



BRAIN-BASED TEACHING & LEARNING

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Agenda

- Introductions
- How well do you know the brain?
- Brain basics
- *Brain Rules* and idea sparks
- Questions & discussion

Introductions

- B.A. Sociology: Syracuse University
- M.Ed. Higher Education: UMass Amherst
- Certificate of Advanced Graduate Studies: Northeastern University
- Current Student M.A. in English and Creative Writing: SNHU
- 15+ years of higher education experience focused on college access, student and faculty success, academic advising, and online learning
- 200hr YTT Certified Yoga Teacher
- Level 1 Yoga for Arthritis and Chronic Pain

Advance organizers

- How much do you know about the brain and nervous system? (One-novice...Ten-expert)
- What are the two main components of the nervous system?
- To what extent do you consider the brain/nervous system in your curriculum development and teaching? (One-not at all...Ten-very much)

True or false?

We only use 10% of our brains.

False

We use most of our brains,
most of the time.

Boyd, P. (2008, February). Do people only use 10 percent of their brains? *Scientific American*. Retrieved from <https://www.scientificamerican.com/article/do-people-only-use-10-percent-of-their-brains/>.

True or false?

Theories of right-brain, left-brain
zones of dominance are a myth.

False (sort of)



- Areas of specialization exist
- Other areas can sometimes compensate but not always
- Left-brain linear processing, language, details
- Right-brain global, big-picture

Damasio, A. (2005). *Descartes' error*. Penguin: New York.

Taylor, J.B. (2009). *My stroke of insight: a brain scientist's personal journey*. Penguin: New York.

True or false?

We each have a unique learning style
(e.g. visual, auditory, read/write, kinesthetic).

False

There is little to no evidence to support the theory of learning styles.

Ankowski, A., & Ankowski, A. (2016). *Letting go of learning styles*. <http://www.pbs.org/parents/expert-tips-advice/2016/03/letting-go-learning-styles/>

Medina, J. (2005). *Brain rules*. Seattle: Pear Press.

Newton, P.M. (2015). The learning styles myth is thriving in higher education. *Frontiers in Psychology*,. Retrieved from <http://dx.doi.org/10.3389/fpsyg.2015.01908>

By improving our understanding of the brain, we can become more effective and empathetic educators.

Note: this is a one-hour summary and a jumping off point for a MUCH larger conversation.

