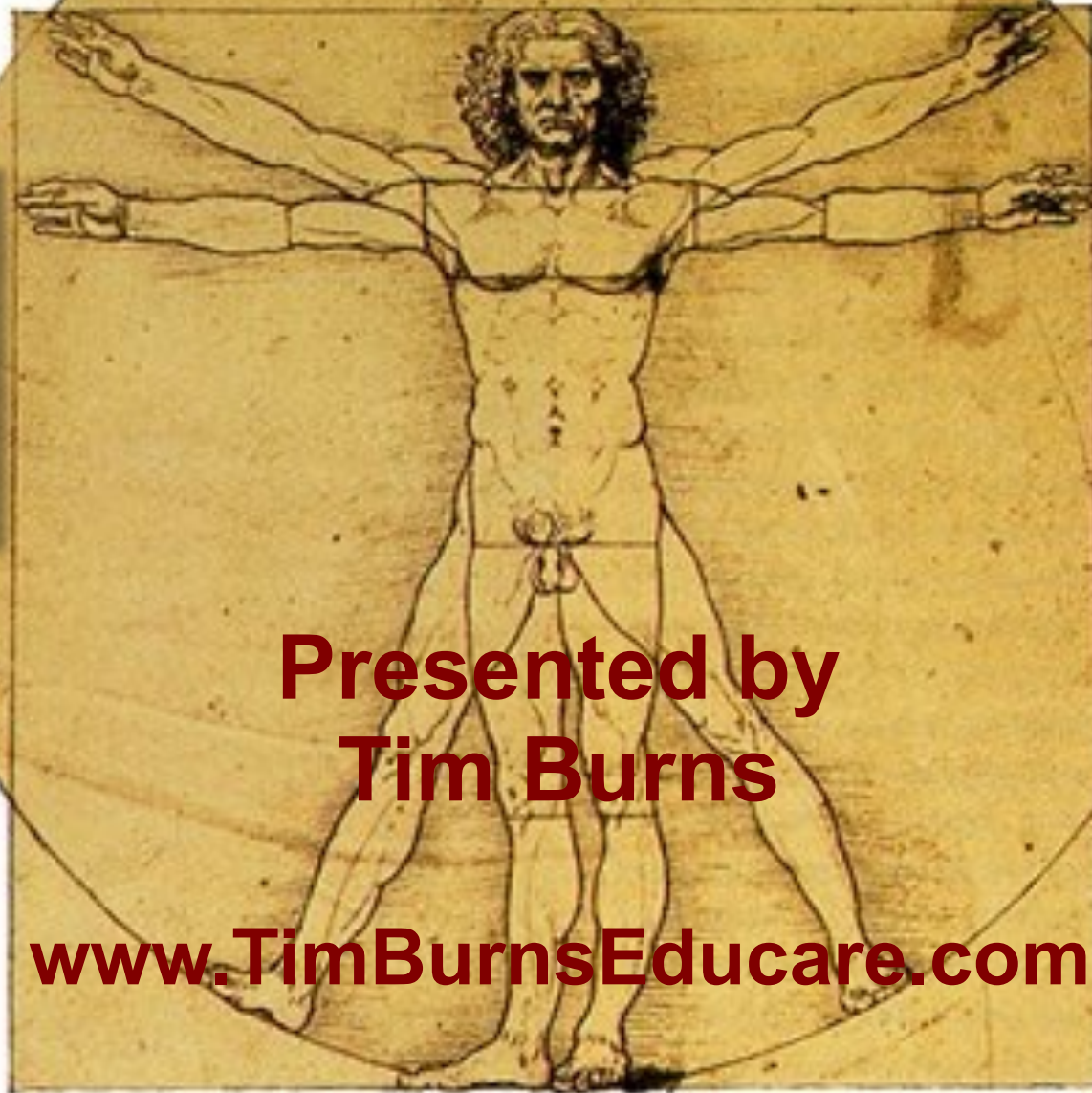
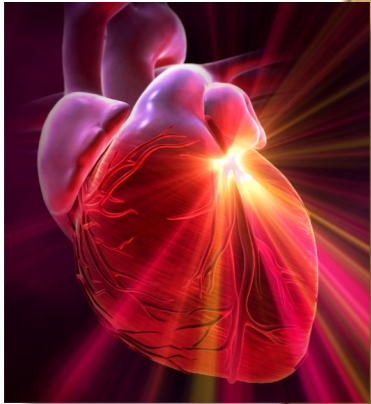


