

Brain Rules

by John Medina (2008)

Rule #1: Exercise boosts brain power (exercise)

Physical exercise promotes cognitive performance by increasing blood volume to your brain and allows more brain cells greater access to the blood's food.

An aerobic exercise (20-30 minutes of physical activity) positively influences cognition – especially executive function.

Exercise stimulates the Brain Derived Neurotrophic Factor (BDNF) which exerts a fertilizer-like growth effect on certain neurons in the brain and aids in the development of healthy tissue.

Q: What are the implications for the classroom?

Treadmills in the classroom? Physical education daily? Moving more between and during lessons?

Can we integrate physical activity into the school day?

Obstacles?

Possibilities?

Considerations:

Independent I-charts (behavior agreements)

We are learning to ...

Remember to ...

Rule #2: The human brain evolved, too. (humans connect and infer)

Meet your brain – “lizard brain” – keeps us breathing; “cat brain” – fight, flee, fight, reproduce; human brain – Jell-o like substance known as the cortex.

Humans infer all the time. It is our signature characteristic.

Symbolic reasoning is a uniquely human talent. It may have arisen from our need to understand one another's intentions and motivations, allowing us to coordinate within a group.

If someone does not feel safe with a teacher, he or she may not be able to perform as well.

If a student feels misunderstood because the teacher cannot connect with the way the student learns, the student may become isolated.

Relationships matter when attempting to teach human beings.

Q: What are the implications for the classroom?

What are things you currently do to create an intentionally inviting classroom?

Notes and Ideas:

Declare your literacy -

Cool stuff bag –

I appreciate my neighbor who ... -

Birthday continuum –

Photos of students –

Question board -

Rule #3: Every brain is wired differently. (wiring wonders)

Prior experience and background knowledge determines understanding.

What you do and learn in life physically changes what your brain looks like – it literally rewires itself. These changes are unique to each learner.

Students of the same age show a great deal of intellectual variability.

These differences can profoundly influence classroom performance. (10% of students do not have brains sufficiently wired to read at the age at which we expect them to read.)

Lockstep models based simply on age are guaranteed to create counter-productive mismatch to brain biology.

We have a great number of ways of being intelligent, many of which don't show up on IQ tests.

Brain rule # 4: We don't pay attention to boring things. (Attention matters!)

The messages that grab your attention are connected to memory, interest, and awareness. Emotions get our attention. Emotionally arousing events tend to be better remembered than neutral events. (Think novelty.)

We learn by first getting the gist or gaining a big picture view and later we work to remember the details.

The brain's attentional "spotlight" can focus on only one thing at a time: no multitasking.

Audiences check out after 10 minutes, but you can keep grabbing them back by telling narratives or creating events rich in emotion.

Notes and Ideas:

Talk to students about how to study and remember. (Turn off the music & tv.)

Teachers need to remember what it means to be a novice. Give time to digest material with consistent breaks.

Consider the ten minute rule and provide the gist or core concept first. No more than five key concepts in fifty minutes.

Consider hooks that trigger emotions. Narratives can be especially memorable.

Q: What are the implications for the classroom?

Rule #5 and #6: Repeat to remember (short and long term memory)

The way to make long-term memory more reliable is to incorporate new information gradually and repeat it in timed intervals.

Review material within 90 minutes of initial learning. (Review cycles.)

Q: What are the implications for the classroom?

Rule #7: Sleep well, think well. (Sleep. Nap.)

Sleep loss = brain drain

Sleep promotes creativity and learning.

Sleep is powerfully linked with the ability to learn.

Rule # 8: Stressed brains don't learn the same way.

Individually, the worst kind of stress is the feeling that you have no control over the problem – you are helpless. (learned helplessness)

Emotional stress impacts a person's ability to learn.

Q: What are the implications for the classroom?

Rule #9: Stimulate more of the senses. (sensory integration)

Multimedia principle: students learn better from words and pictures than from words alone.
(Cognitive psychologist Richard Mayer).

The brain relies on past experience to combine the senses, so two people can perceive the same event very differently.

We learn best if we stimulate several senses at once.

Smells have the unusual power to bring back memories.

Rule #10: Vision trumps all other senses. (Vision)

We see with our brains. (What we see is only what our brain tells us to see.)

We make inferences through our vision and these can be built upon misconceptions and inaccuracies.

We learn and remember best through pictures, not through written or spoken words.

Q: What are the implications for the classroom?

Rule #11: Male and female brains are different.

Emotions are useful. They make the brain pay attention.

