Bringing the SCIENCE of Child Development to the Classroom

UNDERSTANDING HOW YOUNG CHILDREN LEARN

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I have been teaching college courses on child development for many years in tight-knit academic communities and my former students often keep in touch. Many of them are elementary school teachers in the area or work directly with children in preschools and early childhood education resource centers. Sometimes when they are visiting and telling me about their wonderful and challenging jobs they become nostalgic for the past. “I loved your child development seminar, it was so interesting!” they say, beaming. And then I start to get excited and ask them what they use from my course in their daily teaching lives. That’s when we inevitably and awkwardly realize that little of the content I had so carefully chosen makes its way into the classroom at all.

I also attend and present at international conferences on child development year after year, where the latest and most revolutionary research on children’s learning is discussed by leading scientists. Each time I promise myself that I am going to bring these findings to the teachers and children who could benefit from it. So I put together giant sets of course readings on child development and learning, plowing through theories and ideas written for researchers in scientific journals. One of the greatest challenges that I always face when choosing what to
focus on is that the field of child development is so overwhelmed with information. Which theories and studies will be crucial for my students and their students? Inquiry on children’s learning over the past hundred years has been flooded with theories (conditioning and behaviorist theories, social cognitive theories, information processing theories, constructivist theories, and sociocultural theories to name just a few). Each of these theories has corresponding and compelling empirical evidence, but little discussion about how and when they should be used. I have often wished that I could somehow distill the mountain of information in front of me down to a handbook of children’s learning that would-be teachers could keep with them at all times; a synthesis of the important ideas and findings to reference as they design their curriculum and pedagogy. This book is my response to that desire. I aim to organize current knowledge on children’s learning from the field of developmental science in a way that makes intuitive sense, in the hope that it will be both memorable and useful for my students, and all future teachers. After all, shouldn’t this extraordinary knowledge and insight be put to use in the classroom?
Acknowledgments

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Introduction to Learning, Teaching & Developmental Science

What if we were to reenvision our school system from the perspective of the learner? Of course, we all know that the objective of education is learning, but for most of the history of formal education, educators’ training has been focused almost exclusively on teaching. Children’s learning was considered something of an unknown or “black box” until very recently (Gerner, 1981). In the last few decades, however, the field of developmental science has exploded with discoveries of how, specifically, learning happens, giving us an entrée into children’s minds. We can understand how and when children begin to think, perceive, understand, and apply knowledge. Sadly, few of these cutting edge findings have made their way into the classroom. The goal of this book is to bridge the divide between the educators and the scientists examining child development. To do so, I believe that we need to train ourselves to think like scientists—who, incidentally, think much like children, always asking “Why?” An understanding of children’s learning that is grounded in scientific inquiry and research will enable teachers to reinforce and enhance good learning and to offer the best possible educational experiences. This is the solid foundation we need when the weights of uncertain funding, testing, and standards begin to bear down.

In the early 1900s, when most industrialized countries began offering formal, public schooling to children, the curricula were designed for
future workers in an industrialized economy. The idea was to groom a workforce that could understand basic instruction while not challenging any fundamental aspects of the status quo. Teaching techniques were based on common sense assumptions (for example, that knowledge is a collection of facts and procedures, that the teacher’s job is to transmit those facts and procedures to students, and that success at school is determined by testing to see how many facts and procedures students have acquired) (Sawyer, 2006). Some of these techniques are still in place today. Teaching practices that require children to work individually in rows, to compete with others for good grades, to take tests alone, to concentrate for long periods of time without breaks, and to be put into reading or math groups with only peers of matched ability are based upon tradition alone—not at all on evidence of student learning. Children are not passive recipients of information, waiting to be filled like empty vessels. Right from the start they are active, exploratory, and involved in the creation of their own knowledge.

**What Is Learning?**

Learning is very difficult to define. It is the matter of our minds, and includes thinking, becoming aware, imagining, seeing, hearing, hoping, remembering, abstracting, planning, and problem solving (Malone, 1991). Learning is deep in our species, emerging from our desire to take in new information by actively exploring new territory. Learning is a physical phenomenon, occurring in the sensory systems, as energy from light waves and vibrations in the air is converted into electrical impulses that can be interpreted by the nervous system; and in the brain where neurons send out neurotransmitters and forge networks of connections; and in the body where motor patterns are encoded for actions. Learning is also embedded in the world via life experiences, social interactions, and community membership. Because learning occurs at so many levels simultaneously, developmental science (which encompasses the disciplines of developmental psychology, cognitive and linguistic science, developmental psychobiology, and developmental neuroscience) does not privilege any level of analysis over any other (Thelen & Smith, 1996).
The Beginning of Learning: From Infancy to Childhood

For most of the last century scientists and teachers believed that children are born into the world without much ability to understand it, spending their early days in a “blooming buzzing confusion” (James, 1983/1890, p. 462). After all, other than making messes, babies appeared to just lie around or sleep, with limited behaviors, expressions, and interactions. But now we know that this view is all wrong. Humans learn the most and the fastest during the first few years of development. No time in life is close to infancy and childhood when it comes to the capacity to adapt to new environments, to master new material, and to solve complex problems. “What we see in the crib is the greatest mind that has ever existed, the most powerful learning machine in the universe” (Gopnik, Meltzoff, & Kuhl, 1999, p.1).

Studying prenatal development allows us access to the beginnings of human thought and action. Right from birth, infants pick up on all of the complex sights, sounds, smells, tastes, and textures surrounding them, and they skillfully use this information to guide their perception, attention, and learning (Smotherman & Robinson, 1988). Even before birth, movements beginning in the womb are involved in the development of the mind. The embryo plays a role in its own learning by moving and changing within its cellular environment. Movement patterns of the fetus actually set up brain connections required for learning in early childhood. In one recent study, developmental scientists at the National Institute of Child Health and Human Development discovered that fetuses whose heart rates fluctuated more during the course of prenatal development (as opposed to those whose heart rates stayed relatively constant) went on to achieve higher levels of language and pretend play skills when they were two years old (Bornstein et al., 2002).

Brain cells (called neurons) develop and proliferate at the staggering rate of up to 250,000 new cells per minute during the second trimester of pregnancy. Neurons migrate through the neural tube, which bends to form the central nervous system, including the brain and spinal cord. Neurons then begin to grow arm-like protrusions called axons,
which will connect in networks with other neurons via junctions called synapses. By the time of birth, the infant’s neurons will have accrued over a trillion synaptic connections. In fact, areas of the newborn brain are much more highly connected than that of the adult brain. This seems to be an evolutionary adaptation, allowing the infant to assimilate vast amounts of information with ease. As a result, infants commonly experience synesthesia, an overlap of the senses or a blending of sensory information (Maurer, 1993). During early infancy the brain responds to language over both the temporal cortex (responsible for auditory processing) and the occipital cortex (responsible for vision).

Most of what we know about brain development has come from experiments with animal brains or post-mortem human brains. Until very recently scientists were unable to access the living brains of human infants and children at all. But new noninvasive technologies are becoming more available. These technologies include ERP, which tracks changes in electrical brain potentials from the scalp surface, fMRI, which assesses changes in blood flow in the brain, and MEG, which evaluates magnetic field changes in the brain over time (Nelson, de Haan, & Thomas, 2006). Even so, studies that directly assess the brains of infants and children are expensive and time-consuming because they can only produce data from infants or children who stay relatively still.

The human brain is first and foremost an efficient organ. When it comes to brain structure, less is more. In the typically developing infant brain, neurons and synapses grow at astounding rates and are then pruned back. Those neural connections that are frequently used become strengthened, and those that are infrequently used are cut, resulting in the simplest and best brain possible. During the first year of life, the axon of each nerve cell (the part which connects to other neurons) becomes insulated with a fatty, protective coating called myelin. This speeds up the electrical signal, making communication between neurons fast and efficient. Throughout childhood the brain continues to develop. Brain cells grow and die; they connect and reconnect with one another; they grow additional axons and coat them with myelin (Cycowicz, 2000). As a side note, the brains of autistic children often fail to prune neurons in the brain areas responsible for planning and
complex reasoning. They also develop less insulating myelin on their neural connections (Bartzokis et al., 2010; Courchesne & Pierce, 2005).

Thanks to newly developed neuroimaging technology, we now have access to the specific brain changes that occur during learning. Even though all of our brains contain the same basic structures, our neural networks are as unique as our fingerprints. The latest developmental neuroscience research has shown that the brain is much more malleable throughout life than previously assumed; it develops in response to its own processes, to its immediate and distant “environments,” and to its past and current situations (Hinton, Miyamoto, & Della-Chiesa, 2008). The brain seeks to create meaning through establishing or refining existing neural networks. When we learn a new fact or skill, our neurons communicate to form networks of connected information. Using this knowledge or skill results in structural changes to allow similar future impulses to travel more quickly and efficiently than others (Squire & Kandel, 2000). High activity synaptic connections are stabilized and strengthened, while connections with relatively low use are weakened and eventually pruned. In this way, our brains are sculpted by our own history of experiences (Wolfe, 2006).

Processes and Propellers of Learning

Incorporating developmental science research into the classroom means shifting the focus of education from teaching back to learning. In the United States, the content of schooling is determined at the state, local, and national level and is often given the highest priority. Students’ ability to remember facts for standardized tests determines how well their schools will get funded. But what children learn depends on how they learn. And to figure that out, we need to examine the many levels of the developmental system in which children’s brains, bodies, and minds are functioning.

Learning is a complex set of interactive and situated processes which recursively set up the individual’s future experiences. Human beings are born to learn. We have evolved over tens of thousands of years to do it efficiently and easily, with all of the stimulation we need already present in our surroundings and our lives. The components
of children’s learning, motivation, attention, memory, cognition and action, and the processes that propel and inspire them are the topics of this book. I hope to introduce a new way for teachers to think about learning, based on the perspectives and the findings of developmental scientists.
motivation is the driving desire behind all action and is the precursor and cornerstone to learning. It is no exaggeration to say that children have boundless energy for living and learning. From an evolutionary perspective, behaviors that are important for survival (like eating or reproducing) must be pleasurable to do in and of themselves. Young children survive by exploring their world via manipulation, locomotion, language, and social interaction. But they also love doing these things. The immediate satisfaction of “being good at” something also has adaptive significance for cognitive growth. To motivate children and keep them primed for the best learning possible, we must understand how motivation to learn develops.

A Developmental Science Approach to Motivation

Motivation is a readiness (or a set up) to learn. Throughout life we learn incredibly complex skills without consciously trying at all. As the British developmental scientist John L. Locke (1995) notes, infants and children do not set out to learn any of the vast repertoire of skills that they gain in the first years. Instead they study the faces, voices, and actions of others out of a deep biological need for emotional interaction
with those that love and care for them. They simply find themselves in a social and cultural context that values certain skills and uses them constantly. Learning, then, is an unintended bonus. It is a byproduct of wanting to do other things, like receive a smile from your conversational partner or be soothed by your mother’s voice.