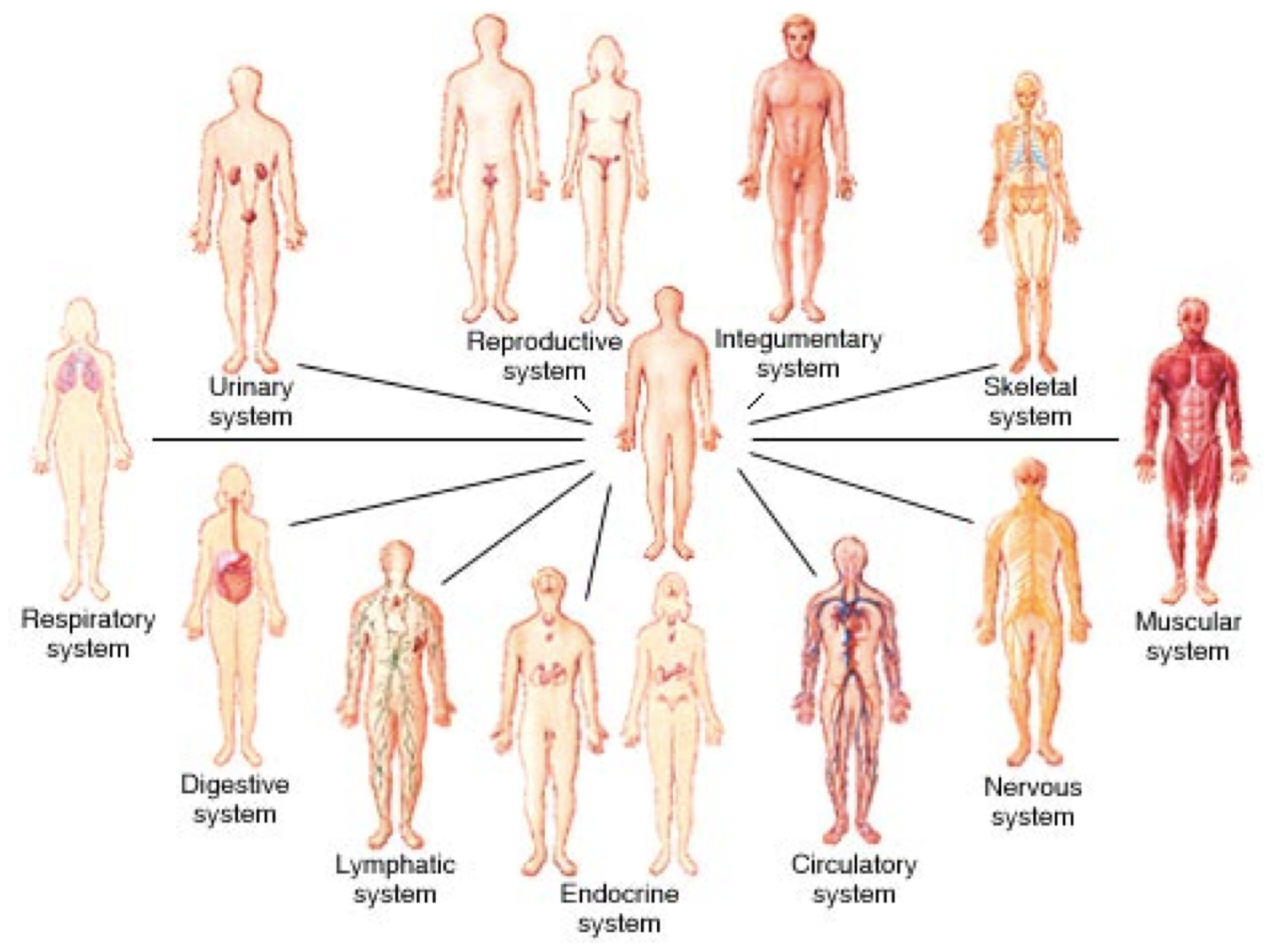
Brain (Nervous System) 101

Important:
Breaking the body into systems is helpful for studying the body.

Our body doesn't work like this.

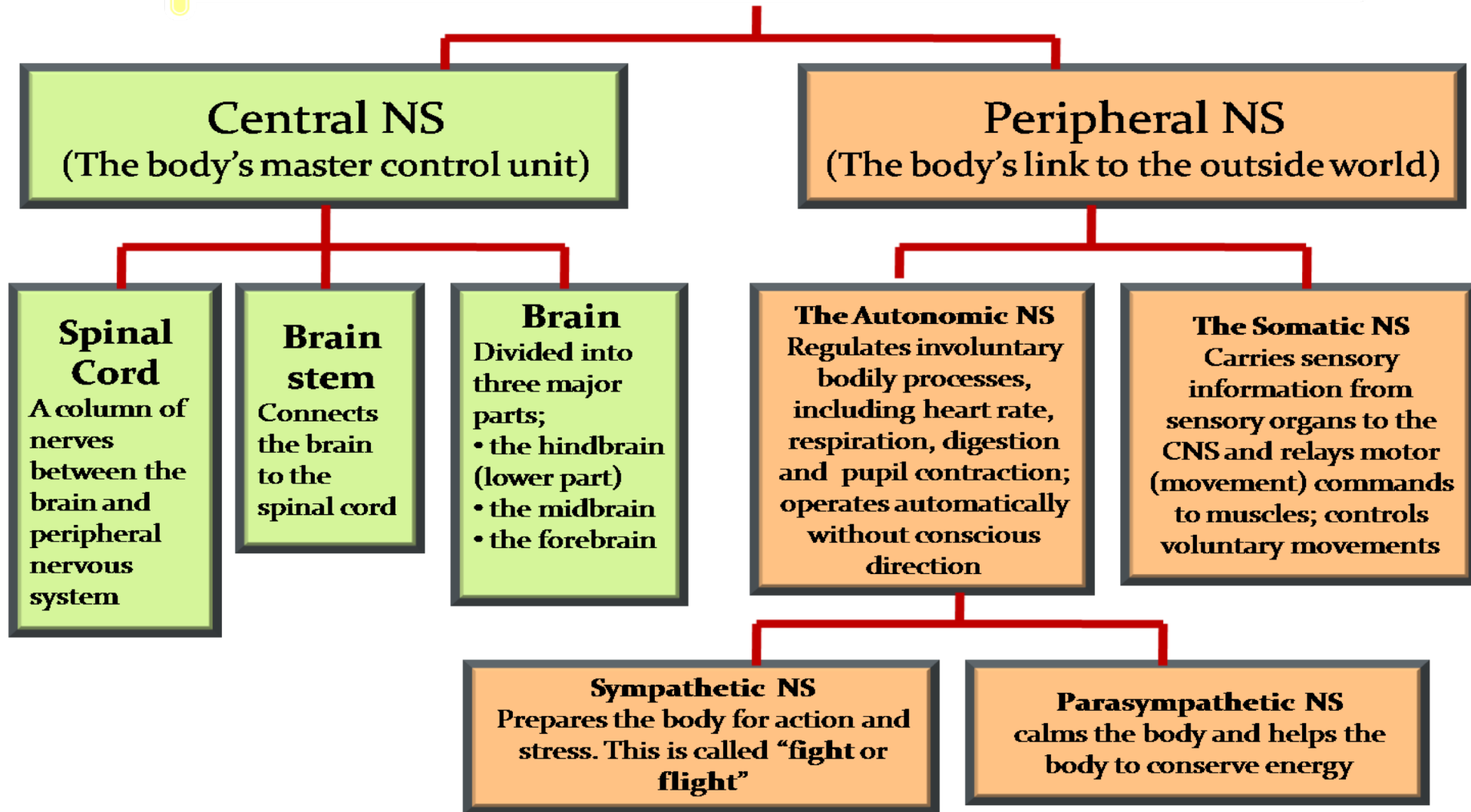
Our body doesn't know that it has systems.