Boys and girls process certain emotions differently.

Girls use their sophisticated verbal talents to cement relationships.

Doing things physically together is the glue that holds boys relationships intact.

Rule #12: We are powerful and natural explorers. (Exploration.)

Curiosity matters! Make asking questions central to one's learning model.

Babies are our learning model – active testing through observation, hypothesis, experiment, and conclusion.

Q: What are the implications for the classroom?

Strategic & Intentional

ACTIVE TEACHING

1. What do I want kids to know and do?

I want kids to know why

Asking questions

Making connections

Tracking what's important

Inferring

Visualizing

Summarizing, and

Synthesizing

helps a reader make sense of a text.

I want kids to know how to:

Ask questions

Make connections

Track what's important

Infer

Visualize

Summarize, and

2. What do I know about what readers do when they are _____? (Can I define this comprehension process in plain words?)

3. What do I know about myself as a reader when I _____?

4. How can I name and model this process? What kind of experience can I create which will help kids both identify and name this process.

Posing questions allow us to SEEK out information, solve problems, and extend our understanding.

A SK QUESTIONS:

Question the text

Ask questions as you read (Purpose)

Read to discover answers

Ask questions to gain information

Ask questions to expand thinking

Wonder about the text to understand big ideas

Student examples of Curiosity – Asking questions

Why did people back in 1793 have such weird ideas about diseases?

Asking Questions

Note: for boys answers mean knowledge and strength. Asking questions can mean 'not knowing' and weakness. Consider using the words wonder and model a lot.

Why did they drain peoples' blood and feed them nasty herbs to cure them? Didn't they know that mosquitoes caused Yellow Fever? When did people learn this?

Emma

Fever 1793 (Laurie Halse Anderson)

Why did the Japanese invade Burma during World War II?

Noel

Elephant Run (Roland Smith)

Would you really time travel if you had the chance? What would the bad things be if you did? Silas
When You Reach Me (Rebecca Stead)

Follow the text signposts:
Use nonfiction features to guide learning

Activate thinking (from cold to warm read)

Merge your thinking with new learning
Read and think and talk about new information

MAKING CONNECTIONS

Physical (Brain-Body)

Music

Snowball

Question: crunch and throw

Answer

Record pad

Contamination zone

I appreciate my neighbor who...

Stand up if you...

Mirror image

CONNECTING AND UNDERSTANDING

Understanding is remembering in disguise.

New things are understood by relating them to things we already understand.
Analogies

Picture Walk

Question

Notice



MAKING CONNECTIONS:

You simply have to connect what you know to NEW information to understand.

Connect the NEW to the KNOWN

Activate and build background knowledge

"Learning loves movement"

Cross lateral lead and follow

Silent scavenger hunt

Listen to voice in head

Notice, count or record—find all the regular polygons... circles...

Tug of war/ push pull (metaphor)

Verb/adverb partners

Skip slowly

Vote with your feet

Understanding new ideas is mostly a matter of getting the right old ideas into working memory.

The next ongoing theme—making comparisons we haven't made before.

MAKING CONNECTIONS

Relationship
(Black's William)

Cats and dogs

Body language that re-assures
Eye contact
Tilt of head, open arms

Use a pupil's name

Clear purpose

We Are Learning Together
Remember

Birthdays

Making affirmations
Affirm—we always...
Standing on cans—squash the “I”

Photos of learners in action

Wait time/think time

Laughter and fun (smile)

Goal centered

Frequent feedback and
encouragement

Connection killers: sarcasm and
comparison



TRACKING AND MONITORING YOUR UNDERSTANDING

Follow your inner conversation
Listen to the voice in your head and
leave tracks of your thinking

Notice when you lose your way
Monitor your inner voice to focus your
thinking

Read, write and talk

Spotlight new thinking
F/Q/R

Record important ideas

Target key information

Determine what to remember
Important ideas v. interesting details

Distinguish your thinking from the
author's
Contrast what you think with the
author's perspective

Construct main idea from supporting
details
Create a topic/detail/response chart



Using Quotes to Make Sense of INFERRING

***What do you think these quotes mean?
What's your best guess? How does
talking about your thinking help you?***

***Write what is in front of your nose.
-- William Carlos Williams***

***A bird does not sing because it has an answer. It sings because it has a song.
-- Chinese Proverb***

INFER MEANING

Infer the meaning of unfamiliar words

Read with a question in mind
Infer to answer your question

Use context clues to unpack vocabulary
Infer with text clues
Draw conclusions from text evidence

Wrap your MIND around the BIG IDEAS
Use text evidence to infer themes

Tackle the meaning of language
Infer beyond the literal meaning

Crack open features
Infer the meaning of subheads and titles

Making sense of poetry by inferring

WORDS

May I have some paper, please
Please, may I have some paper
'Cause these words of mine
go walk away
they go walk away all by themselves
and get lost in the crowd.