Across tens of thousands of years of human evolution, certain proclivities on the part of the infant and child have emerged. In the same way, social and cultural mannerisms have arisen around children and in support of their learning. When it comes to understanding where motivation comes from, we should consider both those things that children actively try to master and those things that they just pick up along the way. Children’s learning is dynamic and results from the interaction between inborn capacity and experience.

Desire to learn is present even before birth. As their world is suddenly filled with new things to see, hear, smell, taste, and touch, fetuses and new babies develop reflexive behaviors to organize that information and to make meaning from it. Reflexes have evolved to help the young of a species to adapt to its environment. The rooting and suckling reflexes, for example, guarantee that a helpless infant takes in the milk it needs to survive. Sometimes reflexes develop into more complex modes of behavior and set up learning. They are important clues to the development of motivation.

**Motivation Propeller 1: Habituation and Novelty Preference**

*Within minutes of Mr. Frymer turning his back to the second-grade class and beginning to write multiplication problems on the board, Aaron begins to zone out. He fiddles with his pencil and rummages through his desk. It is not until he notices the back of Samantha’s neck in front of him that his interest is piqued again. With full engagement and vigor, Aaron begins tearing the corners off of his math worksheet and rolling spitballs.*

Beginning in infancy and throughout the lifespan, humans are motivated by newness, change, and excitement. Habituation, the tendency to lose interest in a repeated event and gain interest in a new one, is one of the most fundamental human reflexes. If the thermostat were
to suddenly turn the air conditioning on, you would hear the loud humming sound begin, but within minutes you couldn’t even hear it if you tried. Habituation, a fundamental property of the nervous system, provides mechanisms to ignore the environment when it presents no immediate threat or reward, and to focus attention on potentially important new input. Habituation is also an elementary form of inhibition, the complex cognitive maneuver that allows us to override urges. This reflects the function of the frontal lobes of the brain. Finally, habituation is considered to be the simplest form of learning. Habituation is important to understand in relation to children’s motivation, because if children are habituating to the learning situation of the classroom, their attention and interest will decline.

Habituation & Learning

Developmental scientists use the habituation response to measure attention, perception, and cognition. Because fetuses and infants cannot tell us about the workings of their minds, researchers must glean what they perceive and understand from behaviors that are in their repertoire. Habituation studies can be done in utero, by presenting fetuses with information (often sounds plus vibration) via headphones on their mothers’ bellies. The fetuses’ responses are then monitored with ultrasound. After many presentations of the same stimulus, fetuses will habituate (stop moving their bodies in response), at which point the vibrating sound will be switched to something new (for example, a tone of a different pitch). If a fetus moves in response to the new tone, scientists infer that it perceived a difference between the two tones (McCorry & Hepper, 2007).

Habituation can also be used to assess infants’ learning after birth. Infants will look at something when they are interested and turn to look away when they become bored. So if we show an infant a repeated display of events until he or she looks away and then switch to a new display (which may be only slightly different), we can determine whether the infant noticed the difference. The habituation response has been linked to both attention and language. Studies have shown that young infants who habituate quickly to complex events have greater
vocabularies as toddlers than those for whom habituation takes longer (Dixon & Smith, 2008; Tamis-Lemonda & Bornstein, 1989). Habituation assessments in the first year of life also predict IQ between 1 and 8 years of age (McCall & Carriger, 1993). Rapid habituation reflects the ability to quickly encode an event into memory, and to recognize it easily when it is presented again.

**Novelty & Learning**

After habituating to an environmental event (like the air conditioning) and ceasing to notice it, your attention may be involuntarily drawn to a new stimulating event. The brain is highly responsive to novelty (Wolfe, 2006). The preference for novel objects and events is a very important clue into the workings of motivation. Danish philosopher Søren Kierkegaard (1843/1985) believed that the only way to overcome boredom was to respond to the world like a child: be inquisitive and curious, and marvel at everything. Scientists have explained novelty preference as an efficient way for infants’ and young children’s immature cognitive system to process information. Once a child has mastered all of the information an object or event offers, paying attention to something new allows him or her to acquire additional information in a short amount of time. It is also a great strategy for getting little ones’ attention away from things we don’t want them to do. Just yesterday, I used the novelty preference to lure my young son Alexei away from biting the soles of my sneakers (a new and unsanitary habit of his) and toward his wooden train kept high and hidden on the bookshelf. A simple, “choo-choo!” sound was all it took to reorient him toward the train, and the sneakers had lost all their appeal. Infants and children have shown a behavioral, perceptual, and emotional preference for novelty across a wide age range, in experiments on memory, language, speech sound categorization and number (Diamond, 1995; Lipton & Spelke, 2003; Quinn & Eimas, 1996; Safran, Aslin, & Newport, 1996).

Infants who lack novelty preference tend to have cognitive delays during childhood. Additionally, novelty preference (just like habituation) is predictive of later cognitive functioning. Infants with a stronger preference for novelty at just six months old have better memories,
language skills, and motor skills when they grow to be toddlers and children (Colombo, Mitchell, Dodd, Coldren, & Horowitz, 1989; Fagan & Knevel, 1989; Thompson, Fagan & Fulker, 1991). It follows then, that the desire to learn new things is a deeply embedded part of being human.

Infant novelty preference develops into childhood curiosity and desire for exploration. In order to survive, animals must actively explore. All living things have an urge called “perceptual curiosity,” which drives them to examine new things. The newer, more complex, or more unexpected the thing, the more deeply it will satisfy this urge. Nobel Prize-winning physiologist Ivan Pavlov (1927) termed this the “investigatory reflex.” When presented with a new, attractive, or surprising object in laboratory settings, children display their drive to explore, which clearly can only be satisfied by attending to, perceiving, or manipulating the object in question. Never before seen objects that call to be examined via touching and manipulation (boxes with lights, buttons, and levers, and plants with shiny ribbons on them, for instance) are almost irresistible to a young child.

Exploration in children sets them up to learn. Russian developmental scientist Alexander Zaporozhets (as cited in Berlyne, 1960) discovered that children automatically expose themselves to the important characteristics of a situation. They experiment with anything and everything they can, in preparation for carrying out difficult actions. In a number of experiments in his laboratory, children were trained to press buttons in a certain order (corresponding to lights being flashed), or to push a toy car through a maze. Upon entering the lab, the children would spontaneously do things to acquaint themselves with the buttons, lights, and other features of the apparatus. In fact, they could not be restrained from doing so! In younger children, the most prominent forms of exploration were touching and feeling movements of the hands and fingers. This was replaced by eye movements as the children’s age increased. Perhaps most striking, the more time children spent on their preliminary inspection, the less time it took for them to master the actions they were asked to perform.

Remember:
- Newness, change, and excitement motivate learning.
- Habituation and novelty preference reflect children’s ability to encode quickly and correspond to their attention, perception, and cognition.
- The brain is highly responsive to novelty.
- Exploration sets up opportunities for learning.
How to Enhance Classroom Motivation Using Habituation and Novelty Preference

Create a secure, predictable structure, with clear expectations and boundaries, from which to divert.

To avoid habituation and foster novelty in your classroom, you don’t have to throw all the rules out the window. On the contrary, children with the most solid foundations are the most willing to explore and experiment with new things. When setting up a classroom full of surprises and newness, do so while ensuring that the students’ basic needs of security are met. This will allow them to feel safe to go out on a limb, to try new things and to play with ideas. Clear expectations and boundaries are a crucial foundation from which to springboard into the unknown and exciting.

Austrian philosopher and pedagogue Rudolf Steiner (1919) believed that young children gain great security from rituals and harmonious transitions between events. In the Waldorf model of education, based on Steiner’s philosophies, transition routines like songs or candles are used for daily activities and to give a form to the day, providing security for the children. Daily rituals offer an inner, bodily knowledge that can then allow children to adapt more smoothly to change. Likewise, connecting with cycles of the year can provide a sense of predictability for children. Nature, though ever changing, is still recognizable. Teachers of young children also claim that strong routines greatly decrease discipline issues.

Set up daily, weekly, and seasonal rituals in your classroom. Beginning the day with a song, a rhyme, or a check-in with each student creates the predictability and comfort that allows for the exploration and risk of learning. Keep seasonal rhythms in mind when designing lessons, including the less obvious ones such as harvests, solstices, and equinoxes. For example, an interdisciplinary autumnal equinox lesson might include tree bark rubbings, paintings each day using a single fall color (e.g., red on Monday, orange on Tuesday), units on animals who store nuts for the winter, charting fall temperatures, or understanding photosynthesis.
Locate the drama in the content of the lesson.

Sociologist James Loewen’s work (2007) has shown that American history is full of fantastic, shocking, and important stories to engage novelty preference and avoid habituation. And yet, even elementary social studies students groan when it’s time for history lessons. Textbooks present a version of history that is boring and predictable, with every problem easily solved, and with the exclusion of all conflict or suspense. Across curriculum areas, children do get hooked into curiosity when they are shown the drama of the subject, when they are asked to speculate on outcomes of controversies, when they are encouraged to explore mysteries and puzzles, or when they are shown competing answers to dilemmas. This can even be done in math, a field with a reputation for being boring and fixed (but one that is actually filled with controversy, crisis, and change). Sixth grade teacher Margaret Anderson always begins her discussion of square roots with the history of Greek mathematician Pythagoras, and his finding that the square root of two was an irrational number. Imagine the crisis to a civilization based entirely on reason!

Ask children to consider the complexity of the past by exploring vastly different points of view on the same events. For example, before presenting historical “facts” in a social studies/language arts unit on slavery, encourage your students to piece together history from different information sources. You can include such diverse perspectives as slave narratives, excerpts from the autobiographies of slave-owning American presidents like Thomas Jefferson, clips of films that represent slavery, or documents showing that some of the earliest settlers in the United States were from Africa. You might ask the students to write journal entries in different voices—that of a working slave, a runaway slave, a slave owner, a Quaker family hiding runaway slaves, or a slave catcher making money by returning runaway slaves (Czajka, 2004). You could stage a debate or a play as a dramatic finale to this powerful unit. Most importantly, you will be priming the students’ minds for curiosity and exploration into new intellectual territory.
Stimulate, engage, and delight not only your students, but also
yourself.

Novelty motivates teachers as much as students. Teaching topics that
you are newly energized about or experimenting with new teaching
styles can model engagement to your students. As a teacher, you have
the unique opportunity to be constantly learning on the job. I have dis-
covered that the most effective courses that I teach (in terms of both
student enthusiasm and student learning) are those that are exciting
to me. When the content or method is novel, I do have to work a bit
harder preparing for each class, but the payoff is tenfold. My passion is
sincere and my students and I are motivated to understand the topics,
frameworks, or ideologies together. It sounds like a risky position for
a teacher, not being completely secure in how certain assignments or
activities will come off. But as radical educator Paulo Freire has said, if
we “abandon the educational goal of deposit-making… The teacher is
no longer merely the-one-who-teaches, but one who is himself taught in
dialogue with the students” (1970, p. 67). Curiosity is not only motivat-
ing; it is contagious.