Every "system" in this image constantly interacts with all of the other systems.



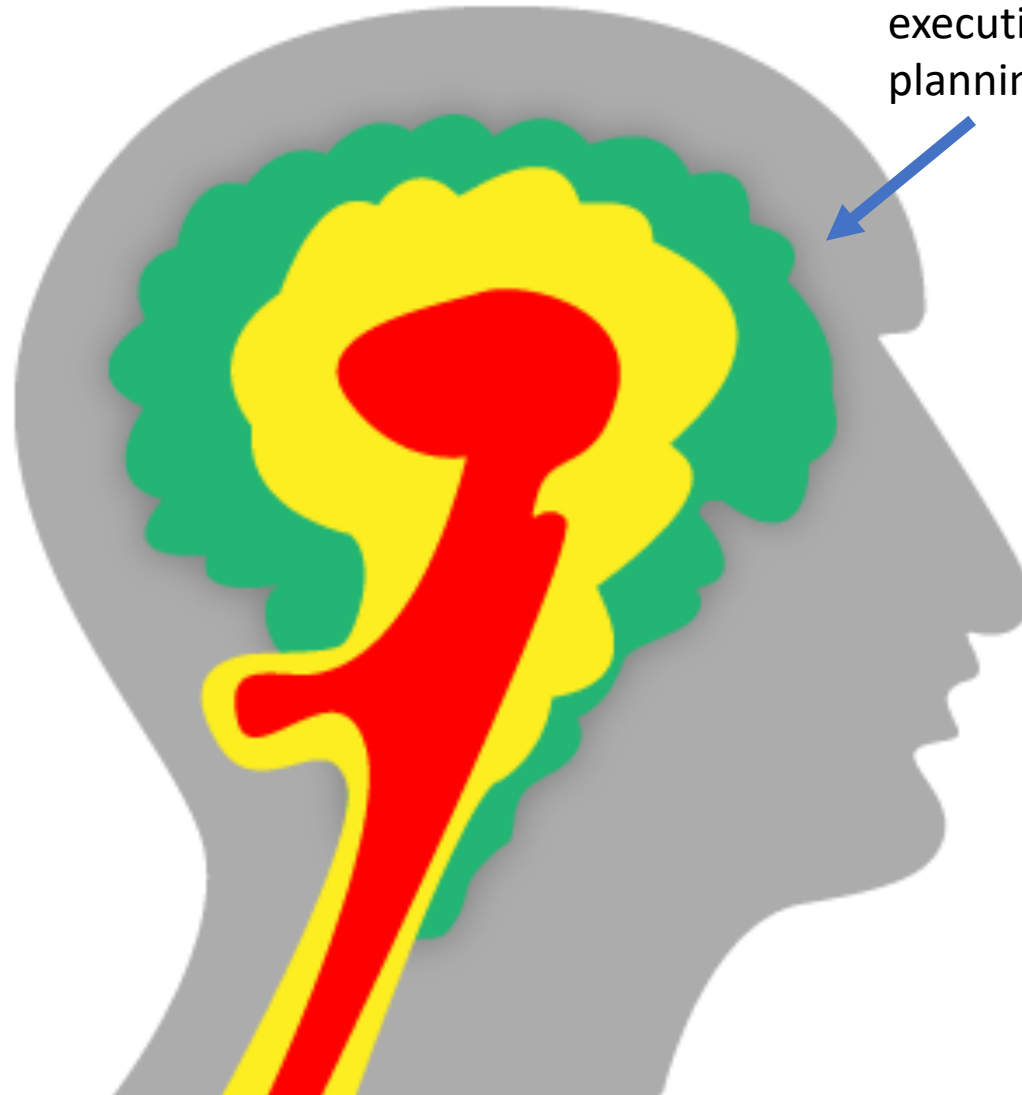
Source: Academy of Family Health

The Nervous System



Triune Brain

Hello pre-frontal cortex (PFC)!
Decision-making, complex behaviors,
executive functions, delayed gratification,
planning, time management



Which brain
formed 1st?

How well do you
learn if you are
focused on
survival?

How well do you
learn if you are
experiencing
strong, negative
emotions?