STRATEGIES FOR ENGAGED LEARNING

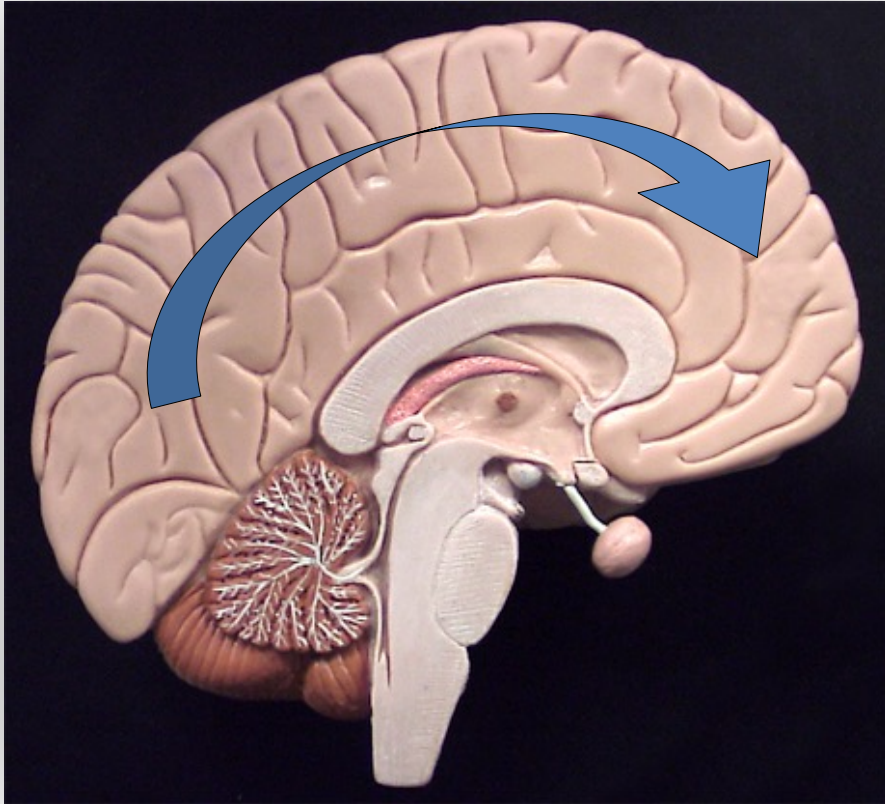
Using Movement, Rhythm, and Creative Play
To Enhance Learning



