visual that represents that word will help students' initial understanding, as well as recall. Before teaching about a civilization, a teacher can show images of the geography, the people, and the artifacts, so students can easily and quickly tap into prior knowledge or add to their current neural networks.

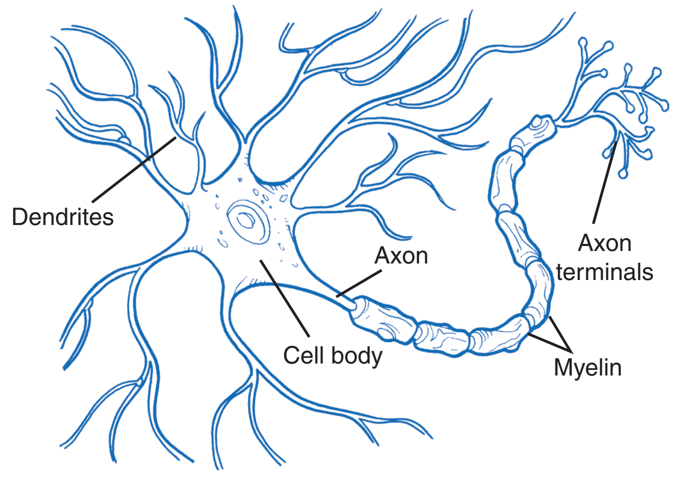
CELLULAR BRAIN

Now that the structures of the brain are understood, it's time to go even deeper, to a microscopic level. The brain is made up of fat, water, and protein. There are different kinds of brain cells. For our purposes, the two important cells are neurons, which are the cells that communicate via electro-chemical messages, and glia. Glia are brain cells that act as structural supports and little nurses, taking care of the neurons. At this time, it is believed that glial cells don't communicate in the same way that neurons do, but recent research is surfacing the possibilities that glial cells play a more expanded role than support system for neurons.

Each neuron is a self-contained functioning unit. The three basic parts of a neuron are the cell body, the dendrites, which receive incoming information, and the axon, which sends outgoing information. The hand is a pretty decent model of a neuron. The palm of the hand represents the cell body, where the DNA lives. The fingers represent the dendrites, while the axon might be the forearm. A substance called myelin wraps around the axon to provide a form of insulation and acts as a superconductor. Myelin is a fatty, waxy substance that allows for optimal processing speed (see Figure 1.3).

The brain is packed with neurons, about 100 billion. When information is processed through the brain, neurons communicate with neighboring networks to create a symphony of thought. The more often certain networks are used, the more efficiently they may work. The more networks are working efficiently, the richer the neural networks may become. This information helps

Figure 1.3 The Neuron



instructional leaders, teachers, and students understand that learning is an active process that is, in part, controlled by the learner. Effort, practice, and elaboration of thought might play a greater role in getting smarter than genetics. Educators have some control over things like practice and elaboration. They can engineer the environment in ways that enhance neuronal communication, and that's what learning is all about.

Understanding the structures and functions of the brain, including some of the key vocabulary, is the first step in comprehending how the brain works. Each of the subsequent chapters build upon this foundational knowledge and add new dimensions to it. This will augment the instructional leader's repertoire and comfort level when providing resources for teachers, serving as an instructional expert and communicating to colleagues or parents about our most important charge as instructional leaders—how we learn.

Understanding how the brain works, coupled with knowledge of plasticity and mindsets, provides the instructional leader with vital information when considering how to assist teachers in improving their practice.

PLASTICITY'S ROLE IN INSTRUCTIONAL LEADERSHIP

I believe that average teachers can become good teachers and good teachers can become great teachers. The same can be said of instructional leaders. I believe this because I have witnessed it throughout my career. But brain plasticity trumps this empirical evidence. Plasticity is a term used to explain how the brain can change its physiological structure. With each new learning experience, new connections are made among groups of neurons. Like sections of superhighways, these groups of neurons, called neural networks, can connect to one another in various, unique configurations. As people learn more, depth of understanding increases, and these neural networks become denser. This is why an expert in a field has less difficulty making connections between seemingly unconnected ideas. The expert has more on-ramps and off-ramps from which to pull information. These thickets of neurons and biological infrastructures result in the kind of intellectual flexibility needed to adapt and continue to think on one's feet in a new or novel context, the kind of skill that benefits teachers, students, and instructional leaders everywhere. It was once believed that the brain you are born with is the same brain you die with, but we now know this is not the case (National Research Council, 1999). Effort, hard work, and deliberate, effective practice, can improve cognitive and physical abilities. This is very good news for instructional leaders and the teachers who aspire to continue to learn and grow.

