

Skill Builder - Part C

The Brain & Intelligence.

Connection Point

How does “intelligence” work? In your notebook, answer the following question: Is intelligence something that is fixed and cannot be changed (some people have it other people don’t...) or is it something that can be built/created/improved upon? Why do you think that?



The World’s Most Amazing Muscle

The brain is a phenomenal muscle, composed of 86 billion neurons, with hundreds of trillions of connections between them. There are as many neurons in one brain as there are stars in the Milky Way galaxy. In all of the world, there has not been another organism that matches the amazing ability of the brain. The awake brain “computes” or takes action on 160,000,000,000,000 different unique processes... every second. The world’s 4th fastest computer can do that many computations... in 40 minutes. Every human being on the planet has one, but we know painfully little about them. Take a moment, and in your mind create an image of an enormous purple panda, with pink polka dots, standing on a lake of pineapple jelly beans (may need to close your eyes for a moment to do so)... Yea, scientist don’t know how you are able to do that; but humans are the only known species on the planet with that ability.

The reality is you have an amazing tool nestled away comfortably between your ears... but you don’t know how it works. More importantly, day after day, year after year, students are required to try to put information into their brains and pull knowledge from their brains... and they do not understand how to do so in a way that actually works WITH their brain. Instead they invest a vast majority of their educational and professional careers either (a) spending a lot of time on strategies that work against their brain or (b) not trying any strategies and hoping that the amount that they paid attention in class is good enough to get the grades they want.

In an AP/College level class, you will be asked to master and apply more information than in any other class you have ever taken. It is vital to gain an understanding of the basics of how the brain learns information and how the brain thinks. In doing so, you can begin to use strategies that work WITH your brain to store more information, faster and in less time. This will lead to success in this class, your other classes, your future classes, and the rest of your career.



The Goal of Learning

While the brain is extremely complex, there are two key functions this section will focus on: short term memory and long term memory.

Short Term Memory. Every second the brain receives thousands of trillions of pieces of information. Every color, every movement, every sound wave, every nerve ending, every taste bud... all sending electrical impulses to the brain giving information and updates on what they are experiencing. While being oversimplistic, the short term memory is the place where the brain filters through all those pieces of information and decides what is vital critical information that needs more focused attention and what is irrelevant that can be dismissed. “My hair is still attached” or “The sky is still blue” information will get dismissed. “There is a snake coming towards me!” information will be kept and acted upon. When it is dismissed, it is gone... forever. For example: You met a person at a party. The person tells you their name and the two of you keep talking and laughing for over an hour. When it is time to go after this amazing conversation, you say, “Goodbye..... Pal!”

Goodbye...
What's your
name again?



This happens because the person's name was dismissed... deleted... gone... and it will have to be reintroduced.

Long Term Memory. When the short term memory decides a piece of information is of value and needs to be saved for later use, it gets moved over into Long memory. The length of time that it stays in long term memory is dependent on a variety of variables. It can stay a couple hours, a day, a week, a month, a year... a life time. However, just like short term memory, once a memory has been "lost" or forgotten, it is gone. Forever. The skill or information will have to be reintroduced and the process started all over.

The Goal of Learning: Get information from the short term memory into the long term memory. Keep it relevant. Be able to recall it, apply it and connect it to other ideas on command and at critical moments in time.

How the Brain Works: The Connective Image Engine

To accomplish this goal, there are a few unique aspects of the brain that a student must understand in order to develop learning strategies that work with the brain to retain and apply knowledge.

Connectivity. Many people have the misconception that the brain is like a filing cabinet - the file gets opened, content gets put in, nice-neat. Then to retrieve the knowledge, the right file gets opened with the content there to be obtained. Unfortunately, it is not that simple.

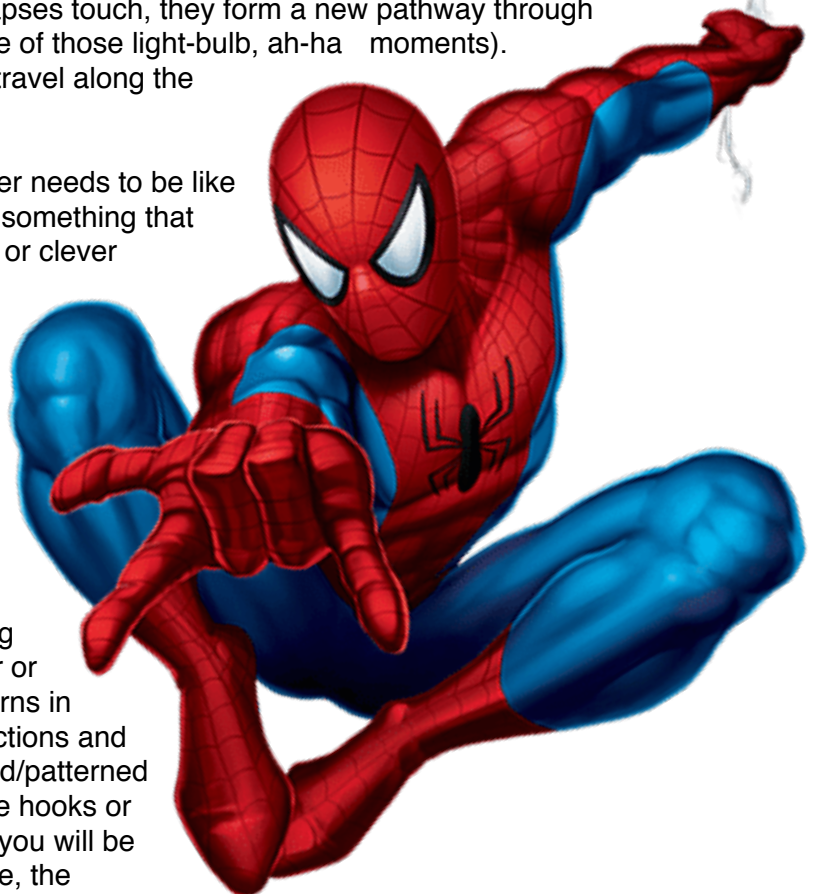
It is better to compare the brain to a spider's web. A spider's web has a series of connected strings.