Please, may I have some paper
To catch these words
and wrap them up
where they can't walk away
slip off the edge
and drown.

The Color of My Words
by Lynn Joseph

May I have some paper, please



VISUAL IMAGES

Front loading

Physical models

PowerPoint images

Acting out
Moving

Close eyes and imagine

Music

Mind maps
Flow charts

Storyboards

**How does visualizing help you
understand what you read?**

What is visualizing?

As you think over a text, pictures form in your mind. Perhaps smells, states, sights,

and feelings emerge, depending on your background knowledge. Sensory imagery is another way of calling it when the information comes to you through your senses. Visualizing or creating mental and sensory images triggers a wide range of connections, memories, and feelings. This process makes reading fun and memorable. Kids like to refer to this as "running a movie in your mind." It's important to recognize as a reader when the movie in your head stops or gets fuzzy. Now you can ACT by rereading, figuring out difficult words, or asking for help to get back on "track."

What does visualizing look like?

What do you see?

How does it make you feel?

Read picture books and participate in extending the story from the pages

Talk

Act

Close eyes and imagine

Start with concrete and move towards abstract.

Craft lessons demonstrating how to create images.

Recognize the importance of background knowledge

Questions to help emphasize creating visual images to build comprehension?

What did you see when you read those words?

What do you imagine will happen next?

Nonfiction: What did you notice the author did to help you grasp the facts?

How do the features signal what's important to attend to?

What advice would you give someone to help them imagine pictures in their heads?

What did you learn about yourself as a reader today regarding creating visual images?

Are kids creating visual images?

Can kids give vivid details of a story?

Do kids laugh, cry, and share feelings about the story?

Can kids extend the story and describe things beyond the page?

Signs that kids might not be creating visual images:

Lack of interest in being read to or reading;

Inability to put into words a description of what they're reading;

Difficulty describing the characters, setting, or what is happening in the story.

Creating Visual Images –

Share powerful literature that focuses on specific nouns and vivid verbs.

Write using specific nouns and vivid verbs.

Picture scenes from poetry and share with classmates.

Talk about how visual images help make sense of their reading

Read lots of poetry

Powerful poems for imagery and inferring:

Dog Around the Block

Dog around the block, sniff,
Hydrant sniffing, corner, grating,
Sniffing, always, starting forward,
Backward, dragging, sniffing backward,
Leash at taut, leash at dangle,
Leash in people's feet entangle—
Sniffing dog, apprised of smellings,
Meeting enemies,
Loving old acquaintances, sniff,
Sniffing hydrant for reminders,
Leg against the wall, raise,
Leaving grating, corner greeting,
Chance for meeting, sniff, meeting,
Meeting, telling, news of smelling,
Nose to tail, tail to nose,
Rigid, careful, pose,

from Snake Music

The boy brings a dozen pet snakes
aboard the airplane in a shopping bag,
then falls asleep. At thirty thousand feet,
a snake comes out, sneaks past the seat
ahead
and then another. It is a night fright
and the plane is dark. The passengers
feel the cool snakes slide past their legs;
they wake with horror to the whole
plane
crawling with snakes, their two worst
fears
fulfilled at once: reptiles and flight.
A hundred human bodies contract as
one
in the dark shock of recognition.
The plane shudders in the stratosphere.
The hostesses call the pilot, who comes
back to round them up. The craft
flies on undamaged, but the boy
wakes at sunrise to an empty bag.
He cries silently for his lost snakes;
the plane begins descending.
by William Carpenter

Liking, partly liking, hating,
Then another hydrant, grating,
Leash at a taut, leash at dangle,
Tangle, sniff, untangle,
Dog around the block, sniff.

by E.B. White

Subway Rush Hour

Mingled
breath and smell
so close
mingled
black and white
so near
no room for fear

by Langston Hughes

E

EUREKA! EVALUATE!

Read, think, and react:
Paraphrase and respond to information

Think beyond the text:

Move from facts to ideas
Read to get the GIST:
Synthesize as you go
Reread and rethink:
Rethink misconceptions and the
opinions to the text

Read, write, and reflect:
Create a summary response

Boosting Brain Power

Where brain research and comprehension strategies
intersect.



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