MINDSETS AND INSTRUCTIONAL LEADERSHIP

Plasticity reveals itself in different ways. People can change or develop new ways of thinking or habits of mind. The way a person views intelligence and learning has an impact upon that person's life as a learner. Plasticity, as it applies to a mindset, is revealed in the work of Carol Dweck. In her book, *Mindset—The New Psychology of Success* (2006), Dweck describes the ideas and rationale behind mindsets.

According to Dweck, people who believe that they have some power over what they do in their life tend to adopt a certain kind of mindset. Mindsets impact how people respond to challenges and how they see their brains as able to change and grow with experience—or not.

Dweck describes two polarities: the growth mindset and the fixed mindset. Those who believe their effort pays off are those that Dweck would refer to as people with growth mindsets. People who, on the other hand, believe that they are habitually powerless to events in their life, who see themselves as constant victims of circumstances, who see having to expend effort as failing before starting, are people who have fixed mindsets.

The idea that our brains are sculpted by experience is something a person who understands plasticity would recognize, and this belief aligns with growth mindsets. Another hallmark of a growth mindset is the idea that intelligence can be developed. People with growth mindsets embrace challenges, figure out how to stay the course when barriers arise, and find inspiration in the success of others.

Someone with a fixed mindset, on the other hand, believes that intelligence is fixed, that our brains are set, like concrete, with an inability to change regardless of circumstances. Fear of looking stupid is another hallmark of a fixed mindset. This fear may keep someone with a fixed mindset from asking a question to clarify, and that person may also avoid challenges or see effort as futile.

Mindsets are revealed in staffrooms and classrooms throughout our nation. Helping administrators, teachers, and students understand mindsets, how to recognize mindsets, and most importantly, how to nurture a mindset, can be incredibly helpful as our brain changes through our learning. Following are two tables that represent the evidence of the two different types of mindsets. These tables show that the instructional leader can play a role in the development of growth mindsets by implementing certain strategies.

Hallmarks of a Growth Mindset	**Growing a Mindset Through . . .**
Sees challenges as exciting	Supporting teachers in efforts that present a challenge
Persists through barriers	Assisting teachers in problem solving through barriers
Sees effort as a necessary component to mastery	Measuring progress and providing evidence of such
Learns from criticism	Finding ways to give feedback effectively
Hallmarks of a Fixed Mindset	**Fixing a Mindset Through . . .**
Avoids challenges	Pointing out failures of the past
Gives up easily	Taking away control and choice
Sees effort as fruitless	Not recognizing efforts and their impact on students
Ignores Feedback	Providing feedback in ways that promote defensiveness

HOW MIGHT THE INSTRUCTIONAL LEADER SUPPORT A TEACHER STRUGGLING WITH THESE PRINCIPLES?

A vital part of an instructional leader's skill set includes assisting teachers with the process of continually improving their practice, and an extra measure of urgency is added when a teacher is struggling. After each chapter, several resources are included that the instructional leader can use to (a) quantify teachers' understanding and implementation of principles, (b) provide teachers with ideas for implementing effective methods, and (c) measure teachers' progress as they increase their understanding about the brain-compatible principles therein. Aside from the use of these tools, there are methods that can be included in the instructional leader's repertoire that will help to promote growth among the teachers.

CELEBRATE WHAT YOU WANT TO SEE MORE OF

It's important for teachers to understand when they are becoming more effective (Marzano, 2003). One way to help teachers do this, after quantifying practice in some way (through the use of a rubric), is to mark the progress made and celebrate it. Finding links between the improved practice of teachers and the improved achievement of students is one of the most relevant and meaningful ways to do this. For instance, if a teacher has made a conscious effort to improve his practice with regard to memory systems, an instructional leader might ask that teacher to collect student work that will serve to indicate their ability to recall information from a content area, and then help the teacher find evidence of this in the student work. As teachers find evidence of improved recall, they need to ensure that it is celebrated in some way. This can be done, for example, by making a statement that clearly establishes the good that has come out of the teacher's learning: (a) "Seventy-six percent of your students have increased their engagement in learning tasks due to the fact that they have internalized the morning procedures in your classroom," or (b) "This science quiz shows that 26 out of 30 students recalled the rock cycle with 100% accuracy." These statements are filled with the reasons many teachers are committed to their profession.

By articulating what she wants to see more of, the instructional leader positively impacts her own practice, her teachers' practices, and the general instructional climate of the school.