To eat, the fly must touch the web. Learning is the same way. Your brain has around 86 billion neurons. When learning happens, the neurons link together with a connective device called a synapses (SNAP-sees, like snapping your fingers). When two synapses touch, they form a new pathway through the brain for electrical signals to flow through (one of those light-bulb, ah-ha moments). These electrical pulses are your "Thoughts" that travel along the pathways through your brain.

When learning something new, an effective learner needs to be like Spiderman: looking to connect the information to something that they already know. It doesn't have to be a "good" or clever connection. It just needs to relate. For example:

"Alexander the Great invaded India like my brother invades my room." Or, "The Mongols spread across Asia like fire ants." Youtube and Netflix paid MILLIONS of dollars in research to figure this out to increase the chances of consuming ridiculous amounts time watching videos that you originally had no intention of watching.

Similarly, when a person comes across something new, the brain searches for things that are similar or might relate to the new item. It searches for patterns in the data available. The brain loves finding connections and patterns, because it is one giant web of connected/patterned neurons. Thus, the more that you know, the more hooks or points of connection your brain has, so the more you will be able to learn. Thus, the more knowledge you have, the easier it is to learn new things. The less knowledge you have, the harder it is to learn new things.



Creating a pathway through the brain is similar to building a road. The first time someone walks through the woods, it takes them a long time and is difficult. After a couple hundred times, a path gets worn through, and travel becomes faster and easier. When a company takes a bulldozer repeatedly through the area and removes all the debris, travel becomes much faster. Once the road has been level, paved, and lined, cars can speed rapidly down the road in a way the person walking through the woods never imagined possible. The neuropathways are similar. The first time creating a pathway is tough. Information travels slowly. It takes a lot of thinking effort. But, the more times the pathway is traveled, the more the person uses that set of information, the faster the electric impulses travel, the faster and easier the thinking becomes.



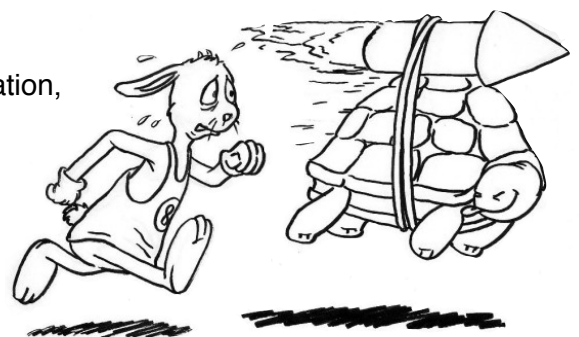
Complexity is Key. The brain stores different types of knowledge in different parts of the brain. The more complex the learning, the more parts of the brain get engaged and connected. The more “deep” and complex things a person learns, the more complex thinking they are able to perform. If a person only engages in simple thinking, with very little difficulty or complexity, they will develop a very simple brain and be only able to complete very simple intellectual tasks.

Images & Audio. The brain stores visualizations and recreations of sounds. The brain does not store words. This is why your childhood memories resemble a movie in your mind, not the written out text on a page. Or your favorite song plays back in your mind as “sound” not as written out lyrics on a page.

Fast & Slow Thinking. When it comes to confronting new situations or solving problems where you have to “think” about them, the brain has Fast Thinking and Slow Thinking. Fast thinking is fast. This is the “impulsive” thinking. The “gut response.” When you come to a new experience, the Fast Thinking automatically (and uncontrollably) quickly sorts through previous experiences and begins to have the body react. This is particularly helpful in potentially dangerous situations. For example, if there was a snake you are about to step on... or a spider crawling on you... a car speeding towards you... Seeing a person bleeding or not breathing. None of these situations would benefit from “deep” thought. They need quick, immediate reaction. This is done by the Fast Thinking. In academics, the people who are strong as Fast Thinkers are the ones who shoot their hand up to answer before the question is even finished being asked. Or the person who blazes through the multiple choice test super-fast.

Fast thinkers must be careful. When Fast Thinking THINKS it already knows the answer, it immediately draws the conclusion and does not pay attention to the finer points or details. Take this question: On the Arc, how many of each animal did Moses take? The answer: None. Moses didn’t go on the arc, it was Noah. However, the familiarity most people have with the story, leads their Fast Thinking to answer the question before the question is even finished.

Slow Thinking is slow. This is the deeper logical problem solving, analyzing from different angles. In a multi-step mathematical equation, Slow Thinking is brought into action. Or, when writing a paper or analyzing a reading. Slow thinking contemplates all the options, sees all the variations, processes possible connections to other topics, and deciphers all the important nuances that Fast Thinking speeds over.