Survival Brain

- Reptilian

Emotional Brain

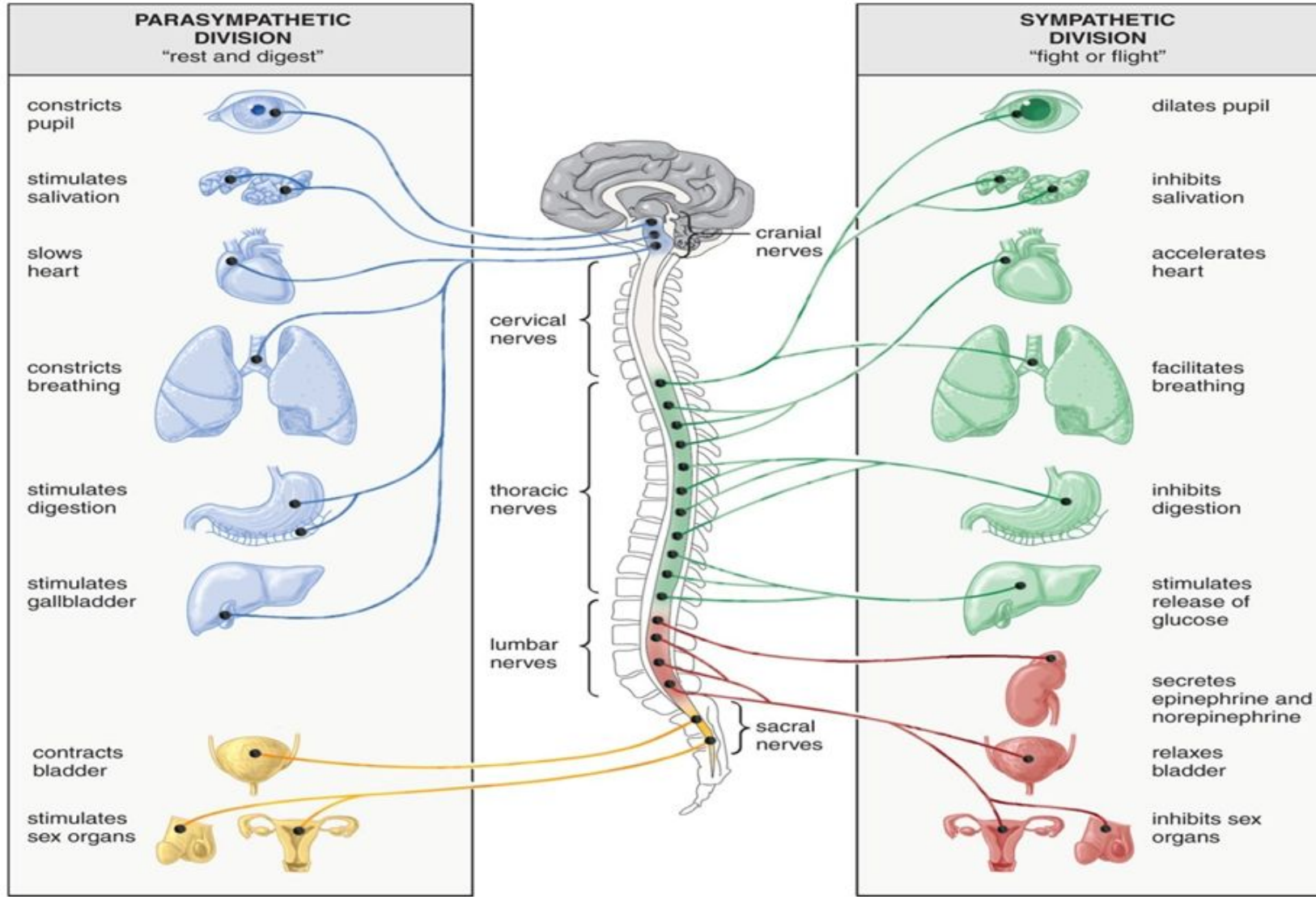
- Limbic

Thinking Brain

- Neo-cortex

The Autonomic Nervous System (Ch 13)

Rest
&
Digest



Fight
or
Flight

Brain Rules

Medina, J. (2005). *Brain Rules*. Pear Press: Washington.