Presented by
Tim Burns

www.TimBurnsEducare.com

BRAIN MATURATION

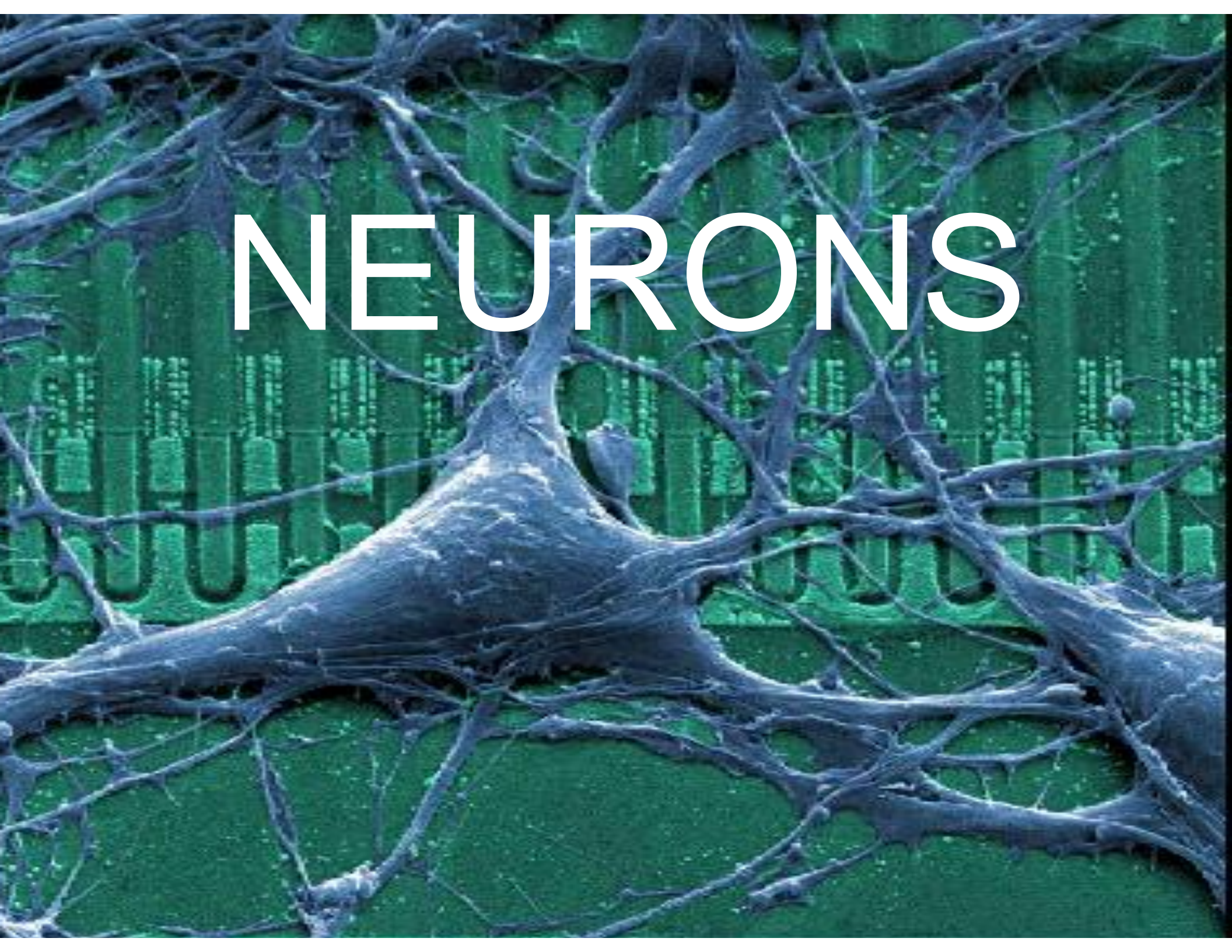


- **Bottom to top**
- **Inside to outside**
- **Side to side**
- **Back to front**