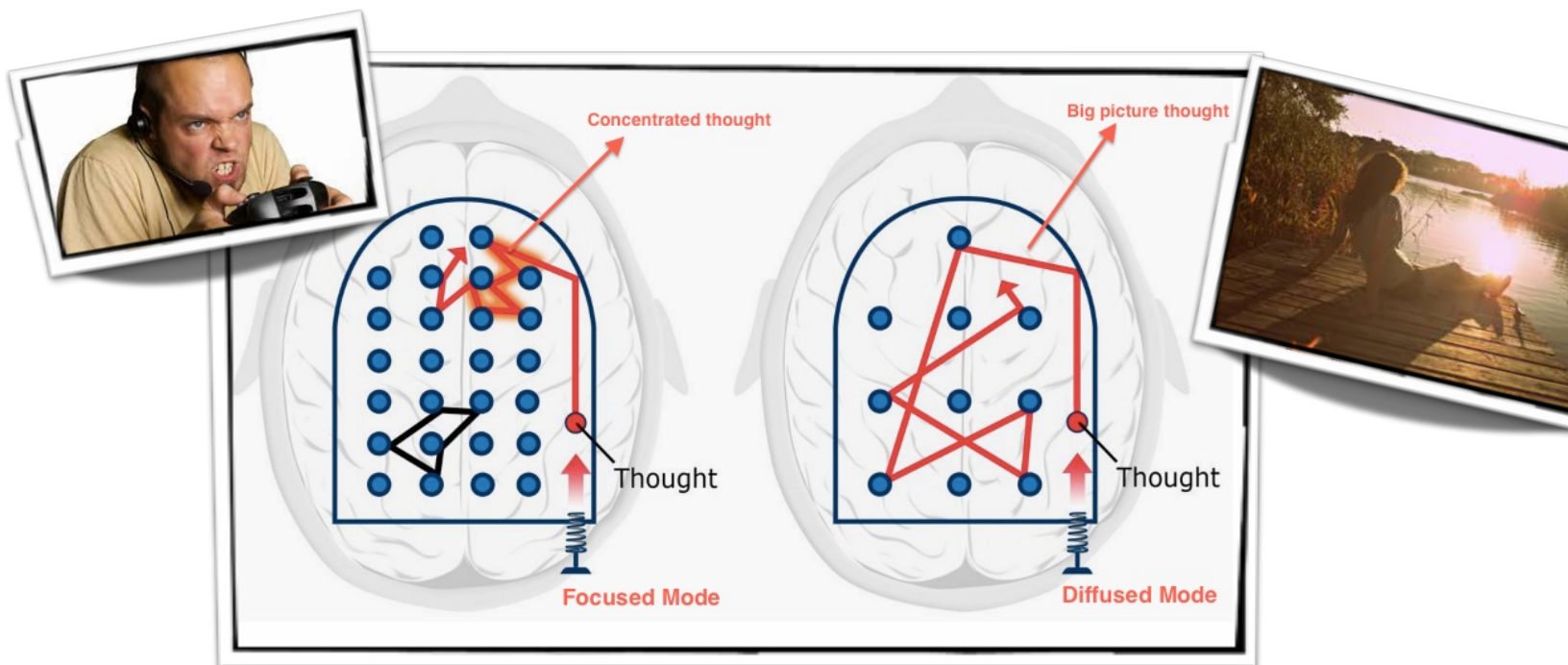
When Slow Thinking, your heart rate goes up, your pupils dilate, and you get “tunnel” vision - becoming blind and deaf to the things around you while you are deep in thought. This is great when writing a large research paper, bad when there is a speeding train approaching.

Unfortunately, in younger grades students are taught that faster thinkers are smarter. If you are not picking up the concept quickly, you don't have what it takes to be successful at higher education. Younger grades overly train people to rely on just their fast thinking, and reinforce it with all kinds of rewards (food, prizes, recognition). However, in college level classes SLOW thinking is critical. Having a fast answer has its place (especially on a timed test). But, it is the deep, complex thinking that will be needed for class discussions, papers, and projects. Allow your brain to have balance. And when writing, let the slow thinking lead the way.

Focused & Diffused Thinking. Paired with the idea of Fast/Slow thinking is the notion of Focused and Diffused Thinking. Focused thinking is when the brain locks in and concentrates on one task or topic. The energy gets invested into one set of pathways in the brain. All the important details of the topic fill your mind, as you try to solve problems, gain understanding, analyze, write or make connections. The brain can stay truly locked into focused mode in a learning environment for ~25-30 minute periods of time before it begins to fatigue and lose focus.

Diffused Thinking is relaxed, abstract thinking. Diffused Thinking is like taking a walk in the park (<<— — *connecting an abstract concept to something you may be more familiar with*). This is the mode of thinking where your brain wonders and bounces between different pathways, meandering this way and that... not seemingly paying attention to much of anything at all. This is the brain mode where the greatest creativity happens. It allows the brain to “escape” the pathways it got locked into during the focused mode and bounce around the other couple billion available pathways. It allows the minds eye to “see” different perspectives or angles about a topic that the focused mind becomes blind to. This is especially important when you get stuck trying to solve a problem but cannot figure it out... Or, when writing a paper, and you cannot think of what to write next... Or hitting the intellectual wall when reading/studying, and it feels like nothing is “sticking.” Activities where diffused thinking is most prominent: resting/sleeping, chatting with a friend, listening to calm music or sitting in silence, exercising (walking, running, etc).

The brain cannot be in both focused and diffused modes at the same time. It is important to be aware of which mode your brain is in. Both modes are extremely important and should not be neglected.