Bring your students along for your next vacation. Okay, not
literally. But why not share your interest and enthusiasm
with your students by designing lessons on topics that captivate your
imagination? Suppose you have always wanted to go to Peru to hike
Machu Picchu. You might begin by planning and mapping your route
through Peru with the class. Next, you could ask the students to create
maps of the region, corresponding to topography, terrain, or climate.
They can determine what you will need in terms of food, gear, and
supplies in order to comfortably complete the hike. They can then go
back about 800 years to understand the Inca civilization and how the
geography of the region affected their architecture, transportation, and
agriculture. (For example, ask the students to map out a terraced gar-
den plan, which would provide all of the food one Incan family would
need for the year). The Incan system of measures can be a lead-in to a
math lesson, just as Incan myths can be a lead-in to a clever creative
writing assignment—the writing of creation stories. Stories can be
depicted in images or even dramatically acted out. Any destination is
ripe for exploration from a variety of perspectives. Whether you are planning an actual vacation or just one from your imagination, bringing the children along for your adventures is a natural motivator.

**Surprise the students with your delivery!**

Our brains have evolved to remember unexpected or novel events because basic survival depends on the ability to perceive causes and predict effects. If the brain predicts one event and experiences another, the anomaly will be especially interesting and will be encoded accordingly. Neurologist and classroom teacher Judith Willis (2006) has claimed that surprise in the classroom is one of the most effective ways of teaching with brain stimulation in mind. If students are exposed to novel experiences via demonstrations or through the unexpected enthusiasm of their teachers or peers, they will be much more likely to connect with the information that follows. Willis has written that encouraging active discovery in the classroom allows students to interact with novel information, moving it beyond working memory to be processed in the frontal lobe, which is devoted to advanced cognitive functioning. Preference for novelty sets us up for learning by directing attention, providing stimulation to developing perceptual systems, bolstering the emergence of thinking skills, and feeding curious and exploratory behavior.

Plan an outrageous lesson. Use surprise to get your students’ attention, and use humor, strangeness, disguise, and drama to keep them transfixed (Pogrow, 2009). For example, at the beginning of a unit on storytelling, 4th grade student-teacher Julie spent the first five minutes of class reading a story about monkeys in the jungle in monotone. She suddenly stopped, slapped her arm and said a bug had bitten her. She then started reading again, but this time in a wildly animated way, gesturing and imitating the animals’ behavior in the story. After a few minutes she pretended to faint.

When the students approached Julie, she exclaimed, “I know what happened. I got bitten by … a Story Bug!” Julie then asked her students to share their own stories in small groups. When she sensed a lull in
their stories, she loudly called, “Look out! Oh no! There is a swarm of story bugs flying into the classroom!” The children excitedly pretended to be bitten, filling the classroom with animated versions of the same stories that had previously been reading. In this way, Julie was able to use surprise to transform her lesson on action verbs in story writing into a highly exciting motivating, novel event (Pogrow, 2009, p. 92).

**Motivation Propeller 2: Confidence**

*Kelly remembers the exact year when she stopped drawing. At first school allowed her endless time to play with art supplies and create wild, colorful pictures that jumped off the page. She drew hundreds of portraits of her house and her cats. But in the third grade her school began its “Artist of the Week” program, and because Kelly was never chosen, she came to see that her drawings were not so great. The children who won could color in the lines much better than her, and their cats looked more like real cats. Kelly’s art and love of learning gradually fell away.*

Confidence helps children learn. As adults, we often have a fairly accurate idea of what we’re best at; what things come easily and naturally to us. Confidence in our own abilities becomes the first step toward success. On the other hand, if we have had a negative experience with learning, we may label ourselves as deficient in that subject. When we believe that we can’t do something no matter how hard we try, we’ll soon give up. I have worked with countless students who believed themselves to be “bad at” a particular subject and who stopped engaging long before. Even when situations change (and they would do well), these students lose the motivation to try, a condition called “learned helplessness.” Assessing potential success might be adaptive in that it can prevent us from making fools of ourselves, but it can also hinder us from trying and practicing new things.

It is critical that we protect and build children’s confidence. In a now-classic study conducted by a San Francisco educator and a University of California psychologist (Rosenthal & Jacobson, 1966), elementary school teachers were told that 20 percent of their students showed unusual potential for academic success (called intellectual “bloomers”). What the teachers did not know was that these students were chosen at random. By the end of the school year, the children who
were merely expected to perform better (but were no smarter), actually did show superior academic performance. This was especially true of the youngest students. But even more striking, children who were labeled “bloomers” scored higher on IQ tests, a lasting measure of intellectual potential! Clearly the teachers’ continued expectation that some students were destined for success imparted some level of confidence in the children themselves.

**Over-Confidence**

Fortunately, young children’s lack of accurate perception of their abilities often keeps them motivated. In study after study, children rate their abilities and proclivities far better than their performance shows. When asked, children overestimate their strength and social standing, their memories, their physical abilities, their knowledge, and their intelligence. In one experiment, 650 2nd through 5th graders were asked to estimate their skills both academically and physically, before trying challenging events. The younger children almost always rated themselves at the maximum, and their ratings decreased linearly with age (Marsh, Barnes, Caims, & Tidman, 1984). In another series of studies, preschool children consistently overestimated their ability to imitate complex acts and therefore tried to imitate behaviors that were often way beyond their grasp. After an unsuccessful attempt at imitating a difficult behavior (for example juggling or tossing a ball into a basket from several feet away), the children were equally inaccurate in their assessment of how successful they had been. “How did you do?” the researchers asked. “I did great!” the children replied. Interestingly, the preschoolers with higher IQs tended to overestimate more (Bjorklund, Gaultney, & Green, 1993). As counter-intuitive as it sounds, being out of touch with one’s abilities was related to higher competence.

In another telling study, kindergarteners, 1st graders and 3rd graders were given a word recall memory test. The children were asked to estimate how many they would remember prior to studying them. Children with less accurate predictions made greater improvements in word recall as compared with those whose predictions were more accurate. Overestimating one’s abilities was associated with greater cognitive gains (Shin, Bjorklund, & Beck, 2007). Developmental scientist
David Bjorklund and his colleagues (Bjorklund, Periss, & Causey, 2009) have posited that such poorly developed self-assessment encourages young children to attempt a wider range of behaviors, which in turn lets them practice and improve. An optimistic attitude corresponds with children’s active, exploratory and playful nature, motivating them enormously to learn new behaviors that they would not have attempted otherwise. Just like the Little Engine That Could from the classic children’s story, success often comes down to confidence.

**Visualization as Confidence**

One reason that confidence catapults learning is because to your brain, imagining achievement is no different than actually achieving. Research on visualization and mental training has shown that vividly picturing success in difficult tasks actually increases the likelihood of success. This has been shown in sports from darts to Olympic gymnastics, and in the classroom in overcoming public speaking anxiety (Ayres & Hopf, 1990; Straub, 1989; Unestahl, 1983). In one compelling study, students who merely imagined themselves exercising the muscles of their arms significantly increased their strength in the relevant muscle groups. Measures of brain electrical potentials showed that mental training was no different from physical training when it came to parts of the brain that increase muscle strength (Ranganathan, Siemionow, Liu, Sahgal, & Yue, 2003).

In a stunning study, two groups of people who had no experience playing the piano were brought into the laboratory and given a brief lesson on a one-handed, five finger piano exercise. The first group practiced the exercise on the piano for two hours a day for five days. The second group imagined that they were doing the exercise and visualized as clearly as possible that they were practicing it on the piano. The brains of those who played and imagined playing both showed structural changes in the area of the brain related to the movement of the fingers. Equally astonishing, the group that had only imagined playing significantly improved in their ability to do the piano exercise (Pascual-Leone et al., 1995). It seems that being confident that we can do something is linked

**Remember:**

- Confidence helps children try and practice new things.
- Overconfidence has positive effects on competence and cognitive gains.
- Visualizing success increases the likelihood of success.
- To the brain, thinking about doing something is not much different from actually doing it.
to motivation and visualization, which feeds success and leads to even greater confidence.

**How to Enhance Classroom Motivation Using Confidence**

- Provide careful, constructive feedback that encourages students’ strengths as well as areas in need of improvement.

If we teachers can casually receive hundreds of compliments from parents and students, but be devastated by a single insult, imagine the power that criticism can have on a young child! Educator Adrienne Mack-Kirschner (2004) will never forget the time that her sixth grade teacher walked around the room tapping shoulders while the children sang rounds of *Three Blind Mice*. Thinking she was being chosen for singing well, Adrienne sang even louder and more joyfully; she loved singing, just like her Dad. *Will the students I tapped*, she held her breath self-consciously, expecting praise, *stop singing? You’re off key and ruining the songs for everyone else.* Adrienne now laments, “I can recall the exact moment when I stopped singing. Nearly four decades passed before I found my voice again” (p. 4).

Feedback on school performance gives children a valuable gauge of their learning. But given without care and caution, negative feedback can greatly harm confidence and motivation. In order to be effective, feedback on a child’s performance should closely follow the behavior or event and it should be as clear as possible. Constructive feedback from teachers should always contain encouragement, and should not focus on too many aspects of behavior at once. Positive feedback should let the child know exactly what he or she did well. Instead of saying “nice job,” you might tell the child how the technique was effective (for example, “I see that you used both high contrast colors and glitter to make the shapes in the painting pop out.”). Helping to make a child’s process explicit leads to self-reflection and self-confidence, which are both learning enhancers.

During any critique of a child, be sure to comment on his or her process, rather than on him or her as a person. In a revealing study,
kindergarteners role-played minor failure scenarios in school (e.g., failing to stack blocks properly or to completely clean up after snack time). Their teacher then critiqued them with either process-oriented feedback (e.g., “The blocks are all crooked and one big mess; maybe you should find another way to do it.”) or person-oriented feedback (e.g., “The blocks are all crooked and one big mess; I am very disappointed in you.”). Then, the children were asked to build a house out of Legos, and given the neutral feedback, “That house you built has no windows.”

When asked to rate their Lego house and themselves, those kindergarteners who had been told that they were disappointing (via person-oriented feedback), rated themselves as significantly less smart and showed little desire to rebuild or fix their houses. Children who had been given process-oriented feedback felt fine about their houses. They rated their Lego creations significantly higher than the others, even without windows. They also believed that they were smart. These children wanted opportunities to try building their house again, this time with windows, thereby finding another way to do it, just as their feedback had suggested (Kamins & Dweck, 1999).

After the next big project, ask students to consider the steps that they went through in their learning process. Perhaps have them represent their struggle toward mastery visually, using drawings or a graph. They should then comment on what worked well, what was hardest for them, and what they might have done differently if the circumstances were different. Written evaluations of the project can have a section for self- and teacher-feedback and the grades and comments can be negotiated during a discussion. Ask the student: Do you feel that this represents the work you did? Why or why not? and take their assessment seriously.