USING THE SURVEY

Feedback can elevate, motivate, and facilitate learning, and this is expanded upon later in the book. Following is a survey that could be used in several different ways. It would be a good idea to simply read the five questions that apply to each of the chapters as they are approached in the reading. The questions can act as a priming tool or allow for a gauge of prior knowledge on any given chapter. I would recommend a return to these questions after reading to measure progress in gaining information from the chapters. Alternatively, there might be a specific section in the book, for example, that is most relevant when beginning a new school year, and you might have your staff take a look at the questions to gauge their current knowledge level or understanding of the topic.

SURVEY FOR BRAIN-COMPATIBLE INSTRUCTIONAL LEADERSHIP

Disagree				Agree
1	2	3	4	5

Chapter 1—A Brain Primer

1. I can locate the basic structures of the human brain.
2. I can explain the basic structures and functions of the human brain.
3. I understand the role neurons play in the brain.
4. I can show why understanding how the brain works can help an instructional leader.
5. I understand the concepts of plasticity and mindsets and how they relate to educators.

Chapter 2—Emotions

1. I can communicate vital information regarding emotions and learning to my teaching staff.
2. I understand how positive and negative emotional responses can impact learning.

3. I can share strategies about creating emotionally relevant learning experiences for students.
4. I can recognize a lesson that takes advantage of the beneficial emotions.
5. I can help a teacher plan learning experiences that elicit positive emotions.

Chapter 3—Attention and Engagement

1. I can describe the relationship between attention and engagement.
2. I can share strategies that help gain a student's attention with teachers.
3. I can share strategies that help engage a learner with teachers.
4. I can recognize attention and engagement in a classroom observation.
5. I can assist a teacher in planning with qualities of engaging work in mind.

Chapter 4—The Power of Processing

1. I can communicate the relationship between neural networks and processing.
2. I can share information with my staff about what factors enhance processing.
3. I can apply my understanding about processing to my work as an instructional leader.
4. I can analyze a lesson plan for adequate processing protocols.
5. I can apply the information about processing to what I observe during instruction.

Chapter 5—Feedback

1. I can describe what is going on in the brain when a person receives feedback.
2. I can analyze a lesson plan for elements of effective feedback.

3. I can share strategies with others regarding ways to provide feedback.
4. I can recognize and record effective feedback practices during instruction.
5. I can effectively give feedback to teachers.

Chapter 6—Memory

1. I understand the difference between declarative and non-declarative memory systems.
2. I understand the three different phases of memory (short term, working, and long term).
3. I can describe some things that inhibit robust memory formation in a classroom.
4. I can describe some strategies that enhance memory in a classroom.
5. I can evaluate a lesson in terms of attention to memory.

CHAPTER SUMMARY

The human brain is an incredibly complex organ. Although the brain works in concert, there are some structures that have specialized functions. First, there are the hemispheres, one left and one right. Each hemisphere specializes in certain ways of thinking and dealing with the world. The cortex is the "wrapping" or bark of the brain. It is where the gray matter (composed of neurons) exists. The cerebellum is a structure that controls balance and movement, among other things. The brain stem's function is to promote automatic functions, like breathing and the beating of the heart.

There are four lobes of the brain and two strips within those lobes that serve several functions. The frontal lobes, which contain the prefrontal cortex, help us with executive functions such as critical thinking, goal setting, and delaying gratification. The parietal lobes are in charge of the perception people have of their body in space. The motor strip is a piece of cortical real estate behind the frontal lobes and serves as the area that helps people move their bodies, while the somatosensory strip handles how people perceive physical sensations, like whether something is hot or cold, sharp or dull. The temporal lobes deal with language, hearing, and memory, and the occipital lobes handle sight.

On a cellular level, the brain is composed of fat, protein, and water. Neurons are brain cells that communicate with others in order to form thoughts and actions. Neurons fire and wire together, creating neural paths, or networks, that serve as cognitive maps for use in thinking or remembering.

Plasticity is the term used to explain how the brain changes as a result of the environment. What was once believed to be an unchanging organ is now known to be a dynamic and responsive one. This means we can become smarter, more adept, and better practitioners, with the help of effort, practice, and mindsets.

POSTASSESSMENT CHAPTER 1—A BRAIN PRIMER

1. I can locate the basic structures (lobes) of the human brain.
2. I can explain the basic functions of the human brain.
3. I understand the role neurons play in the brain.
4. I can explain why a teacher might want to consider using more than one mode of input.
5. I can explain why assessing using different modalities might be beneficial.

QUESTIONS FOR STUDY GROUP

1. Do teachers take full advantage of their students' visual processing abilities? How might teachers enhance their learning and recall through visual input?
2. The executive functions of the frontal lobe are critical for thoughtful, mature actions. What protocols or procedures are in place that might help students' frontal lobes to develop fully?
3. How might the information in this chapter assist teachers in teaching more effectively?