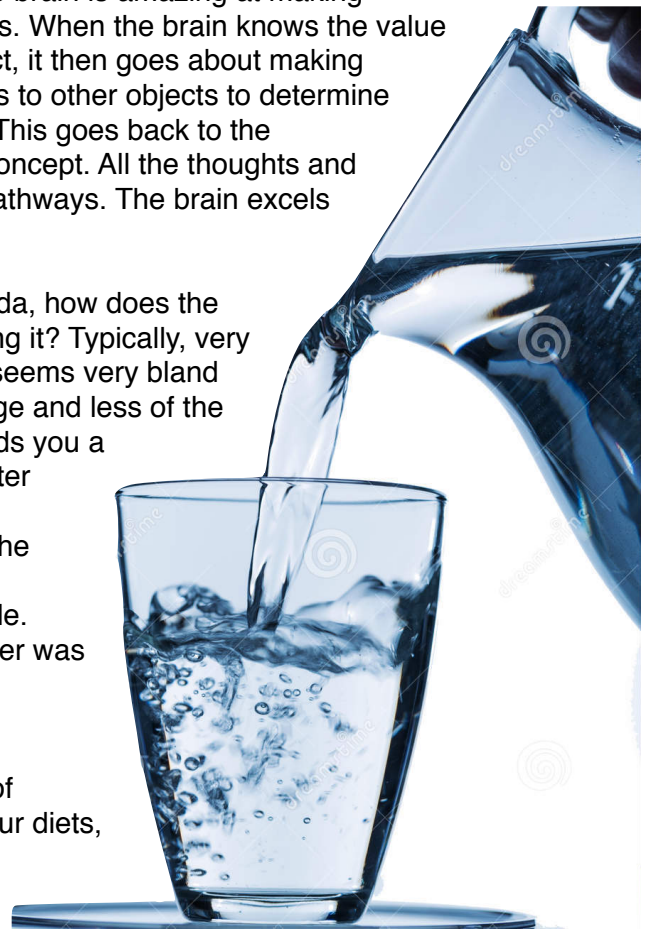
The Master of Comparisons. How much is your pen or pencil actually worth? How about your phone? Or your t-shirt? Not how much did you PAY for it. How much is it worth right now? The reality is you really don't know. You may feel like you have a guesstimate... but most people do not feel very comfortable evaluating the true value of an object, person or activity. Our brains are horrible at this.

New scenario: the pen you use to take notes is worth \$10. How much is the notebook worth? Your shoes? Your water bottle? The human brain is much better at this game, because the brain is amazing at making comparisons. When the brain knows the value of one object, it then goes about making comparisons to other objects to determine their value. This goes back to the spiderweb concept. All the thoughts and

information in the brain are, in their own way, interconnected pathways. The brain excels at comparing these different pathways to each other.

An example: water. After having sweat tea, fruit juice or pop/soda, how does the water taste? How much desire or enjoyment is had from drinking it? Typically, very little enjoyment because compared to the sweet sugar, water seems very bland to most people. People will opt for more of the flavored beverage and less of the water. Change scenarios: You just ran 20 miles. Someone hands you a glass of water. How does that water taste? AMAZING! That water has become the nectar of the gods, and you are probably very grateful to the person who gave it to you. What changed? Did the water change? No. Same H₂O. The comparison changed. Compared to flavored beverages, water appeared less desirable. Compared to the dehydrated feeling of a hard workout, the water was heavenly.

This is just a small example that plays to a larger point. Our perceptions are based on our comparisons. Change the point of comparison, and you will change how you feel. This is true in our diets, finances, romantic interests, attitudes, and even in our learning.



How to Work WITH Your Brain

Now that the (very, very, very) basic explanation of the brain's learning system is done, this leads to a more practical question: So what can I do to learn better, faster and more genuinely with taking up less time?

Structuring Your Learning Time: Pomodoro Method. As SkillBuilder A showed, time management is key for creating pockets of time to be able to invest in learning. The Pomodoro Method is about how to best structure the study time to work WITH the brain. The base concept is that the brain best focuses on 1 task at a time. The brain's focus power lasts about 25 minutes. And there is great value to have "break time" spent in Diffuse Mode.

- **Materials Needed:** To Do List. Water. Timer.
- **Step 1:** Identify the first task to be done. Choose 1 and only 1.
- **Step 2:** Remove all other distractions (phone in airplane mode, TV off, etc). If music is playing, make it music without lyrics.
- **Step 3:** Set timer for 25 minutes.

- **Step 4:** Work on the ONE task for 25 minutes. Stop when that task is done, or when 25 minutes has finished (whichever comes first). At the end of 25 minutes, pause to review and verbally say the key things that were learned or accomplished.
- **Step 5:** Set timer for 5 minutes.
- **Step 6:** Take a 5 minute break. Do an activity that has nothing to do with your tasks, that puts your brain in Diffuse Thinking Mode (closing eyes and breathing deeply, get up, and walk or jog around the house, jumping jacks, talk to a friend, listen to music you enjoy, grab a snack, go to the bathroom).
- **Step 7:** When timer goes off, get back to work. Spend a moment to recall/review what you did in the previous session. Either finish the previous task, or start the next task. After each task is done, cross it off the list (it releases dopamine in your brain, makes you feel good, and gives motivation to accomplish more)
 - ◆ Repeat 25 minute sessions until the necessary tasks are done. Every 2-4 sessions, take a 10 minute break for food or power nap, depending on how you are feeling that day and what else you have planned.
- **Step 8:** When finished, reward yourself with something fun (that is not sugar). You will have worked hard, accomplished a good amount of work.

Structure the Knowledge: Rhythms, Rhymes, & Devices. The brain loves structure and creates structure out of any knowledge that is entered. The more you structure the knowledge before you try to put it into your brain, the better it will stay in your brain. The danger to not structuring your knowledge before trying to learn it is that your brain may structure the knowledge for you in a way that your teacher may not appreciate. Example: A student once wrote an essay response about the birth of Christianity in Rome as follows:

Jesus, after he was crucified in Jerusalem, took an Army and marched on Rome. They defeated the Roman army and built an Empire.

The student had good information... but the structure was off: Jesus was crucified. Muhammad took over Mecca, and started an empire. Here are different ways of structuring knowledge for easy entry into the brain:

- **Rhythm & Rhyme:** Rhythm & Rhyme are the patterns of sound. If you listen carefully enough, there is the rhythm of life around you. (It is actually impossible for there to be complete silence. If put in a chamber with no outside noise, there would be a high pitch humming of your nervous system working). Your brain LOVES it. Your brain actually has its own unique rhythm and timing. It is the reason when listening to a new song, you will be repeating the chorus by the end of it, and have it stuck in your head within a few times of listening.