Children in the 5th grade at the Smith College Campus School end each day by completing a learning evaluation form. They respond to questions such as: What are two things that you learned or practiced today? What is one learning goal that you have for this week? What is your plan to reach that goal? What seems to help you in class? and What seems to slow you down? The children’s daily evaluation forms are kept in their desks in a portfolio that they review with their teachers at the
middle and end of each term. This way, they become mindful of what they consistently excel at, and what they might want to work harder on. Children who get used to articulating their strengths and what they enjoy will retain their confidence and develop the ability to realistically self-critique in time.

Reward student attempts and intellectual risk-taking over “playing it safe” to get correct answers or high marks.

When I was in the first grade, we spent a whole week in March on a special art project, making kites. The large piece of construction paper had to be completely covered in multi-color crayon strokes, which we would then paint over with black. When the paint dried, the crayon wax would begin to show through the paint, magically reappearing. Then we were meant to cut a diamond shape out of the paper and use each of the four corner scraps to make the bows of the kite. I was so excited about my kite that I spent longer than anyone on the coloring part, making each patch as dark and rich as possible for that magic moment they would poke through. When it came time to cut the bows using patterns, I cleverly accounted for all four bows using just two of the corners of the left over triangles. It wasn’t easy, but if I turned them just right, it worked. But my teacher, Mrs. Angers (aptly named, it turned out!), valued obedience over initiative and creativity. She forced me to publicly admit that I had not listened and therefore done it incorrectly. Then she made me stand in the corner for the rest of the day. I stood there and cried, humiliated and shamed, my kite thrown aside and never finished.

Risk taking is important to cognitive growth. But all too often, fear of not measuring up, of making mistakes, or of being embarrassed discourages children from taking chances intellectually. Research shows that children who are willing to risk asking questions, sharing tentative ideas, or attempting to do new things also tend to exhibit ongoing interest in the topics at hand. They also exhibit greater confidence and deeper, longer-lasting learning (Beghetto, 2008).

Unfortunately, many of the procedures we associate with learning in school quickly squash creativity. Two of the top creativity killers are surveillance and evaluation. If children feel that you are hovering over them and constantly observing and judging their work, they begin to
worry about how they are doing. This can rattle their confidence. Writer and graphic novelist Lynda Barry (2008) claims that asking herself the question, “Is this good or does this suck?” plagued her work for years. It was only when she was able to stop asking this question that she could let her ideas flow. Surveillance makes the urge for creative risk-taking go deep in the ground and hide. So does over-controlling. When children are told exactly how to do every step of a project or problem, they begin to feel that originality is misbehavior and exploration is a waste of time. Telling children what exactly they should be doing and how to do it encourages them to simply follow directions by rote. Their wonderful openness for learning will promptly shut down. Likewise, external rewards, competition, and pressure deprive children of the joy and pleasure of creativity. Exercises suddenly become win-lose situations and self-judgment takes over for playful experimentation. Setting unreasonable expectations for a child’s performance depletes their confidence, pressuring them to both perform and conform. Innovation, again, goes almost immediately dormant (Amabile & Hennessy, 1992).

Grading is just one of a series of controls used in the education system today. Ultimately, grades say to the learner, “You are answerable to me, the teacher.” Lighting children’s intellects on fire and letting them come to care about their own education is a much better pathway to lasting motivation. Rather than sorting children into competency categories, why not invite them to love learning and be answerable to themselves? Would you like to try this? is a much more effective mantra for long-term motivation than is any carrot or stick approach.

Get children into the habit of taking intellectual risks by inviting them to be comfortable questioning everything around them: ideas, books, teachers, and peers. One great way to encourage questioning is to assign it. The next time you are beginning a unit or lesson, ask the children to come up with 100 questions about the topic. For instance, in a language arts lesson on E.B. White’s novel Charlotte’s Web (1952) the students might begin with questioning the events of the story: Why was Wilbur in danger? or What happened when Charlotte began to praise him? Then they may begin to ask more analytical questions, such as, Do animals befriend each other in real life? or Do animals
have the same kinds of feelings as humans? They might run out of ideas at 20 or 30 questions, and begin to get creative, or even silly: What if Charlotte had 10 million babies, could they begin to run the farm? And so on. When they really run out of ideas, they can pair up with someone else to combine their lists and see how close they can get to 100. The more children get in the habit of asking questions, the more likely they will be to stretch their minds and challenge the people and texts around them.

Let students work and be evaluated in pairs or teams so they have an opportunity to be part of something bigger and to be less self-conscious.

Russian developmental scientist Vygotsky (1930/1978) advocated for collaborative learning because he believed that meaning is socially constructed. He also discovered that working together allowed children to surpass the levels that they could have achieved alone. When children work collaboratively they are more likely to get engrossed in the challenge of learning and less likely to focus on achieving good grades. In terms of confidence, peer and group learning can also diffuse the pressure that an individual child can feel to excel. Finally, and perhaps most importantly, a mountain of evidence now shows that collaboration enhances and deepens learning, even on subsequent solo endeavors.

Pair students on tasks that are traditionally done alone. Writing is a great example. Poems and stories can be written serially, with each child seeing only the previous line, adding a line, and passing it along. When the final pieces are read aloud, the juxtapositions can be hilarious! Even short-answer or essay exams can be done in pairs, with the children helping each other remember important information from the lessons they are being tested on. I often ask my students to critique one another’s essays, and find that they have a hard time expressing what needs to be changed. If instead they are asked to rewrite the other student’s essay (if the essay they are critiquing becomes “theirs”) they have no problem finding areas that need work. Essays can be passed multiple times, with each student having the opportunity to work with several, and to get each one into
the best shape possible. In the process they will learn a tremendous amount about other people’s ideas, about grammar and structure, and about writing as a process. They will also begin to separate their sense of self-confidence from individual grades.

**Create lesson plans that highlight multimodal strengths, giving each student a chance to shine in some way.**

In the children’s book *Horris and Morris Join the Chorus, but What About Dolores?* by James Howe, three best-friend mice try out for the chorus together, but only two make it in. The third mouse, Dolores, is told that she has a terrible voice and finds herself suddenly left out of all the fun. In an impassioned and lonely moment, she writes a letter to the chorus director describing her love of music. The chorus director is stunned to realize that Dolores is a wonderful writer! He promptly recruits her to write the songs that the chorus will sing.

This picture book would make Harvard psychologist Howard Gardner proud. His (1993) theory of multiple intelligences accounts for the wide varieties of abilities that humans are capable of when it comes to mastering their environments. Gardner discovered that traditional definitions of skill, based on IQ testing, limit human potential and creativity. Unfortunately, both our education system and broader culture prioritize linguistic and mathematical-logical intelligence over other types. But where would we be without the artists, architects, musicians, naturalists, designers, dancers, therapists, entrepreneurs, and athletes who enhance the world with equal brilliance? We should place equal merit on the unique ways of thinking in linguistic, logical-mathematical, spatial, bodily kinesthetic, musical, interpersonal, intrapersonal and naturalist intelligences (Gardner, 1993).

Teaching students in the modes they learn best (molding lessons to those who are primarily auditory learners, visual learners, or kinesthetic learners) does in fact enhance their learning (Bellflower, 2008; Douglas, Burton, & Reese-Durham, 2008). Additionally, research studies show that all students benefit from being taught in multiple sensory modalities as compared with teaching the same material via only one modality (Mayer, 1999; Mayer & Gallini, 1990). Teaching complex material using text and pictures, for example, is more effective than teaching
the same material using text only (Gellevij, van der Meij, de Jong, & Pieters, 2002).

Whatever topic you are teaching, imagine ways to connect it with words (linguistic intelligence), numbers or logic (logical-mathematical intelligence), pictures (spatial intelligence), music (musical intelligence), self-reflection (intrapersonal intelligence), a physical experience (bodily-kinesthetic intelligence), a social experience (interpersonal intelligence), or an experience in the natural world (naturalist intelligence) (Armstrong, 2009).

In a botany lesson, rather than simply teaching the names and characteristics of trees, go out in the woods and ask your students to pick a tree to be “theirs.” They should gather as much information about their tree as they can. You might ask them to draw it, take measurements, or bring a digital camera to photograph their tree. They might be able to find some loose bark or fallen leaves or acorns from their tree to select as samples. Then, back in the classroom, they will put their information to use. Ask the students to pick partners and blindfold one partner. The first child will describe their tree and ask the other to visualize it. They should describe as many aspects of the tree as they can: color, shape of leaves, fruit or pods, feel of bark. If they have collected any physical specimens, a piece of bark or a leaf, they should allow their partner to feel them and get a sense of them. The partners can then remove their blindfolds and attempt to draw the trees they have been introduced to. This will access spatial, visual, verbal, kinesthetic and interpersonal intelligences.

Next, ask the students to anthropomorphize their trees. After reflecting on the shapes, sizes, colors, textures, they should imagine what it would be like if the tree had human characteristics. Would its voice be high or low? Would it be a slow or fast-moving tree, if it tried to move? Models of trees can be made from clay and animated with human features or children can act out their trees’ personality in front of the group. They might also write an illustrated story about their tree and its adventures, tapping verbal and linguistic intelligence.

You may also want to bring slices of trees into your classroom. You can find them at local tree removal businesses or mills. Ask the
children to calculate the age of each tree by counting the rings and also ask them to map out a story of that tree’s life. You might continue with the anthropomorphizing theme by asking the children to invent stories from the tree’s perspective. “In the spring of 1955, we had the most rain of my entire life! I gulped down that water and made over 100 extra pinecones by summer.” In this way, you can tap verbal, spatial, logical, and mathematical intelligence. Finally, ask the class to find ways of remembering the names of twenty local species of trees. (You might ask older children to learn the Latin genus and species of the trees). Small groups can use any techniques they want, but should be encouraged to try rhythm, songs, and visuals to make the memories “stick.” This will tap auditory, rhythmic and musical, and interpersonal intelligences.

Lots of lessons can be adapted to integrate more multimodal stimulation. Activities can be applied to almost any area or discipline of study, including group discussion, journal writing, choreography, constructing timelines, putting on plays, making videos, writing stories, making graphs or Venn-diagrams, designing posters, emailing experts, sculpting models, or composing songs. Each of these activities integrates skills that children have across their many intelligences. Using the theory of multiple intelligences, you can engage learners on many levels while at the same time increasing their motivation.

Motivation Propeller 3: Play

Six-year-old Peter squeals with glee as the tribes of ants he has been drawing march toward their helicopters. These are rescue ants, in full gear, ready for any emergency that might come up. “Psheeeeeeeeeew!” he says, furiously scribbling the explosion that will cause an avalanche. In come the ants! “Look out below!” And Peter continues this way for almost an hour, his paper and pencil transformed from things to interactive places. He is not at all concerned with the finished product or what others might think. His imagination has transported him from his bedroom to the depths of the ants’ miniscule world.

Play is a wonderfully natural and spontaneous set-up for learning. Children have an inclination to play as a means of exploring and being inventive, creative, and curious; it is their chief pastime, accounting for a substantial portion of their time and energy and is endlessly absorbing and exciting for them. The motivational forces of play cannot be
overstated. Children and other primates play not because they know it will help them learn, but because they have fun doing it. When it stops being fun, children stop playing. Play is the quintessential feature of childhood, sometimes defined as “that behavior exhibited by juveniles.” It is also the central activity during the time in development when humans are at their most receptive to knowledge, making it the ideal vehicle for learning.

