Learning Principles

Quick Reference Guide to Brain Compatible Learning Principles

Definitions
Brain Bites: What brain research says about each principle
Student Tips for using each principle
Learning Principles
Definitions, Brain Bytes and Student Tips
Starting the Connections
Interest

The brain prioritizes by meaning, value and relevance.

To have meaning, you must understand what you are learning.

In order to remember something thoroughly, you must be interested in it and think that it has value and relevance in your life.
Prioritizes by value, meaning, and usefulness

Brain poorly designed for textbook memory
  - Semantic memory (academic and profession knowledge), ideas, facts, typical exam questions, etc
  - Weakest of retrieval systems

Need to find ways to make information relevant
Must Come Up With Ways to Get Interested

**Students**

Find a Study Partner
Get to Know the Professor
Do Extra Practice or Research
Teach an Assignment to Someone
Seek Ways to Make Personal
Ask Questions

- What is this like that I already know?
- How can I make this concrete?
Intent to Remember

Your attitude has much to do with whether you remember something or not.

A key factor to remembering is having a positive attitude that you get it right the first time.

Attention is not the same as learning, but little learning takes place without attention.
If information does not get enough attention or if it is “not deemed necessary for long term memory, it will be encoded in short term memory only and ultimately discarded and reclassified.

Brain needs to make sense of information
Asking questions promotes positive attitude as well as critical thinking.
Brain Byte

*Intent to Remember*

Positive attitude can change the brain in at least three ways:

It alters the chemistry of the brain with the production of *dopamine*, the feel-good neurotransmitter.

It increases the *noradrenaline* which provides physical energy.

Constructive thinking activates the *frontal lobes* which are most responsible for long-term planning and judgment.
Getting it Right the First Time

Physically begins the growth of connections in dendrites and axons

Creating new connections

And strengthening existing connections
Intent to Remember:
Getting It Right the First Time

Students

Taking Notes
Asking Questions
Predicting Test Questions
Providing Context
Making Sure You Understand
$20 bill
Basic Background

Your understanding of new materials depends on what you already know that you can connect it to.

The more you increase your basic knowledge, the easier it is to build new knowledge on this background.
The knowledge in our minds consists of neuronal networks in our brains, so if knowledge is to grow, the neuronal networks must physically change.
The more learning, the more connections you make.
The greater the number of connections in the brain, the greater the meaning derived from learning.
Brain Byte
Intent to Remember

When we experience something new, the brain looks for an existing network into which the information will fit (finding fit adds meaning).
If there is not a neural network for something, it simply doesn’t exist in our brain.
This is why totally new concepts are so difficult to grasp at first.
When you activate what you already know about a subject before learning something new, the brain actually makes more connections.
Prior Knowledge

Is fact
Is persistent
Doesn’t vanish with marks on paper
Is the beginning of new knowledge
Where learners start
We have no choice
Build as Much Background as You Can

**Students**

Before Reading an Assignment, Preview It
- Survey Title and Headings.
- Study the Pictures and Charts
- Read the Summary
- Familiarize Yourself With Study Questions

Try to Recall What You Already Know

Look for Patterns

Formulate Questions
Building Background

Students

Read Assignments BEFORE Going to Class
Do All Homework Assignment and Readings
Begin With Basic Level Courses
Do Extra Research
Explore the Internet
Create Ways to Experience the Subject
Controlling the Amount and Form of Information
Selectivity

You must determine what is most important, and select those parts to begin the process of studying and learning.
Most students are *drowning in information* and *starved for meaning*.

Because of the tremendous volume of information you encounter (millions of bits of random information per minute), it is *crucial* that you *consciously cue* into your memory system.
You Can’t Remember *Everything* about *Everything*

**Students**

Look for Clues When Reading--Bold Print, Headings, Summaries, Review Questions.

Look for Clues During Lecture--Verbal Clues Such As Emphasis and Repetition

Pay Attention to Non-verbal Clues

Make Yourself the Test Maker

Make Flashcards
Meaningful Organization

You can learn and remember better if you can group ideas into some sort of meaningful categories or groups.
To form a sharp memory of something:

Original information must be encoded accurately.

Maintained or strengthened over time.

Triggered by association or cue.