Make this POWERFUL device work FOR you: rewrite lyrics to a pop/rap song, Christmas carol, or nursery rhyme with the content from the course. “Mary Had a Little Lamb” can become “Subsistence Farming is Really Bad.” “Let it Snow” can become a political geography song about, “Let them Go.” Doesn’t have to be complicated. It will help you to learn and recall.

- **Mnemonic & Acrostic Device:** When having to learn a set of knowledge or a specific order/process, there are different learning devices to create structure. First, take the first letters of the different words/actions/skills you are trying to learn. Then, put them into an order and create a new saying out of them, out of the things you know. The new saying becomes the “Brain Hook” that allows the rest of the knowledge to connect. Another option is to take the first letters and create its own unique word. Examples

- | | | | | |
|-----------------------|----------------|----|--------------------|---------|
| ◆ Please | Parentheses | or | Spain | Spoon |
| Excuse | Exponents | | France | Feed |
| My | Multiplication | | Italy | Infants |
| Dear | Division | | Switzerland | Sleep |
| Aunt | Addition | | Germany | Good |
| Sally | Subtraction | | | |
| ◆ PEMDAS (P-ehm-Dahs) | | or | SFISG (Sss-ph-isg) | |

Engaging the Body in Learning. Different sections of the brain control various parts of the body. In turn, the more aspects of the body that can be engaged in learning, the greater the likelihood of making strong neuron connections within the brain and between regions of the brain. This takes the learning experience to a whole new level, providing deeper connections and understandings within the students brain.

- **5 Senses:** Taste, Touch, Smell, Hear and See. The more of these that get engaged, the better.
- **Emotion:** This is an oft neglected piece when it comes to education. Find an emotion that relates to the topic that is being studied: Anger, Disgust, Fear, Joy, Sadness. It will draw a deeper connection to the material, using a larger range of the brain.
- **Physical/Kinesthetic Activity:** There is very strong evidence of physical movement to assist in both learning and the recalling of information. This can go multiple ways:
 - ◆ Moving while learning helps move blood flow, increase oxygen, triggers higher order thinking (examples: walking, jumping jacks, running, dancing)
 - ◆ Putting some type of physical motion in association. For example, using the hands as a triangle to remember the shape of a population pyramid



The Power of Anecdote & Connection. Stories are a very powerful learning tool. They take abstract concepts and breathe life into them in a way that connects to more parts of our brain. Finding examples or anecdotes that give life to a concept helps tremendously. It is even more powerful in your learning when it is an example from your own life.

Repetition & Recall. Since academics requires the brain to pull out information and use it, it is important to do tasks that requires the brain to... pull out the information and use it. This is even doubly important, as neuropsychology get “stronger” and the information moves faster the more it is used.

- ◆ Reviewing a concept over multiple days.
- ◆ Flashcards or Quizlet to test the ability to remember vocabulary
- ◆ After reading a section of text or watching a video, pause and force the brain to recall/retell the information. This builds the brains ability to both store information watched/read and strengthens the ability to recall information gained visually.

Work Before Play. If the brain is a comparative computer, then the school work needs to come before play. Everyone would agree that educational reading, homework or studying is not nearly as much fun as TV, movies, videos games, etc. If you do the fun activities first and THEN do the school work, the brain will compare the school work to the fun you just had... and it will make the school work seem even worse. Instead, do the homework first and THEN have the fun. It will make your brain treat the fun like a reward and it will make your favorite movie/tv/game that much more enjoyable. Another alternative is to do something that you like even less than school work BEFORE doing the school work (like chores) so then the school work doesn't seem so bad. None of these options make work "fun"... but it reduces the negative.



Things that Work AGAINST Your Brain

The curse of stress. Stress of any kind releases adrenaline and cortisol. Both of these chemicals create a fight or flight response: increased heart rate, sharpened tunnel vision, faster breathing, increased Faster Thinking. This is good if there is a bear, a snack, an attacker, or some imminent danger that is threatening your life. However, when there is anything academic to be accomplished, this is detrimental to success. A few negative side effects: decreased ability to create/store/recall memories, destroyed brain cells/neurons, weakened immune system, and can lead to a state of depression (not to mention heart attack or stroke). The more stressed the learning situation, the worse it is for the learning and the body of the person learning.



Bad Timing. Doing something really, really fun just before doing school work creates a highly negative attitude towards the school work and encourages procrastination.

"Multi-Tasking". Many people claim the ability to multi-task. This is essentially a myth. The brain can only focus on one thing at a time. You can DIVIDE your time, and jump your attention between different activities in a short period of time... but studies show that people who do this get less done than if they do a Pomodoro 25 minute focused session on one task or set of tasks.

All-Nighters or Marathon Studying. This works against the brain in a variety of ways. The brain functions worse when sleep deprived. The "focus mode" is relatively short and fatigues quickly. It is high stress, which shuts down the thinking part of the brain. Thus, it is doing a lot of work for very, very little reward.

Distraction. Being in a highly distracted environment is bad for brain learning. It is easy to find things that are seemingly more enjoyable than school work. Distractions break concentration, prolong the school work time, and cause wasted effort.

Disorganization. Messy knowledge goes into the brain in messy ways... and no one knows how, or in what order, it will get stored.

Dehydration. The neuromuscular pathways require a fairly large amount of water. Being Dehydrated causes the pathways to not function as well; not to mention mental fog, head ache, and moodiness.