Play behavior is rooted in evolutionary adaptation; it is ubiquitous among mammals, seems to exist in birds and fish, and is most frequently found in species that have rich behavioral repertoires. Play is also observed in greater complexity among animals with higher cognitive capacities. In order for this distinct motivational system to have evolved, it must serve important biological functions. Peer play lets members of a species bond with each other and enables them to learn to identify one another, to learn acceptable and successful behavior, and to learn to communicate well. These are all crucial skills for the group’s survival. Scientists speculate that juvenile play is practice for adult behavior and even suggest that it represents a virtually irresistible drive to acquire the skills necessary for effective adult functioning. Time to play is perhaps the reason that our extended period of childhood exists at all.

Research shows that animals that take longer to reach maturity also play more. Humans (who take the longest to mature and are the most cognitively advanced), spend many years developing complex, symbolic fantasy play as practice for adult roles and socialization. After studying cultures from antiquity to the 20th century, Dutch historian Johan Huizinga (1971) concluded that playing is the foundation for human civilization, including science, law, sport, and trade. Likewise, Russian philosopher Mikhail Bakhtin (1965; 1984) claimed that all cultural innovations have arisen from some element of playfulness.

Children in all parts of the world quickly develop an overwhelming desire to play. First, infants come to perceive the playfulness of their caregivers in their speech, songs, and caregiving rituals. With the onset of smiling at about two months of age, infants become partners in playful exchange. Within the next weeks and months, infants begin to manipulate objects and their bodies by sucking, waving or banging
repetitively in exploration. From six months of age and beyond, infants spend much of their waking time using their mouths and hands to explore and maneuver objects, including relating two or more objects to understand their unique functions and properties. Young children who engage in more object-oriented play are more successful at simple tool tasks than those who engage in playing with fewer objects (Gredlein & Bjorklund, 2005).

The similarities in object manipulation observed in human and nonhuman primates are striking, suggesting that these behaviors have an evolutionary basis. However, around one year of age children’s play diverges from that of other primates, becoming more intentional and symbolic. Children begin with imitative play and then move toward more social forms of playing, such as turn taking and role-reversal games, and finally to social-fantasy play, which is uniquely human. Humans are also the only species who plays throughout life, resulting in continued behavioral flexibility and learning.

Play is first and foremost a voluntary activity, and by definition involves freedom from clear functions and goals. Children and animals are highly motivated to play because they enjoy it, and that is the power of play for cognitive growth. In play, the child can survey a situation and respond in an unlimited number of ways. A child can hypothesize or imagine many possible new situations, while creating responses to them (stretching ideas, theories, and behavior patterns). According to Vygotsky (1978) a child’s’ greatest self-control occurs during play, since play requires acting against real-world knowledge. A child must put aside what he or she already knows about a stick to allow it to become a horse, for example. Because playing is by definition liberated from real-world consequences, children in play can be free to experiment and take risks that they might not take in other circumstances. Such risks are crucial to learning.

**Play in Social and Historical Context**

More than 2,000 years ago, Plato advocated that the children of Greece be given toys and tools to play with as a means of encouraging their development. However, since the Industrial Revolution, the West has
had a mixed relationship with the freedom of play. On one hand, it is considered the opposite of work and is thought of as useless economically, socially, and ethically (being associated with laziness and idleness). Pedagogue and writer John S.C. Abbott, in his 1839 *Guide For Youth to Truth and Duty* cautioned “if you waste your schoolboy years in indolence and play... in all probability, you will not be successful in any business in which you may engage, and you will live and die in poverty and obscurity” (p. 12). Alternatively, early childhood educators and philosophers of education (such as Jean-Jacques Rousseau, Maria Montessori, John Dewey and Rudolf Steiner) have had a strong tradition of valuing play as essential for learning and development.

Recently our relationship with play has become more splintered. While there has been a huge rise in research on play, children’s lives at home and school are increasingly structured with the “work” of getting ahead. Parents receive carefully marketed messages that children need preparation in order to be successful in this world, and fill their every waking hour with achievement-oriented activities. According to one estimate, children’s free-play time at home has decreased by one third over the last thirty years due to the (false) belief that specified academic preparation will enhance learning in school (Burdette & Whitaker, 2005). Meanwhile, teachers and school boards, in response to the *No Child Left Behind Act of 2001*, are cutting free time for more focused study on reading and mathematics. Likewise, the number of schools in the United States with at least one recess period has dropped almost 30 percent in the last 20 years. Recess is one of the only times of the school day for children to talk, run, play, and be with their peers with relatively little adult intervention (Holmes, Pellegrini, & Schmidt, 2006). By limiting or eliminating recess, some administrators and teachers believe that they are enhancing children’s opportunity to learn, when in fact they are doing quite the opposite. In response to this misunderstanding, the United Nations High Commission for Human Rights has recognized play as the right of every child based on its importance for optimal development (Ginsburg et al., 2007).

Taking away playtime for more formal “academic” activities may directly harm learning, especially in infants and young children. In a
telling experiment, Czech developmental scientist Hanus Papousek (1977) taught infants to turn their heads at the sound of a bell. The infants’ training began either at birth, at 31 days, or at 41 days of age. Those who began training at birth required more days to learn the behavior than those who began training later. Perhaps even more striking, 8- to 16-month-old infants who watched “educational DVDs” designed to enhance the cognitive development of infants (for example, Baby Einstein or Brainy Baby), had significantly smaller vocabularies (six to eight fewer words for every hour spent watching the videos) (Zimmerman, Christakis, & Meltzoff, 2007). Such findings have led media activists to put pressure on the corporations who market videos as being “educational” for infants and toddlers. In 2009, the Disney Corporation admitted that advertising the videos as educational was misleading and potentially harmful to infants. They offered a full refund to anyone who had purchased Baby Einstein videos during the prior five years.

Passive viewing simply does not engage the infants’ sensory systems in the manner that actively exploring the world does. Developmental scientists have discovered that merely having the television on in the background while 12-, 24-, and 36-month-olds played with their toys led to deficits in both focused attention and the quality of play. The effects occurred even if the toddlers showed no signs of paying attention to the TV (Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008). If we actually allow infants and children the time and space to play, we will find them engaged in testing out ideas and hypotheses that involve imagination and creative fancy; we will find them making rules (which can be changed), and having fun. They will make choices and decisions, negotiate, use ideas and imagination, show independence in thought and action, sustain physical and intellectual engagement, and experiment and investigate with ideas and objects. In other words, playing children exhibit all of the cognitive skills that we consider desirable.

**Child-Directed Free Play**

Some play advocates have implied that instructors should guide children’s play as a means of improving its quality or justifying it as
preparation for more productive use of their time. On the contrary, research suggests that unstructured free play is especially important for learning. Children’s performance on skills differs tremendously when they are left alone to play. In one series of experiments by developmental scientists at the University of Minnesota, preschool children showed significantly less sophisticated language skills when they were playing in a group that included adults. When the same children were allowed to play with only peers, their language was more advanced, more explicit (had more clearly defined pronouns, for instance), and was structured more like a narrative (using more causal and temporal conjunctions like “and then” and “because”). Such language corresponds to higher performance on tests of early literacy. In these studies, children’s use of fantasy in play was also more advanced when the adults left them alone. They were likely to take on a wider variety of roles, including playing adults and the teacher (Pellegrini, 1984, 1985; Pellegrini & Galda, 1993).

Children’s conversations with adults are less likely to lead to learning, because children are much less likely to question or challenge adults. Researchers posit that when young children are interacting with adults, the adult often does the work of keeping the interaction going. This is especially true when the child struggles socially. Unfortunately, socially struggling children are the ones who tend to want to spend their time with adults on the playground.

The importance of child-directed play cannot be overstated. Play is more advanced when children take the lead. In one study, 1- to 2-year-old toddlers were observed for complexity of symbolic play while playing by themselves or with their mothers. The results indicated that while symbolic play increased during collaboration, mothers who gave directions or offered other instructions had children with significantly less complex symbolic play than mothers who let their children take charge (Fiese, 1990). In another important study, kindergarteners recalled classroom activities from the previous day (including listening to stories, singing, building with blocks, drawing, planting seeds, baking bread, and eating a snack) and were asked whether each was “classroom work” or “classroom play.” All activities assigned by the teacher, including building with blocks or singing, were considered
“work” by the children. Even those activities that were voluntary but directed by the teacher were called work. The only activities that were considered play were those that the children directly controlled (King, 1979). If we are extra-sensitive to children’s cognitive, social, and emotional needs for free play, we will allow them the pleasures of creativity, spontaneity, independence, and the sense of power. Children who play more are happier. They relate better to their peers and have more fun. They also engage more fully in the classroom and do better in school.

Social critics have pointed out the contradictions in spaces claimed to be set up for children’s play but actually designed to serve adults’ needs. One research team noticed that at Walt Disney World, imaginative play was not only missing from the environment supposedly designed for children, it was actually disallowed. For instance, children who spontaneously began the Mexican Hat Dance on the steps of the Mexico Pavilion’s attraction stairway were quickly stopped by park staff and literally steered back into line (Kuenz, Willis, & Waldrep, 1995). Even well-intentioned adult overtures may harm children’s freedom to play.

To insure that adults do not interfere with children’s autonomy and freedom (and therefore their learning), Danish preschools often have a room that is only for children with no adults allowed. Whenever I mention this to my students, they panic, images from *The Lord of the Flies* swirling in their heads. Most fear that the children will hurt themselves or others and be unable to handle the conflicts that will inevitable arise. Japanese early childhood educators tend to concur with the Danish. From their perspective, even physical conflicts (like grabbing and pulling toys away from one another) can be valuable learning experiences for young children. Children, they believe, need to be *kodomo-rashii* (which translates to “childlike”) first and foremost, and the point of school is to let them learn about the complexity of being social. They argue that non-intervention in physical fights gives children an opportunity to work out their differences without interference, whereas intrusion by adult teachers denies them that opportunity (Tobin, Hsueh, & Karasawa, 2009).
Play and Cognitive Development

It is enormously important for us to recognize that children’s cognition develops primarily through play. Vygotsky (1930/1978) claimed that play not only contains all of a child’s developmental tendencies in condensed form, but it also serves as a source of development in and of itself (because children in play often behave in a manner way beyond their actual age). As children learn to interact with other people and the environment, they also learn to think. Play is related to higher reading levels and IQ scores, and to greater creativity and imagination. Kindergarteners’ behavior during free play at recess predicts their academic success in first grade (Hirsh-Pasek & Golinkoff, 2003).

Using a research procedure originally designed for chimpanzees, developmental scientists have discovered that free play enhances problem-solving skills in children. In the experiment, children are brought into a room with sticks that can be joined together to make longer sticks. The children are given no instructions whatsoever, except that they may touch the sticks. After this free play period, they are then given one or more problems, the solution to which necessitates joining the sticks together to create an extending tool. Results indicated that free play with the sticks made it possible for the children to solve the problems (at times even more effectively than when they were given directions). The more complex their play with the objects beforehand, the more complex the problems children could solve (Cheyne & Rubin, 1983).