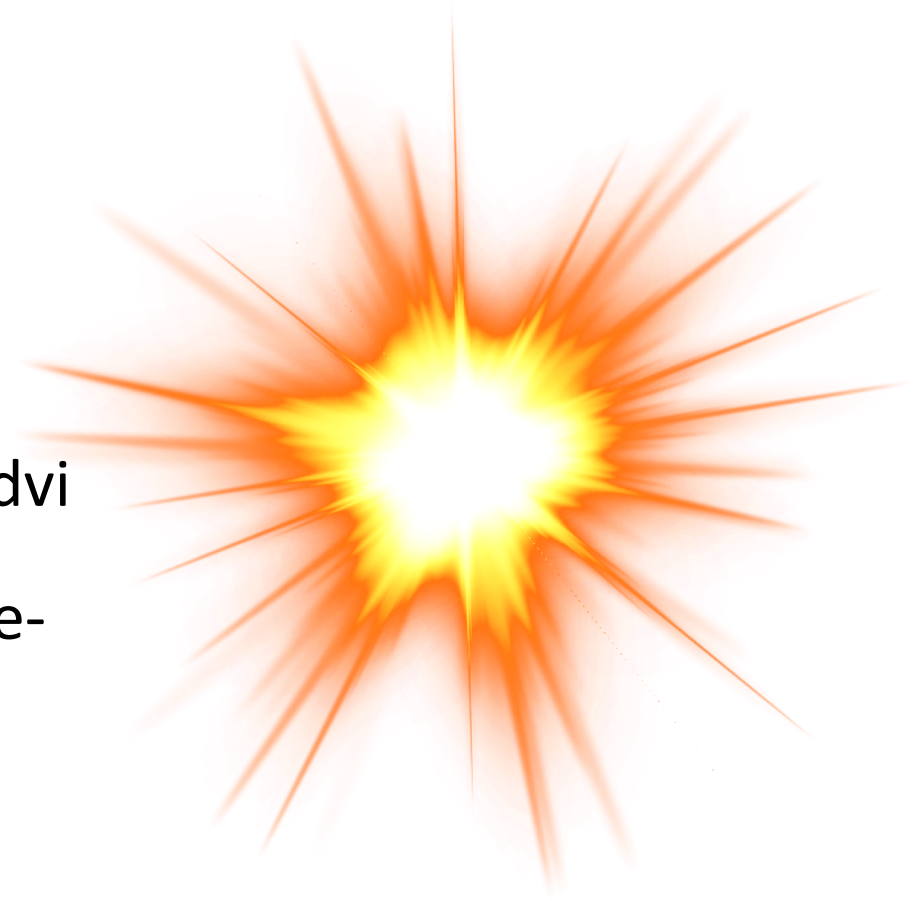
Rule: Exercise boosts brain power



- Magic Bullet
- 12 Miles/Day
- Concentration, behavior, and problem-solving, fluid intelligence
- Read more: *Spark* by John Ratey

Spark: One idea for your campus

- Let students move
- Exercise courses
- Online students-video exercise courses
- In Loco Personal Trainer:
<https://www.insidehighered.com/advice/2016/07/12/exercise-improves-cognition-so-colleges-should-require-physical-education-essay>



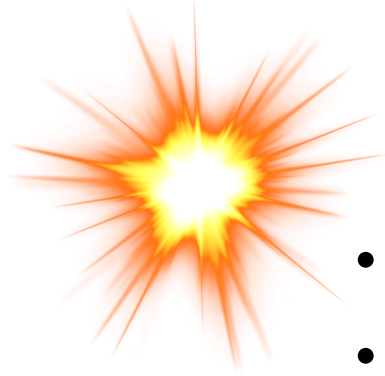
Rule: We don't pay attention to boring things



- Emotions are chemical post-it notes
 - See Sarah Rose Cavanagh's *The Spark of Learning*
- Meaning before details (Working the why)
- Every lesson or concept should connect back to the larger theme of the course.

Spark: One idea for your campus

- Tell and value (good) stories
- Working the Why
 - Mapping Course or Meeting Outcomes (see Hardiman)
 - Online Mind/Concept Mapping software
 - What's your campus why? Course why? Teaching why?
- Evaluate device use, teach students how/when to use them
- Structure classes to include rest & digest



Rule: Repeat to remember (Short-Term Memory)



- The history of SQ3R
- Survey, Question, Read, **Recall**, Recite
- Francis Robinson-*Effective Study*
- Intentional encoding strategies boost retention of information

Spark: One idea for your campus

- Teach and apply SQ3R in all courses.
- Examples increase retention esp. personal examples.
- Use emotions.
- “Ability to create a compelling introduction may be the most important single factor in the later success of your mission.”