Malnutrition, Starvation & Sleep Deprivation. As seen in SkillBuilder B, the brain has key nutrients needed to function. When the nutrients run out, brain activity shuts down. Similarly with a lack of sleep, the brain function is greatly reduced when there has been inadequate sleep. Both scenarios cause stress on the body, which only compounds the issue.

Preparing for the Sport You Are Playing

Ashley was preparing for her important soccer game in a couple days. She was practicing hard. Very hard. With the efforts of 1,000 warriors. She was focused. Super focused. Focused with the mental precision of a laser. She was investing time. Hours. Dozens of hours (almost too many hours). Ashley knew that she was going to play a key role in her teams success. She had to be ready.



So with a sense of pride, Ashley woke up the morning of the big game thinking of the successful week of training she had put in. On Monday, Ashley spent two hours dribbling. She dribbled the basketball up and down the court until her hands had blisters. On Tuesday, Ashley focused on her shooting. To win, Ashley knows her team has to outscore her opponent. That morning at 5am, She got up early and shot 500 goals. She shot so many goals with her hockey stick, that part of the blade actually broke off. On Wednesday, Ashley knew she needed to have a better on the field “connection” with her teammates, to have better passes, in moving the ball forward. Ashley got her teammates together and they passed the pigskin football for two hours until they had 10 different plays mastered from the line of scrimmage. She could throw the ball to her best-friend-and-teammate 30 yards down field with her eyes closed. Now that is great timing and preparation. Ashley got up, grabbed her cleats, and headed off to her soccer game with the knowledge that her week of work was going to make her an all-star at the game.



Education.

What advice would you give Ashley? Did Ashley prepare herself well for the game of soccer she was about to play?

Even the most anti-sports fan would agree... No, Ashley did not. She did nothing that prepared her for the soccer game she was about to play.

Certainly, Ashley spent a lot of time and effort. Ashley was dedicated. She cared deeply about her success, and even the success of her teammates. They even got together for a group workout session. But the problem... The skills they were practicing were NOT the skills needed for the game that was going to be played. There is a high probability that Ashley did not perform as well in her soccer game as she would have hoped. Maybe, just maybe, Ashley is such a talented athlete that no matter what Ashley does she will perform on the field. However, there will come a point where Ashley will play a game against competition that is even more athletic then she is... And at that point, her false-preparation will catch up with her.

The Game of

It is easy to say that Ashley was fool-hardy in her efforts. It is easy to sit in judgement of Ashley, sighing in contempt, and tell Ashley all the different ways she SHOULD have been preparing instead of wasting her time and effort. However, when it comes to the “Game” of education, many students in America make the same fool-hardy choices when it comes to studying and preparing for assessments.

Education is a game. It is dressed up differently than Monopoly, Yahtzee, football or the latest video game... but there is no doubt it is a game. There is a specific location it is played. There are rules. There are boundaries. There are ways that points are scored and kept; along with ways that points are lost. There are prizes or rewards for those who play the game the best, and consequences for those who do not learn how to play the game well.

- Base Purpose of the Game: (A) Put knowledge that is outside of a person’s head and put it inside the person’s head. (B) Master skills and apply them in a new situation.
- The field of play: Tests/Quizzes*. Students are asked to recall a certain set of knowledge to choose the correct answers. Advanced Placement/College Tests ask students to apply the information to a new situation. All of this WITHOUT help or support (notecards, notes, Google, etc).
[*Projects & Papers will be addressed at a later section]
- The reward/prize: Good grades. Entrance into college. Scholarships. Governor School. Internships/ Apprenticeships. Good GPA for Job application resumes (Note: you will put your High School & College GPAs on every job application for the rest of your life)

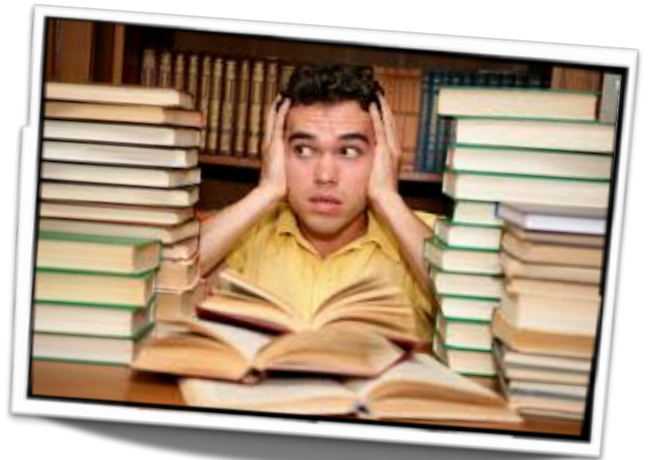
How do many students prepare for this game of testing with high-stake rewards? They stare at notes. Flip through a textbook. Maybe look at a few flashcards or watch a video. Still others HOPE what they got in class was good enough (Which class period is that again... what is that teacher’s name?) Do any of these examples of preparing for a test actually reflect what they will be asked to do come “game time”?

No.

And many well-meaning students, like Ashley, invest MANY hours and TONS of effort into strategies that have nothing to do with what they will be asked to do on the test. When the test time comes, the massive effort does not translate into better grades. This results in students thinking: “Studying was a waste of my time.” And they are correct: they did waste their time. Just like Ashley. Practice does not make perfect, practice makes permanent. Instead, PERFECT practice makes perfect. So too with studying. Effort alone does not create results. WELL PLACED efforts in EFFECTIVE STRATEGIES create results.

The good news: there are strategies for how to be successful in playing the game of education. Mastering these strategies can and will change the rest of your life. Failure to learn them will put up serious barriers for you to overcome.