In another classic experiment, one group of preschool children was given the opportunity to free-play with four types of objects (paper clips, paper towels, a screwdriver, and a wooden board). A second group was asked to imitate an adult using the objects in obvious functional ways. A third group did not see the objects at all, and was simply asked to draw anything they wanted. The children were then asked to come up with ideas for how the objects might be used. Those in the free-play group came up with totally new and different ideas for each object than those in either of the other groups, indicating that their playful activity fostered creativity (Dansky & Silverman, 1973). In a third interesting study, a pediatrician and researcher gave a box of
wooden building blocks to preschool children from both middle- and low-income families and asked their parents to keep a log of how often the child played with them. Incredibly, after six-months, the children scored significantly higher on tests of language development than a similar group who received no blocks (Christakis, Zimmerman, & Garrison, 2007).

**Play and Socioemotional Development**

Free play can act as a buffer to stressful events and anxiety. In one compelling study, preschoolers watched films that were designed to evoke stress and anxiety. Researchers measured their levels of emotional distress (both behaviorally and physiologically) before and after playing, and then compared them with a control group who had not seen the films. The children showed a marked decrease of anxiety after playing, and their play behaviors were related to the events they had watched (as compared with controls). This indicates that playing allowed them to express and thereby reduce their stress and negative emotions. The same researchers examined this phenomenon in a more real-life situation: the transition to preschool. Specifically, they observed 3-year-olds on the first day of preschool and categorized them (based on their behaviors) as high or low-anxiety. The children were then allowed either to play freely or to sit and listen to a story. High-anxiety children who chose free play had a greater reduction in anxiety as compared to the other groups. Their play was also more imaginative and solitary than the other groups, indicating that children use creative free play as a conflict resolution mechanism (Barnett, 1984; Barnett & Storm, 1981). Finally, in a striking longitudinal study, adults from impoverished backgrounds were better adjusted socially if they had had opportunities for free play in their schooling (Schweinhart & Weikart, 1997). Nothing can compare to free play as an instrument of learning, least of all formal instruction.

Neurological research indicates that the motivation to play (and in turn, to learn) is deeply rooted in our biology. Play prepares the brain to handle the unexpected and may contribute to healthy brain development. This becomes clear when we examine animal models for human behavior. In one study, rodents placed in environments with
running wheels and other play structures showed greater brain development and intelligence than rodents who did not have such opportunities to play (Dugatkin & Rodrigues, 2008). Play behaviors also seem to promote neural development in the higher brain areas (those involved in emotional reactions and social learning). For example, animals that are not allowed to play during youth display social, emotional, and cognitive deficits as adults, compared with those raised normally (Pel- lis & Pellis, 2007). Likewise, juvenile animals raised with an adult (who they could see, hear, feel, touch but not play with) showed deficits on tests of cognitive and social functioning. If they were allowed to play with a peer for just one hour per day, no deficits occurred (Einon, Morgan, & Kibbler, 1978).

How to Enhance Classroom Motivation Using Play

» Develop pedagogies of play.

Volumes of evidence in developmental science research have shown us that children learn best when they play. With no fundamental difference between playing and learning, the classroom should primarily be a place for exploration, freedom, and creativity. You can use your own creativity as a teacher to find the fun in lessons, transform schoolrooms into play spaces, and encourage children’s imagination during learning exercises. Carefully observe children’s play expressions and look for opportunities to support or scaffold learning. According to developmental scientists, children should be given opportunities during the school day to engage in both solitary and social play activities, ideally with partners on different developmental levels from themselves. The classroom can provide the space for free-play with complete autonomy, while also allowing for activities that children may not otherwise be allowed to do (activities usually engaged in by the opposite gender, for example) and play with partners whom they would not choose on their own (partners of different ages, for instance).

The freedom of playing is a wonderful vehicle for learning because it is self-determined and self-motivated. Psychologists speak of intrinsic

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<td>&gt; Play is children's prime motivator.</td>
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<td>&gt; Play enhances self-control and experimentation.</td>
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<td>&gt; Taking away recess and free play harms children’s cognitive development.</td>
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motivation (desire which comes from within us, rather than being imposed from the outside) as leading to the most effective, highest quality learning (Deci, 1972). In order for intrinsic motivation to develop, an individual’s actions must be free. Such freedom develops in children only if certain basic needs, such as feelings of autonomy, of competence, and of relatedness are met.

Begin every new unit or lesson with a session of free play. If you are setting up a science unit on vision, for example, before you begin any formal instruction, fill a table with visual optics objects: magnifying glasses, prisms, plastic models of the eye, old pairs of glasses with different lenses and just let the children explore them. Another table might be wallpapered with images of optical illusions, views of the solar system via telescope, or close-ups of animals with vastly different looking eyes. You might have some themed music in the background or project the night sky on your classroom ceiling. If you avoid structuring every second of the day, you might be surprised at the creative responses to new materials that the children come up with. Being allowed to play with tools before being asked to use them not only fosters enhanced problem solving skills, it is also a lot more fun!

► Avoid the high-stakes academic approach with young children.

Intense approaches to academics are counterproductive for young children. The pressure places them at both short-term risk (e.g., stress, fatigue, loss of appetite, decreased efficiency, psychosomatic ailments) and longer-term risk (e.g., reduced motivation for learning, minimized self-directed learning, harmful social comparisons of intelligence). Attempts to enhance young children’s intelligence through vigorous instruction, sometimes beginning in infancy, can be quite harmful. Parents and teachers who feel that children’s intelligence needs to be formally sculpted seem to be misinterpreting the research evidence. Developmental science has clearly shown us that the young mind has evolved to be an elegant and efficient system to which learning is as natural as growing.

For example, there are no lasting differences in intelligence between children who go to academically oriented preschools and those who do
not. When preschool is viewed as a preparation for kindergarten, the curriculum becomes more adult-directed and sedentary as opposed to child-directed and filled with play (Egertson, 2003). According to one study, the advantages that children gained in an academically intense preschool (for instance, knowledge of letters, numbers, and shapes) had fallen to baseline levels by the end of kindergarten. However, the negative effects, such as test anxiety, lack of creativity and a dislike of school were lasting. Students who attended high-stakes school programs as young children experienced more stress, disliked school more, were less creative and had more test anxiety than their counterparts in less vigorous programs. Any academic benefits gained had equally compelling costs in terms of motivation (Hyson, Hirsh-Pasek, & Rescorla, 1989).

Let the children know that there is much more to school and learning than grades. Notice areas that they are excelling in naturally, and comment on them. For example, I heard that you were the star kickball player at recess today! Nice job! Or That was a hilarious joke that you told during lunch! When you are making specific assessments of their learning, clarify what the goals of the lesson are in advance, and then reflect with them on whether or not they have met those goals. You might say, When I planned this lesson I wanted to make sure that you know the location of the planets in the solar system and how they move together. If I pointed to a planet, would you know which one it was? Can you show me? Lowering the stakes on most lessons can allow children to develop a more playful attitude toward school, keep their motivation up, and let them learn more.

▶ Give students choices in both the process and content of learning.

Children learn best when they have choices. One way to emphasize choice over control is by letting student interests guide the curriculum. Allowing your students to create their own learning goals, and thus to glean their own meaning out of activities, assignments, and free time, sets up a classroom that blurs the lines between work and play. The Montessori education method, for instance, allows children control by
making interesting, useful, and captivating materials and spaces that can catch the child’s attention. Freedom and choice are not risks in this model—anything that the child chooses to do will be productive and foster learning. The role of the teacher becomes like that of a conductor, bringing together the pieces into a melodic whole (Csikszentmihalyi, 1997b).

Whereas teachers and school boards typically decide in advance what knowledge children should receive based on their age, emergent curriculum is the technique of letting topics for study arise out of student interests and actions. Curriculum becomes what actually happens, rather than what was planned to happen. After all, children design their own “curriculum” all the time, simply by playing in, exploring, and studying the world. In schools inspired by the Italian Reggio-Emilia approach, all lesson plans are tentative and open to change. Reggio-Emilia teachers believe that the interests and inquiries of the child are of equal value to those of a teacher or school board, and therefore let the students invent the topics of study. You can do this by carefully observing and documenting the children’s responses to events around them. Then, design instruction from the bottom up. For example, if you notice a construction project going on across the street from the school, bring the children outside to watch the big machines at work. This could lead to a lesson on machines or demolition or local architecture or the layers of dirt underneath them, all depending on what the children show interest in. Reggio Emilia teachers allow students to work at their own pace, in their own way (rather than by the clock), and to redirect themselves if they are disengaged. The result is a love of learning and an explosion of motivation (Wurm, 2005).

When students feel a sense of control over their own learning process, a much wider range of learning can occur. Furthermore, the brain’s cortex becomes more fully functional when an individual exercises choice and empowerment (the cortex is the seat of high-level, meaningful thought-processes including problem solving, creativity, analysis, synthesis, critical thinking, and decision making). Research has shown that students who believe that their learning experience is beyond their control exhibit less cortical activity. In this case the limbic
Let the children design their own curriculum. It can be done with even the youngest students, and within the framework of very rigid content standards. First grade teacher Lin Frederick has very successfully integrated student-led curriculum into her classroom of 6-year-olds (Nelson & Frederick, 1994). She scaffolds the selection of themes, guiding questions and instructional activities over two weeks with the study of each unit overlapping with the design of the next one.

To use her method, first identify possible topics for the lesson. For example, you might suggest Ancient Egypt, local insects, jazz music, or whales. Make sure that the themes you choose sound interesting to the class, and that they build on previous classroom experiences and feed future ones. Next, present the themes to the children and provide lots of materials to explore each of them, including books, magazines, and websites. Spend the first week researching and discussing with your class the potential themes, gauging what they already know about the topics and what they are most curious about.

Help the children formulate guiding questions for what they want to learn about. You might develop a specific timeline and outline the sequence and scope of the unit. Ask the children to how they would approach answering their guiding questions (including sources they might use, games they could play, and ways they can remember information) to design specific learning activities. Prompt students to think through their suggestions using think-aloud statements. For example, when one of Frederick’s students suggested that they could do experiments to learn the names of types of whales, she responded, “Let’s think about some experiments we could do to learn the names of whales.” The children discussed this and concluded that experiments really weren’t the best method of learning the names of whales, and were guided toward considering more appropriate options (Nelson & Frederick, 1994, p.74). Designing the curriculum itself is a powerful experience in problem solving, not to mention a major boon to creative, playful engagement.
Encourage students to generate their own strategies for solving problems.

Children who come up with their own ways of working through problems learn more deeply. Too much procedural input from the teacher, including the use of “learning tools”, can interfere with learning. In one interesting study, third-graders were taught an organizational strategy in order to enhance their memories. The researchers found that the mental effort that the children had to expend to use the strategy reduced their mental capacity for the test and did not significantly help their memories at all (Bjorklund & Harnishfeger, 1987).