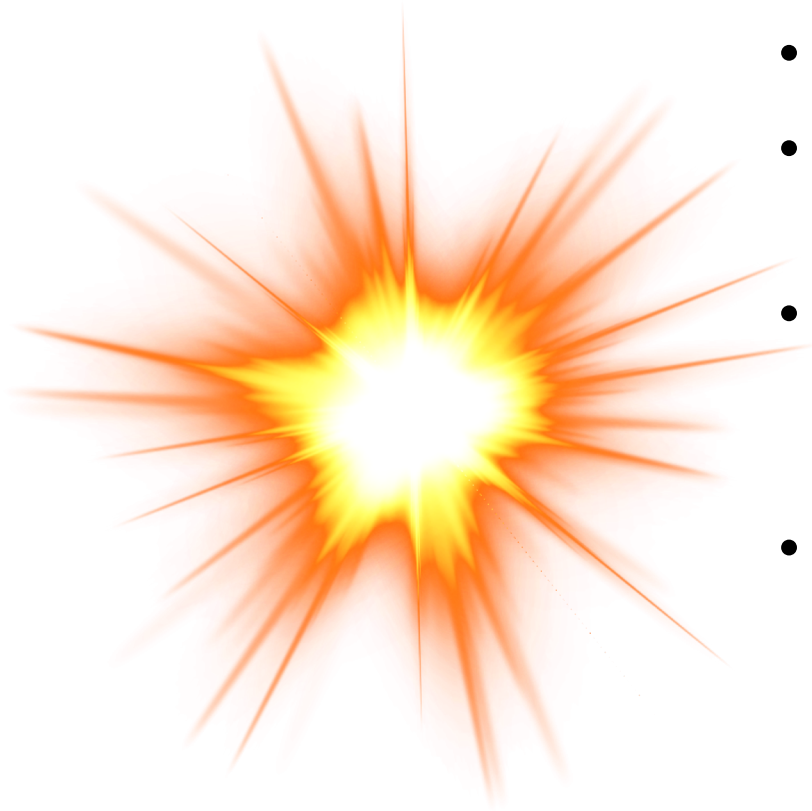


Rule: Remember to repeat (long-term memory)



- Cramming is an ineffective strategy.
- Small bursts of information over time improve long-term retention.
- 10 repetitions over a week are better than one cram session.

Spark: One idea for your campus



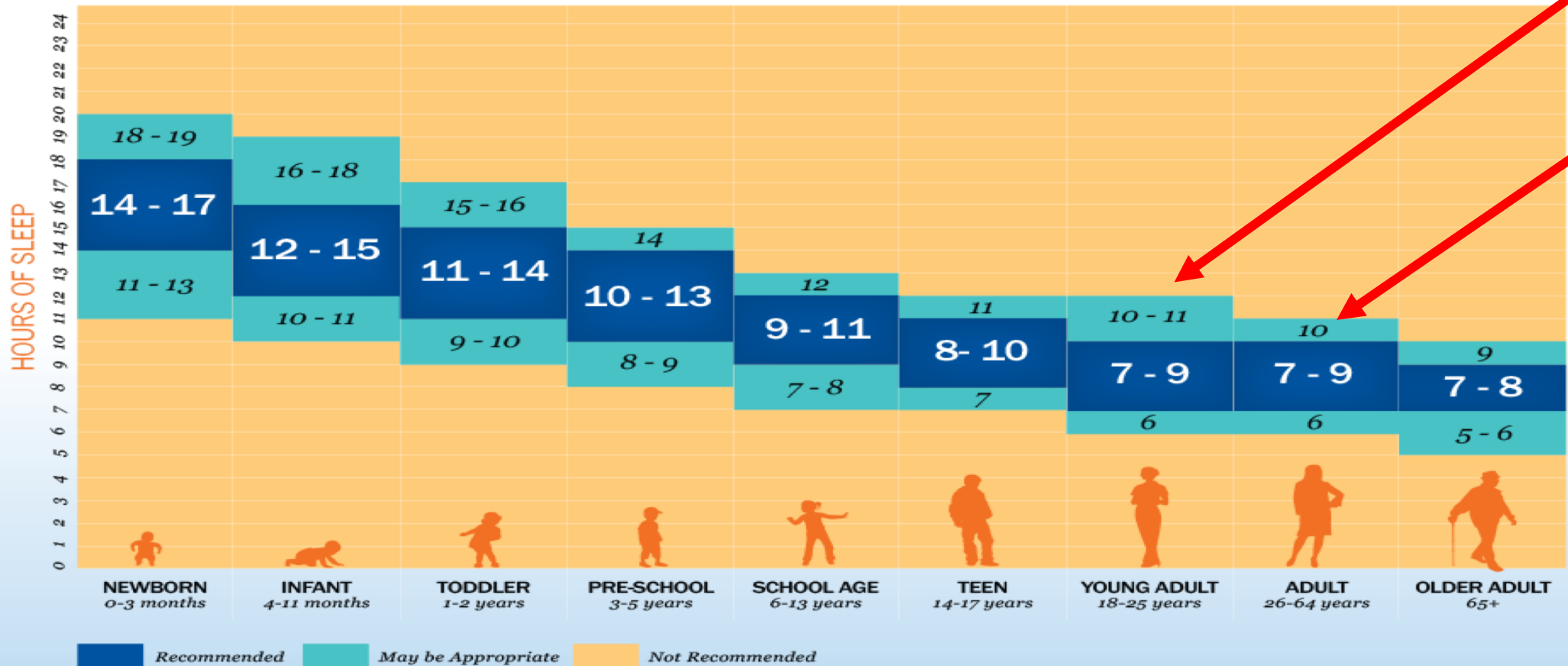
- Are your courses taught as cram sessions?
- How do you present other important information (e.g. billing, deadlines)?
- Be intentional. Give multiple opportunities for students to practice, especially challenging topics.
- Be mindful of cognitive load.