Focusing specifically on AP Human Geography (or any other AP Course): This is a college class with college-level information. More importantly, the college-level AMOUNTS of information. For many honors students, they have cruised through honors courses with relative ease. They pay attention in class, answer class questions, read, take notes... and then rock the test. If they do study, it is with a strategy that does little to actually prepare them for the test. However, many students AP Human Geography is the first class that has such a large quantity of information... they cannot retain it all just with what they do in class. And for those with the ineffective study habits, they invest HOURS into “studying” to end up getting grades they did not know could be placed on their tests... and get them in trouble at home. The complexity and interconnectedness is such that the honors students’ old habits can no longer get them the grades they have become accustomed to receiving. At this point, many students start to view themselves as “not smart” and want to drop the course. Others just give in and accept failure, and stop trying.



The good news: there is a better way. The first part of this section has discussed brain-friendly strategies to learn WITH the brain. The last part of the section holds the true secret: how to use these strategies to be most successful in learning, with the least amount of time/effort.

Master this skill, and it will change your academic and professional life... forever.

4 Levels of Learning

To study successfully, a student must first understand that there are four “levels” or depths to which a person can know a topic: I Don’t Know, I Kinda Know, I Understand It, I Have Mastered It. Each level has strategies that help move a person from one level of knowledge to the next. The goal is to go from I Don’t Know to Mastery as quickly as possible.

The first step is for the student to have a moment of honesty: “How well do I know this piece/set of information?” The second step is to find strategy that best moves the student to the next level. Remember: there are only 24 hours in a day, 8 of which need to be devoted to sleep. As the time management section illuminated, there are only a few small pockets of time available to devote to academics outside of class time. Identifying the “Level of Learning” and applying an appropriate strategy will help save time and increase effectiveness. This will allow for more work to be accomplished in less time, and to a higher quality. In turn, the student will find greater success in the course or intellectual endeavor.

Level 1: I Don’t Know It

Identifying this one is simple. You have never heard of it before. You have no clue. Example: Tell me about Samarkand.

99% of students in America do not have the faintest idea about Samarkand. Your brain is trying to find things that relate to Samarkand... Is it related to Smurfs? Is it something like Timberlands? I have a friend name Shamar...? The end result is... you don’t know. And that is ok. It is called ignorance. Ignorance means not knowing. It is ok to find out you are ignorant. You don’t know all that you don’t know. But, once you find out you are ignorant about a topic... do something about it. Here are some good strategies for when you finally know that you don’t know.

Strategies: These are all strategies that provide basic knowledge and explanations about a topic.

- Reading and note taking. Finding or drawing pictures of the topic in the notes
- Creating a graphic organizer
- Listening to lectures, podcasts
- Talk to an expert and ask questions (ex: fellow student, teacher, etc)
- Watching videos
- Look at maps, charts, graphs

Honors Student Pride

The single most devastating trait an honors student possesses is their pride about their image. Honors student believe that “smart people just know things”, “smart people learn ideas the first time they see/hear it” and “smart people never ask questions.” Thus, an honors student does not want to appear to OTHER students as being “not smart.” Thus, when they don’t understand, they do not ask questions. They don’t seek help. Because they don’t want to ruin their image of being smart to other people.

However, this idea could not be further from the truth. Benjamin Franklin once said that humanity only knows 1/1,000,000th about anything. You don’t know all that you don’t know. There is a whole UNIVERSE filled with things you don’t know. The more you learn, the more you realize... there is a lot you don’t know.

The most successful students (and workers) are the one’s who quickly realize when they don’t know...and ask the MOST questions until they know. When they realize they don’t understand, they IMMEDIATELY seek help.

True learning begins when a student realizes, “I don’t know” and then takes action to do something about it. When a student reaches the end of themselves... and takes the next step forward. Don’t let pride keep you from learning.

Level 2: I Kinda Know it

This level is where you have a general, vague understanding about a topic. After looking at a map, you found out that Samarkand is a major city in Southeast Uzbekistan, in Central Asia. You watched a video, showing a tour of its city streets and its Muslim influenced architecture. Now, it is time to prepare the information for the test. Continuing to read or look at videos or look at notes will no longer help you. You have to switch strategies to take your game to the next level.

Strategies: Train the brain to both “permanently” store the information and to be able to repeatedly recall/pull out the information without assistance (aka: without a notebook, book, Google, or someone to help). Repetition. Repetition. Repetition. (the more the brain uses the pathway, the faster the thoughts travel. The information then becomes accessible to the “Fast Thinking” mode in the brain.)

- Flashcards or Quizlet
- Being quizzed by a friend repeatedly
- Connect the information to something you already know, and repeat the connection again. And again. And again. And again.
- Create an acrostic/mnemonic device and repeat it over and over and over and over.
- Filling out blank maps or graphic organizers, then checking to see if correct 15 times
- Putting down notecards with the word on one card, definition on another. Mix up all the cards and have to match them. Again. And again. And again.
- Covering up notes and reciting the information, then checking to see if it's correct. Write down which topics you get wrong. Look them back over, and repeat. Again. And again. And again.
- Creating a song or poem, and singing it over and over and over and over and over.
- Any of these strategies can have movement applied to them: walking, dancing, biking, jumping jacks...