Problem-based learning is an active-learning strategy in which the curriculum is designed around real, open-ended problems that are approached in small groups, with the teacher as an advisor on the side. Students learning this way are forced to draw upon their own existing knowledge and to investigate the problem to satisfy their own “need to know” (Gordon, Rogers, Comfort, Gavula, & McGee, 2001). In one study, elementary students who used a problem-based learning approach were more curious, thoughtful, engaged, and motivated than peers studying the same science unit in a traditional way (Drake & Long, 2009).

Turn a real-life dilemma into a problem-based learning lesson. Let’s say that your students are interested in a class pet. The problem might be that you have to first get the permission of the school administration and each student’s parents. The job of the small groups could be to design a persuasive presentation (in the form of a “white paper,” a pamphlet, or a poster) directed to parents and administrators. The presentation should specify issues surrounding animals in classrooms. Your groups may want to detail the advantages (such as a sense of responsibility) and disadvantages (such as the risk of allergies) of animals in schools. They should be sure to cover any logistics that will need to be in place with a class pet (such as licenses or plans for school vacations), and to make specific recommendations. The key to problem-based learning is letting the student groups develop their own approaches and strategies for solving the problem. Children will develop flexibility with their own and other’s ideas, and will learn to
allow room for movement, to listen, to think together, and to play with possibility.

**Motivation Propeller 4: Joining the Community**

Ten month-old Diego has been learning Spanish since his ears began hearing sounds, when his mother was only 6 months pregnant. Now he smiles when she smiles and follows the melody of her voice to know when it’s time to relax or to get excited. He is also learning to listen when she talks and to babble and coo when she’s quiet; they take turns and have little “conversations” all day long. He isn’t trying to learn language, but just loves the soothing voice of his mother, and will do any charming necessary to get one of her warm smiles.

Perhaps the greatest motivator and set-up for learning is the one we notice the least because it is so seamlessly embedded in our daily lives—our desire to join the community. Humans have been evolving for over two million years and living in social groups has been paramount to our species’ survival. Like other primates, humans are inherently social, living in complex organizations such as tribes, families, and nations. Social interaction has allowed us to establish complex ways of being together—to develop rituals, value systems, social norms, and artistic expressions, to name a few. Humans have evolved within communities and the desire to be part of those communities is among our most basic needs. In fact, many neuroscientists now consider the human brain to be primarily a “social tool,” meaning that our cognitive skills have adapted for and function in the service of social relationships.

The desire for community-joining is so deep a motivator to learn that our lasting learning often occurs without our even noticing. As pioneering education researcher Frank Smith has pointed out, “You learn from the company you keep. You don’t learn by consciously modeling yourself on the company you keep or by deliberately imitating other people. You become like them” (1998, p. 9). In other words, most learning is not hard and purposeful, as we tend to characterize it. We are constantly learning, and have acquired virtually all of our knowledge effortlessly, including knowledge about who we are, how our (many) worlds function and how to navigate them. In hunting-
gathering societies like the !Kung or the Hazda, children learn through socializing, playing, watching, and slowly doing. All skills are acquired via experience with virtually no formal teaching. The children in turn are not asked to prove what they have learned by explaining or writing, they simply show their learning by doing (Bruce, 2005).

Daily events in our lives can reveal the power of motivation for learning and the power of community-joining for motivation. Recently, we were trying to interest our son, Alexei, in new, healthy foods. Feeding after feeding, his dad and I put spoonfuls of healthy vegetables in his mouth, only to have him spit them all over the highchair tray, practically gagging. We tried sweet potatoes for lunch, but he refused. Several minutes later, we had the same sweet potatoes on our plates and were having a “picnic” lunch on the floor. Alexei wanted so badly to be part of our picnic experience that he reached for forks and napkins, lunging his body forward toward the floor. When I used the tip of my real fork to give him some sweet potatoes, he happily took as many bites as I would give him.

The intense motivational pull of community-joining can bootstrap infants and children into new forms of complex learning. For example, the development of walking is a complex motor milestone that involves having enough strength to hold one’s body weight on one leg (while the other leg moves forward) and having enough postural control to keep the body centered. This takes a lot of time and effort to learn! But the desire to join the walking community is enough motivation to speed up that learning curve. Research shows that children with older siblings walk significantly sooner than those without, regardless of their height, weight or gender (Berger, 2006). Walking tends to start at about the same time that infants begin to understand and benefit from access to the social world.

**Language Users:**
**The Ultimate Community to Join**

The most powerful example of learning as community-joining is the development of language. Spoken language has been coined *the crowning
glory of our species. It separates us from animals by allowing us to mentally transcend the here and now. It also affords such complex cognitive skills as symbolic thought and representation. Some developmental scientists believe that thinking itself is only possible due to the representational functions inherent in language.

Learning one’s native language as an infant is no small task, and yet it is not directly taught. Developmental scientist Jenny Saffran of University of Wisconsin describes it this way, “Imagine you are faced with the following challenge: You must discover the underlying structure of an immense system that contains tens of thousands of pieces, all generated by combining a small set of elements in various ways. These pieces, in turn, can be combined in an infinite number of ways, although only a subset of these combinations is actually correct. However, the subset that is correct is itself infinite. Somehow you must rapidly figure out the structure of this system so that you can use it appropriately early in your childhood” (2003, p. 110). Indeed, learning language requires remembering and correctly using a vocabulary of some 80,000 lexical items (words or phrases that convey a single meaning). This includes learning the collection of sounds in one’s native language, called phonemes (English has about 44 phonemes; some languages of the world have up to 141). It also includes remembering a set of rules for combining phonemes sequentially in order to form words (of which the average child learns about 20 per day from birth through adolescence!) Finally, learning language involves understanding a set of meanings for those words, a set of rules combining these words into sentences and a set of rules relating sentences to larger meanings. Once a child has mastered the information and skills, he or she has the ability to understand and speak an infinite number of sentences.

Remarkably, infants from all parts of the world learn to talk effortlessly, and at approximately the same time. By about 3 years of age, children speak their native languages in all of their complexity, including all distinctive sound sequences, words that reference abstract ideas or entities, and novel sentences that involve many types of constructions. This is especially striking considering the huge differences in cultural practices around the world, and considering that the languages of the world vary tremendously in terms of phonology, semantics, and
grammar (the structure of some languages being significantly more complex than others). But even more striking is the fact that infants learn all of this with very little, if any, explicit instruction!

There are two aspects of the infants’ community that support the development of language: first, people around infants engage them in rich, structured speech; second, people around infants constantly communicate with each other. Language begins as an exploratory activity and evolves as a cooperative process between an infant and proficient language users. The desire to join the language-using community actually begins before birth. Infants pick up the linguistically relevant features of their auditory environment in the womb. For example, in one study second and third trimester fetuses showed differences in heart-rate in response to the presentation of various vowel sounds (Fifer & Moon, 1994). Newborns prefer sounds they have perceived in utero, including, for instance, their mother’s voice, a melody, a story read aloud by their mother, and the tone and rhythmicity that are characteristic of their native language (Mehler, Dupoux, Nazzi & Dehaene-Lambertz, 1995).

People engage newborn infants in a way that is very specific and very informative. Without even realizing it, they are enticing infants to join their community! Parents and nonparents, adults and children from around the world all talk to infants, even though infants cannot yet understand. They put their faces close to infants, look directly at their faces and make bids for interaction with them. Moreover, they do so in an interesting way: they exaggerate the melody of their speech by elevating the pitch, elongating the vowels, and increasing the rhythmicity. Adults and children also simplify their linguistic information when talking to infants; they use shorter utterances, repeat words, and use simpler constructions of meaning. They exaggerate their facial expressions and gestures, and slow down their actions, both verbal and nonverbal (Fernald, 1989; Kitamura, Thanavishuth, Burnham, & Luksaneeyanawin, 2002). My son Alexei, who is just learning to talk, already raises the pitch of his little voice when talking to babies, dolls, or the ants that have invaded our kitchen. Why do people engage in this type of specific exchange (often called “baby-talk” or “infant-directed speech”) with someone who can’t even understand them?
Adults may use infant-directed speech, facial expression, and gesturing because infants are small, helpless, and cute. Because they love them, caretakers become emotional in the presence of their infants and thus express themselves in a way characteristic of positively and emotionally aroused individuals. (Think of couples in love that talk to each other in sweet, “baby-talk” voices or the way in which someone’s pitch goes up when they share exciting news). Another reason adults might adjust their speech when addressing infants is that when infants actually do begin to talk (or even to babble) their voices are small and high pitched. Adults adjust their own voices to match the anticipated response from the infant. Adults also match the small voices of little children who can talk (that is, they speak to them in infant-directed speech). Finally, people may talk to infants this way simply because they have seen and heard other people throughout their lives do the same (although that does not explain how the phenomenon began). Whatever the initial reason, once adults begin to use exaggerated speech, facial expressions, and gestures, they will likely continue to do so because infants love it! When spoken to this way, infants focus their attention, widen their eyes, and smile, laugh, or nod. Thus, a reciprocal relationship forms between the infant and the caretaker. Each one behaves in ways that gives the other a pleasing response, in a dynamic communicative exchange that influences both (Cooper & Aslin, 1990; Fernald & Kuhl, 1987).

Not only do people engage and talk to infants, they engage and talk to each other. The environment of the human species is incredibly communicative. Language is our link to both social experience and learning. Thoughts themselves come to be comprised of words and over time it becomes impossible to describe the detailed contents of nonlinguistic thought. Infants and children pay attention to language structure and content in every circumstance, actively trying to become competent partners in the community.

Infants so deeply desire to join the talking-club that they become expert listeners to the complicated stream of speech. An interesting study showed that newborn infants cry with an intonation pattern that reflects the language they heard in the womb. French newborns tended to cry with rising melodies and German newborns tended to
cry with falling ones (Mampe, Friederici, Christophe, & Wermke, 2009). In addition to growing sensitive to melodies of speech, young infants develop very sophisticated mechanisms for understanding the specific sound patterns of their native language simply by being immersed in it. Although none of us remembers doing this, by eight months of age, we as infants perceived the statistical structure of our language (the likelihood that certain sounds would come before or after other sounds or would be found at the beginning or end of a word). This information allowed us to know where one word ended and another began, since word boundaries are not delineated by pauses when people speak. For example, in the phrase “pretty baby” the child must discern that “pretty” and “baby” are words, and that, say, “tyba” is not. In English, the syllable *pre* comes before only a small set of syllables (including –*tend*, –*ty*, and –*cede*); the probability that *pre* is followed by *ty* is roughly 80%; whereas the probability that *ty* is followed by *ba* in English is only .03% (Saffran, 2003). This is just one powerful decoding mechanism that infants learn without being taught. In fact, if developmental scientists hadn’t made us aware of statistical learning, it is doubtful that any of us would have recognized the need to learn to segment the speech stream, never mind understand how to do it! In any case, the daily life of the infant (including active listening to sounds) is nested within the linguistically rich environment provided by the caretakers and the community at large. Language learning is highly adaptive to the helpless infant. By joining the community, the infant accomplishes the job.