Rule: Sleep well, think well



- Brain is not resting during sleep
 - Offline processing
 - Learning?
- Improved brain function and learning
- See Arianna Huffington's *The Sleep Revolution*

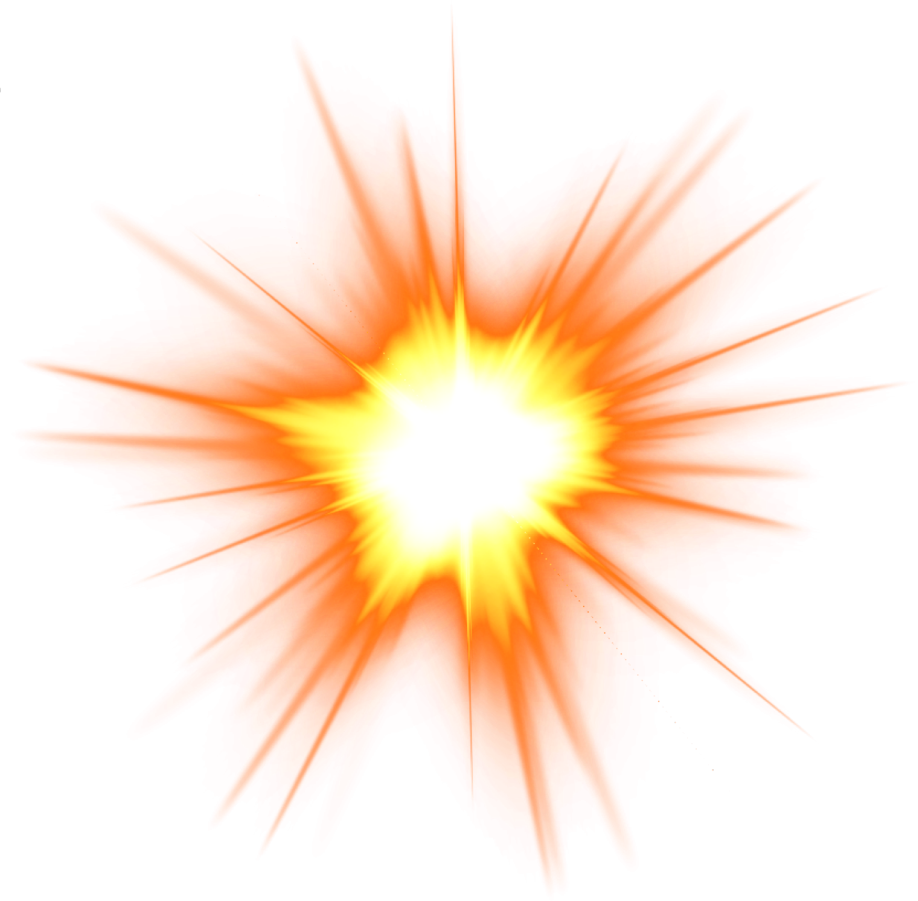
SLEEP DURATION RECOMMENDATIONS



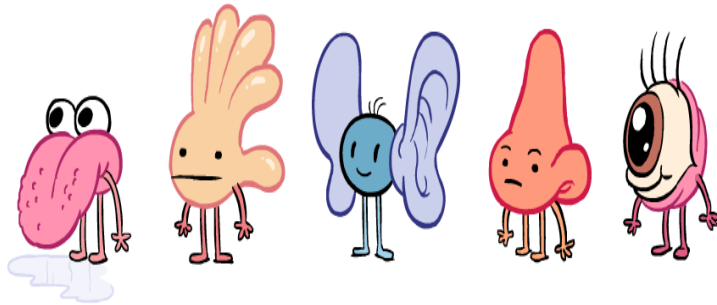
SLEEPFOUNDATION.ORG | SLEEP.ORG

Spark: One idea for your campus

- Don't make this a standalone conversation from the health office. Talk about sleep.
- Sleep research paper
- Sleep note on syllabus