*When information is poorly encoded there is no hope for data recovery.*
Information Must Be Organized If You Have Any Hope of Finding It Again.

Students

Search for Ways to Organize in Categories That Are Meaningful to You
Alphabetize a List
Use Mnemonic Devices
Use a Set Sequence
Set it to Music
Look for Patterns
Strengthening Neural Connections
Recitation

Saying ideas aloud in your own words strengthens synaptic connections and gives you immediate feedback.

The more feedback you get, the faster and more accurate your learning.
The more *senses* we use, the stronger the *neural trace*. The more *feedback* we get, the *faster* and more *accurate* our learning is.

Recitation is where the difference in *understanding* something and *knowing* become most apparent.
Seeking feedback is a natural and essential learning tool that helps us minimize false impressions before inaccurate memories are formed.
More Than Repeating Out Loud.
Saying Out Loud in Your Own Words

Students

Recitation Works for Several Reasons

• When you know you are going to recite something in your own words, you pay more attention.
• You get immediate feedback.
• You are using many parts of the brain.
Some Tips for Recitation

Students

Make use of flashcards for anything you need to learn well.

When you finish reading a paragraph in your reading assignment, stop and recite. Understanding what you read and explaining it in your own words are very different.

Find a partner. Ask each other questions and answer out loud.

Commuter tapes
Visualization

The brain’s quickest and probably the longest-lasting response is to images. By making a mental picture, you use an entirely different part of the brain than you did by reading or listening.
90% of the brain’s sensory input is visual. The brain’s quickest response is to color, motion, form and depth. The brain has an attentional bias for high contrast and novelty. The brain has an immediate and primitive response to symbols, icons, and strong, simple images.
Words are Processed on the Left—Pictures on the Right side of the Brain. Use Both sides!

Students

Pictures usually stay longer and we can remember more.
No matter how abstract, make mental videos using color and action.
Will it convert to a chart?
Can I draw it out?
Do I know what the person looks like?
Visualization Activity

If you need proof that visualization works for you, Work Exercise 4.3 on pages 89-90.
Association

Memory is increased when facts to be learned are consciously associated with something familiar to you.

Memory is essentially formed by making neural connections.

Begin by asking, “What is this like that I already know and understand?”
Association is central to the process of encoding and retrieval.
Extremely important to encode new information consciously.
Optimal learning occurs when the brain’s multiple maps work in synchronization or network with each other.
The more connected these neural networks are, the greater the meaning derived from learning.
Recalling something you already know, and making a link to the “brain file” that contains that information

Students

Is this like something I already know?
Is the number similar?
Is the sound similar?
Can I use it for something similar?
If I were filing it in my brain’s filing cabinet, is there an existing file I can use instead of creating a new one?
Allowing Time to Solidify Pathways
Your brain must have time for new information to establish and solidify a neuronal pathway. When you make a list or review your notes right after class, you are using the principle of consolidation.
Brain is not designed for nonstop learning.

As the brain learns new information, new connections are formed.

Learning is a biological process that literally changes the configuration of the brain.

Processing time is necessary to build the inner wiring necessary for connectivity and recall.

Repetition of information strengthens new connections.
Three criteria necessary for this are
1. Reinforcing in your preferred modality (visual, auditory or kinesthetic).
2. Reinforcing the right number of times (for some once, for others it may be 20 times),
3. Reinforcing a sufficient length of time (a couple of seconds to several hours).

Richard Bandler  co-discoverer of Neurolinguistic Programming(1988)
New Information Takes Time to Soak In

**Students**

- Take Notes in Class
- Ask Questions in Class
- Review Notes
- Stop After Reading Each Paragraph. Write a Question in Margin and Recite Answer
- Visualize
- Recite
- Flashcards
- Practice Tests
Distributed Practice

A series of shorter study sessions distributed over several days is preferable to fewer but longer study sessions.
Several Short Sessions Usually Better Than One Long Session

Students

Take 10 Minute Breaks After Each Hour of Study
Review What You Just Learned Before You Begin Again
Have a Scheduled Time to Study Each Subject
Make Use of Daylight Hours and Time You Normally Waste
Use Flashcards
Study Immediately Before and After Classes