Level 3: I Understand it

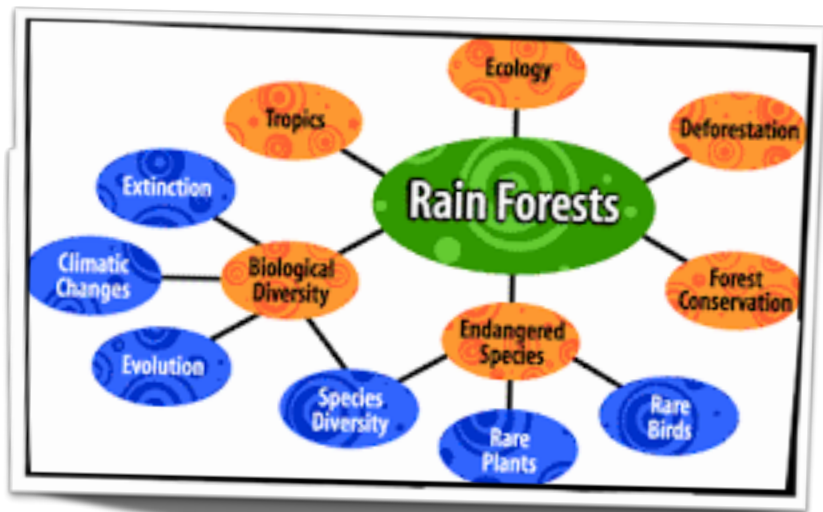
Now you know the location of Samarkand on the map, about its religion, its architectural heritage, heritage. You are able to spout this information on command... or even when not commanded to do so. You do it just for fun, or to annoy your friend. If there is a multiple choice question that asks about Samarkand, you will rock it. However, in a college level class, it is not enough to kind of know it, or to even understand it. You must be able to apply the knowledge to new situations. You must be able to connect the new information with what has been learned previously.

Strategies: Be able to flawlessly recall information, applying it to new scenarios and connecting it to other content.

- Watch the news or read current events. When you find something that relates to the topic, write about it in your notebook in the margin of the topic. Or explain to a very patient friend or family member how the event relates to X, Y, and Z ideas.
- Go through notebook, writing down ideas from other units that connect or relate to that particular topic
- Take a blank sheet of paper. Set a timer for 5 minutes. Put a Big Idea, Key Concept, or Essential Question from the unit in the center. In 5 minutes, create a concept web, mapping out the knowledge that is related to the big idea: vocabulary words, key concepts, examples, people, places... At the end of 5 minutes, flip through notes and evaluate how you did. Make note of areas that you were “weak.”)

- ◆ NOTE: If you create a “Master Concept Web” with all the possible right answers for the Big Ideas/Key Concepts in your notebook, then it will allow you to quickly see what you got right/wrong, etc.

- Teach or Explain a concept to your friend or family member. Ask them to pretend to be completely clueless and to keep asking you questions. Keep a list of questions that you did not have answer correctly, to re-read or research.



Level 4: I Have Mastered It

This is the level when you have “arrived.” Your knowledge of Samarkand has evolved from just trivia to being an interwoven blanket of knowledge. A person starts talking to you about all Muslims being extremist, and you interrupt them about the peaceful Muslims in Samarkand. You read about the struggles of land-locked countries in Africa, and it reminds you of Uzbekistan. You can speak about Samarkand across a breadth of subjects and topics. You have mastered the topic.



Strategies: At this point there is not a “specific” strategy that is beneficial in taking your learning further. You do not need to invest hours on flashcards, or looking at your notes. That is now a waste of your time. You know that you know that you know the topic and can apply it to new situations with examples. As you learn new concepts, keep interconnecting old ideas with the new ideas. Remember: the brain connects new information to things that you already know. The more that you know, the more you can learn. The better you know a topic, the faster you will recall it and apply it. And like any other skill, it will go slowly at first, but with time and repetition, your brain will get faster and more efficient. Mastery learning will become a habit that you begin to do without thinking about it. And THAT is when you start to learn large amounts of information, quickly and effectively with great academic success... AND a great life outside of academics.

In Conclusion: What Does this Mean for Intelligence?

The most promising take away from this skill builder is this: Intelligence is NOT fixed. Intelligence is something that can be built and improved upon. Sure, there is a role that genetics plays... However, the more important factor in increasing your intelligence is your efforts WISELY applied to brain-friendly strategies. The brain is a muscle that can be trained. 86 billion neurons and synapses are ideally waiting for you to connect them. It is what they are designed for, it is the purpose of their existence. You want to become “smarter”? Learn more. The more you learn, the more you will be able to learn. Want to think faster? Master the content through repetition, connectivity, and imagery making frequent use of the material. Want to think more deeply? Use slow thinking and diffuse thinking methods to allow your brain to challenge the deeper meanings and connections of the world and yourself.



So what...? So what is at stake? Why put in the effort to train your brain this way?

1) *Having a better life and better quality of life now and in the*

future. Once you learn how to learn, you will learn more information faster. It will free up more time in the rest of your life to have a life. Plus, with better grades, more opportunities open up after high school. These opportunities tend to pay well (or save you from having to pay)... or open doors to future opportunities that do.

- 2) *Better success in future jobs*. The jobs you will have in the future will be using technologies that have not been created yet. The speed of innovation in the real world is moving at a blistering fast pace. To stay employed, you will need to be able to learn large amounts of information and skills quickly, applying these mastered skills to your job. Real money will be at stake. For the company, it could mean the difference in millions of dollars in revenue gained or lost. For you, It could mean a pay raise. Or a promotion. Or the difference between being an employee or starting your own company. You will be learning the rest of your life and it will have a real, financial and quality of life impact. It is better to refine this skill of mastery now, then to wish you could do it later.



In conclusion... in this course, we will be using brain based strategies for learning. These strategies will be built into this textbook, the classroom instruction, the organization of the content/information, and into the review materials... They are everywhere. All it is waiting for is a brain, like yours, to work through the process and begin to achieve its amazing potential.

Don't worry. All that is at stake is your future intelligence and success.

Connection Point

Reflect on yourself as a learner. Identify in your notebook 3-4 learning strategies that you can begin to apply in this upcoming unit. Don't be afraid to take the risk. At worst, you find out what doesn't work, so you can begin to identify, use and master what does.