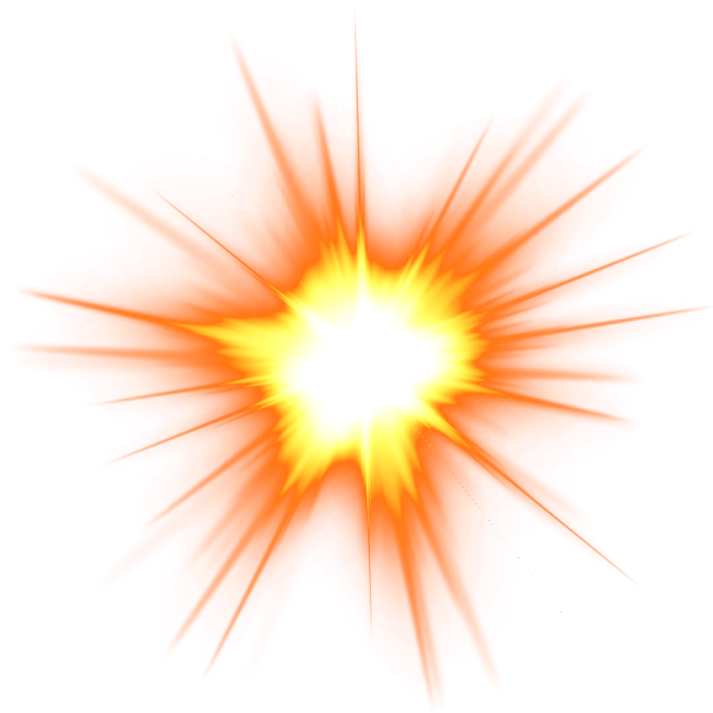


Rule: Stimulate more of the senses.
Vision trumps all other senses.



- Senses are wired to work together.
- Whenever possible, use more senses.
- When in doubt, go with pictures.
- “Burn your current PowerPoint presentations.” Less text, more images.

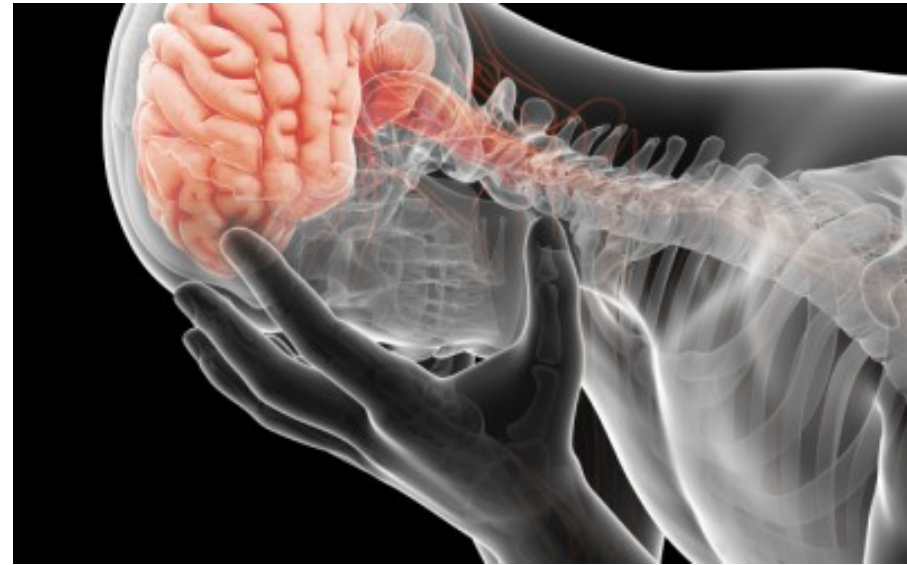
Spark: One idea for your campus



- When crafting lessons or presentations, notice what senses are put to use.
- When in doubt, err toward visuals.
- Give students the opportunity to practice this too through multi-sensory assignments.

Rule: Stressed brains don't learn the same way

- Distress vs. eustress (riding a roller coaster)
- Medina on distress: Arousal, aversive, no control
- Stuart Shanker: Anything that requires the body to burn energy to return to homeostasis.
- **CDC: 80% of medical expenditures are stress-related.**



More on stress

- Allostatic load: Breach point (varies by individual)
- Shanker: Gas Tank Analogy
- Neocortex (especially PFC) shuts down.
- Living Limbic (calm before conversation)
- Chronic stress is deadly.
- Balance sympathetic and parasympathetic nervous systems.



Spark: One idea for your campus

- Culture of Care
- Stress education across campus
- New-Traditional Students
- Connection b/t stress and student success (see *With Their Whole Lives Ahead of Them* Report)
 - Students leave because they are overwhelmed.
- Reframe problem behavior and provide support
 - See also *The College Fear Factor* by R. Cox



Start Here

- Ongoing professional development with opportunities for practice
- Teach SQ3R
- Tell more stories
- Manage your stress. Talk about stress. Educate the entire campus about stress. Become a stress-aware and empowered campus.
- Read *Brain Rules* by John Medina

Future Directions

- Does learning happen outside of the brain?
- *The Body Keeps the Score* by Bessel Van Der Kolk
- *The HeartMath Solution* by Doc Childre and Howard Martin
- How does this play out for diverse populations?
Students with disabilities?



Thank You!

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