**Learning to Read as Community-Joining**

While language emerges before entering formal schooling, learning to read most often occurs within the context of a strict educational curriculum. However, reading too can be achieved seamlessly when couched in motivation for community-joining. Six-year old Scout, the heroine of Harper Lee’s classic novel *To Kill A Mockingbird*, was reprimanded on the first day of first-grade for already knowing how to read, and was told to stop because it would interfere with her learning to read properly. But she was never actually taught to read…
I never deliberately learned to read, but somehow I had been wallowing illicitly in the daily papers. In the long hours of church—was it then I learned? I could not remember not being able to read hymns. Now that I was compelled to think about it, reading was something that just came to me, as fastening the seat of my union suit without looking around, or achieving two bows from a snarl of shoelaces. I could not remember when the lines above Atticus’s moving finger separated into words, but I had stared at them all the evenings in my memory, listening to the news of the day, Bills To Be Enacted Into Laws, the diaries of Lorenzo Dow—anything Atticus happened to be reading when I crawled into his lap every night. Until I feared I would lose it, I never loved to read. One does not love breathing” (Lee, 1960, p. 19).

Boston College developmental and evolutionary psychologist Peter Gray writes that children can learn to read with the same unawareness and ease that they learn to speak; his youngest brother and son learned to read completely unintentionally by joining communities of readers. For example, at the alternative Sudbury Valley School (where students are free all day, every day to do whatever they wish within a participatory, democratic community), “there are no formal reading lessons, children learn to read because reading is a valued part of their social environment. They see other children reading and hear them talking about what they have read, so they want to read. They play games that involve the written word. Adults and teenagers read to them enthusiastically. They want to hear the same books over and over again until they have memorized them, and then they playfully ‘read’ the books they have memorized until their pretend reading turns into real reading” (Gray, 2009, para. 16). In other words, children learn to read by joining a community of readers and by spending time with books. They are not learning to read because they desire to be literate—they are simply enjoying the stories. Learning to read is a byproduct.

As mentioned above, an important characteristic of human development is that developing organisms begin to do things before they
can fully do them. Reading can begin as exploration and evolve as a cooperative process between the interested child and the proficient language user. This was clear when my son Alexei was one year old. He began “reading” his favorite book, *Goodnight Gorilla*, on his own: he flipped through the pages the way we always have together and exclaimed “Ahhh!” on the page that the zookeeper’s wife realizes there is a gorilla in her bed! Hundreds of shared experiences with that book had begun to bootstrap Alexei into the culture of readers. In this case as well as above, the experienced reader served as the vicarious mind until such time as the new learner can master his own action through consciousness and control.

Vygotsky (1930/1978) termed the discrepancy between what children can do alone and what they can do with assistance the *zone of proximal development*. In terms of both language development and reading, learners co-construct new capacities in cooperation with more learned partners in a rich, structured environment. First, someone in the community shows you what can be done, then helps you with whatever you want to do for yourself. As you become more skilled and more knowledgeable, you can participate more competently and independently in the desired arena and in new arenas as they emerge (Smith, 1988). From birth, children are highly motivated to join their ambient communities. Learning springs from joining in, and children come with an unquenchable urge for both. Like the cartoon characters in the film, *Who Framed Roger Rabbit?* (who cannot resist chiming in with “Two bits!” when they hear the musical couplet “Shave and a haircut . . .”), my daughter Sonia’s extreme desire to participate in *The Bumblebee Song* by squeezing and opening her little fingers to the music and singing “Buzz buzz buzz, Ba-buzz” can trump any other situation: getting hurt, falling asleep, or even feeling sick. She wants to participate and make contributions. Children’s learning has more breadth, depth, and permanence when the information and skills have a purpose and function or are embedded in the meaningful context of their everyday lives.

**Remember:**

- Our brains and cognitive skills have developed in the service of social relationships.
- Community-joining is a premier motivator.
- Joining the community bootstraps children, seamlessly, into learning the most complex skills of their lives, including language use and reading.
How to Enhance Classroom Motivation Using Community-Joining

► Create a learning community in the classroom.

A learning community is a place where all participants are active and responsibility is shared. Students come to learn via collaboration with their peers and with their teachers. To begin to build a learning community, create an environment in which students feel secure and comfortable both physically and emotionally. First, get to know your students and help them to get to know one another. Set up a social context that encourages collaboration, in which asking questions and seeking help are appreciated. Empower your students rather than overpowering them with rules. In a learning community the teacher is required to hand over some of the control of the classroom to the students. But the good news is that if the students feel empowered and part of a club or community, they will be more likely to monitor themselves when it comes to both academic and social matters.

Hold a regular class community meeting. This is a wonderful way for the students to get to know each other better and to bond as a group. First, set aside about 20-30 minutes at the same time each week. Begin your first meeting by collaboratively establishing some ground rules for the year (for example, listening attentively, showing respect, avoiding side conversations, saying “pass” if you don’t want to talk). You might also want to designate a gesture that can bring the group back in control if needed.

At each meeting announce a prompt for sharing. For example, go around the circle and take turns finishing sentences such as, One thing I like about our classroom is…. or One good thing that happened to me recently is…. or I’m bigger than a _____________. I’m smaller than a _____________ (Gibbs, Rankin, & Ronzone, 2006). Your class meeting can also be a forum for conflict resolution. You might reflect on the previous week and ask students to check in as to how they are feeling about school or their lives outside of school. They can feel welcome to bring up things that worked or didn’t work (in terms of lessons or
relating with one another). If there is a conflict between students, let the group hear multiple perspectives and try to come up with a resolution. Once students realize that their insights and opinions are valued, they will begin to feel part of something larger than themselves. This can have a powerful effect on motivation and learning.

**Use dialogue as much as possible.**

Conversation and reflection are the pillars of critical thinking and cognition. They are at the foundation of empowered learning communities. Greek philosopher Socrates is said to have invented this form of exploratory intellectual discussion, in which questioning brings deeper levels of understanding and ideas become illuminated. As Freire has observed, “only through communication can human life hold meaning…. The teacher cannot think for his students, nor can he impose his thought on them” (1970, p. 63). Participants engaging in collective, supportive dialogue (including young children), learn to put aside their own thinking and listen to the thinking of others. This is a recipe for making them feel valued and heard. The power of shared insight via participation in dialogue is a palpable motivator for community-joining.

Incorporate open-ended Socratic Seminars into your daily teaching practice. Once your students are in the habit of listening, thinking, and discussing in groups, you can engage them in lively discussions on anything from science to art. The purpose of an open-ended seminar is for the students to deepen their understanding of a “text” (which can be a story, a nonfiction book, a film, or an experience). The outcome of the seminar must not be predetermined. Students may make discoveries as surprising to the teacher as to themselves. The goal is the inquiry process. The teacher should avoid “telling” the students, and instead guide the class in the hard work of questioning, deliberating, and searching (Finkel, 2000).

First, find a compelling short text to share—for example, the classic fairytale *Cinderella*. You might begin with reading the text aloud or asking the students to read quietly on their own. They can then work in pairs to develop questions for discussion. Remind them that their questions should be supported with evidence from the text, and also
might be open to interpretation (an example might be, *Why didn’t the fairy godmother just change Cinderella’s life?*) The children should be encouraged to write down their questions and to mark the parts of the text (with sticky notes) that lend support (Chorzempa & Lapidus, 2009). The next step is sharing the questions and deciding which one to open with. A go-around works well. You might also write questions on the board and decide together which are the most compelling. Then, sitting in a circle (either by moving their desks, or on the floor), they can begin a dialogue on the questions and the text. Each child should be encouraged to share his or her opinions and to back them up with evidence. They should build on one another’s statements, connecting them to their own experience and to previous lessons. The children will begin to compare their perspectives with those of their peers and of the authors. They will begin to feel that their opinions are important, all the while respecting the views of others, improving their reading comprehension and vocabularies, and learning how to evaluate evidence and make arguments. They will also feel the excitement and energy that go along with a tight-knit intellectual community, which in itself spurs motivation for learning.

► **Work within the child’s zone of proximal development.**

Vygotsky wrote, “What the child is able to do in collaboration today he will be able to do independently tomorrow” (Vygotsky, 1934/1987, p. 211). Indeed, children learn best when encouraged to move just slightly beyond what’s already comfortable for them. You can create this optimal learning situation by presenting ideas and concepts which are just above your students’ current understanding; tasks that require a significant amount of help to complete. Then, by pairing them with peers of different skill levels or scaffolding their budding abilities yourself, encourage them to reach and challenge themselves.

Teach math concepts with board games. For example, to win at backgammon, a player must have an understanding of probability. After presenting the basic rules of the game to your class and letting them play a few times, break them into collaborative teams to figure out the odds of rolling particular numbers (Doolittle, 1995).
First, the students can calculate the probability of rolling a certain number by figuring out all possible outcomes in rolling two dice. Two students from each team can then be responsible for calculating the likelihood of each total using mathematical probability. In this pair, one child might be in charge of determining the number of possible ways that each sum can be rolled, while the other child records the information and calculates the actual probability percentage. The members of the team can be charged with figuring out the probability of each outcome by actually rolling the dice enough times and recording the results. One student in this dyad might roll the dice and sum the tallies, while the other is in charge generating the probability percentage. Then, the student team can come together to compare results and share them with the rest of the class. Finally, the team can play a series of games together, but this time announcing before they roll what sum they would like to get, and what the probability is of actually rolling that number (Doolittle, 1995). You can create learning experiences at the top end of the children’s zone of proximal development with other challenging games as well. Try cribbage, chess, or mancala next!

**Focus curricula on relevance to students and on applicability to their lives outside of school.**

In order to be motivated to learn from school activities, students must see them as meaningful and worthwhile. In other words, they must see a need for learning the material you present. Let children (as valued members of the learning community) bring their ideas, thoughts and notions to bear on new topics. Learning is not something that is reserved for the classroom—children are constantly learning! They also come to the educational setting with a whole range of beliefs and experiences that have been relevant to their lives. If this real-world knowledge becomes the starting point for learning, rather than being treated as irrelevant, lessons will come alive and be better integrated. To connect children with real world applications and value, be explicit about what they are learning, why they are learning it and how new knowledge and skills can affect their lives. Being respected as an interesting, knowledgeable member of the community will spur their motivation for learning.
Find out what your students love, and what they are excited to master, understand or comprehend on their own in their lives. For example, if the children in your math class love to skateboard, design and build a half-pipe! In the words of a student whose teacher did just that, “When you’re building a half-pipe, everything has to be precise, and you have to do the math to figure out where you need to cut the wood or where you need to put the angles, and there’s a lot of math in it. But since we wanted to build the half-pipe, it was a lot easier to do the math for it” (“What Helps Us Learn,” 2010, p. 68). Indeed, as developmental science shows, the best possible way to get and keep your students motivated in school is to capture the motivation that they already have, as humans, and as confident and playful children seeking novelty and community.


References


References


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