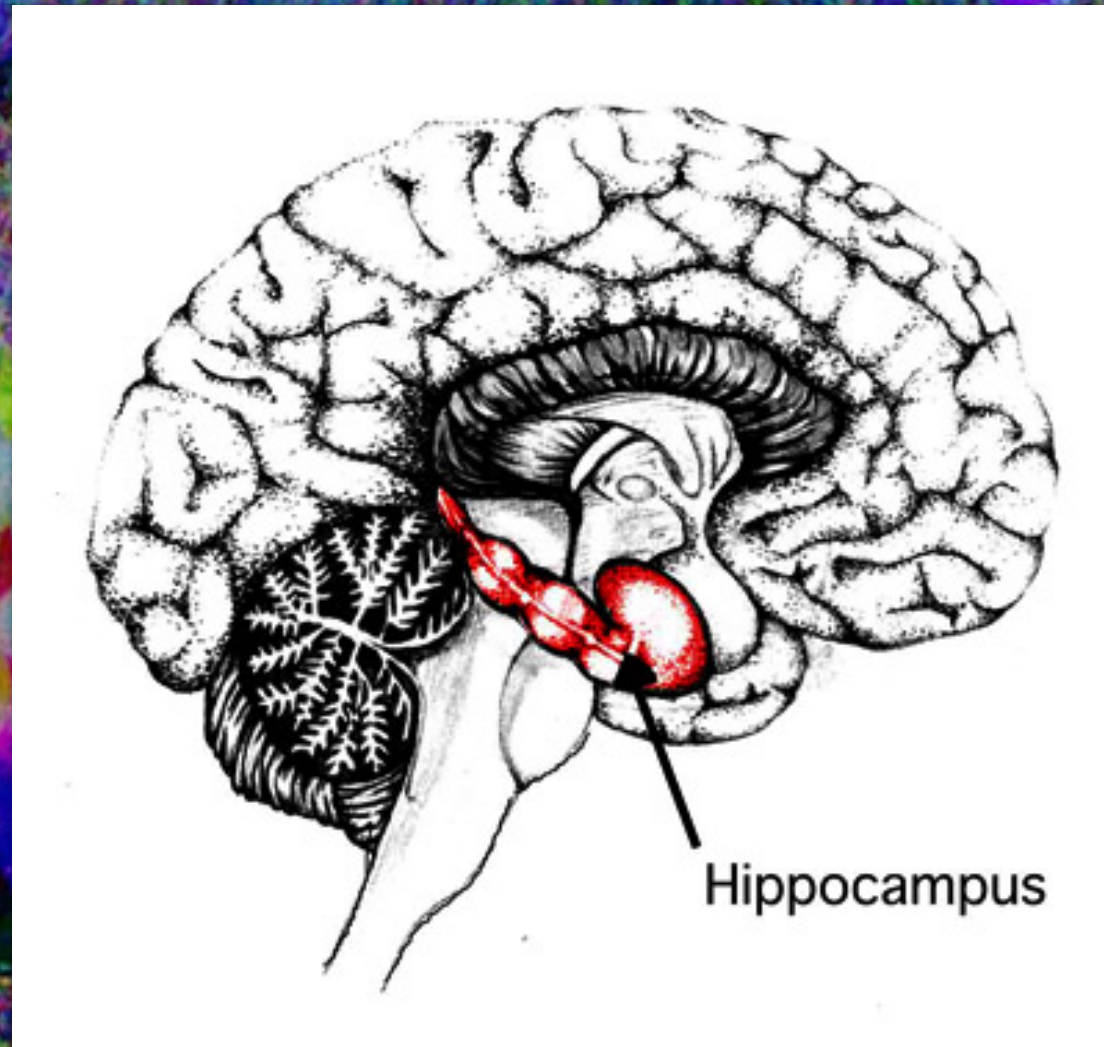
Developmental Stages and the Brain

	Brain Stage	Intelligence Domain	Piaget Cognitive	Erickson Virtues	Maslow Needs	Kohlberg Moral	Steiner Spiritual
Mature Adult	<i>Brain-Heart Integration</i>	<i>Heart: Wisdom and Compassion</i>	<i>Post-formal operations</i>	<i>Care/Wisdom: Generativity vs. Stagnation/ Integrity vs. despair</i>	<i>Self-actualization: morality, creativity, acceptance</i>	<i>Post-conventional: principled conscience universal ethic</i>	<i>Spiritual orientation</i>
Teen - Adult	<i>Neo-mammalian: Frontal cortex Teen to Adult</i>	<i>Thought: Abstraction & Meaning-making</i>	<i>Formal operations</i>	<i>Fidelity: Identity vs. Role confusion Love: Intimacy vs. Isolation</i>	<i>Esteem orientation: confidence, achievement, respect for & by others</i>	<i>Conventional: social-contract to Post-conventional</i>	<i>Soul orientation</i>
6/7 - Puberty	<i>Neo-mammalian: Posterior cortex Ages 6- 11/12</i>	<i>Thought: Concrete & Problem-solving</i>	<i>Concrete operations</i>	<i>Purpose: Initiative vs. Guilt Competence: Industry vs. Inferiority</i>	<i>Belonging orientation</i> ----- <i>Esteem orientation</i>	<i>Conventional: conformity authority social-order maintenance</i>	<i>Truth orientation</i>
2 - 6/7	<i>Paleo-mammalian: Limbic system Ages 2 - 6</i>	<i>Social-Emotional: Relationship</i>	<i>Pre-operational "The dreaming child"</i>	<i>Will: Autonomy vs. Shame & Doubt</i>	<i>Love and affection orientation</i>	<i>Pre-conventional: punishment & obedience</i>	<i>Beauty orientation</i>
Birth - 2	<i>Reptilian: Brain stem/ Cerebellum Birth - 2</i>	<i>Body: Self-preservation</i>	<i>Sensory-motor</i>	<i>Hope: Trust vs. Mistrust</i>	<i>Survival and Safety orientation</i>	<i>N.A.</i>	<i>Goodness orientation</i>

NEURONS

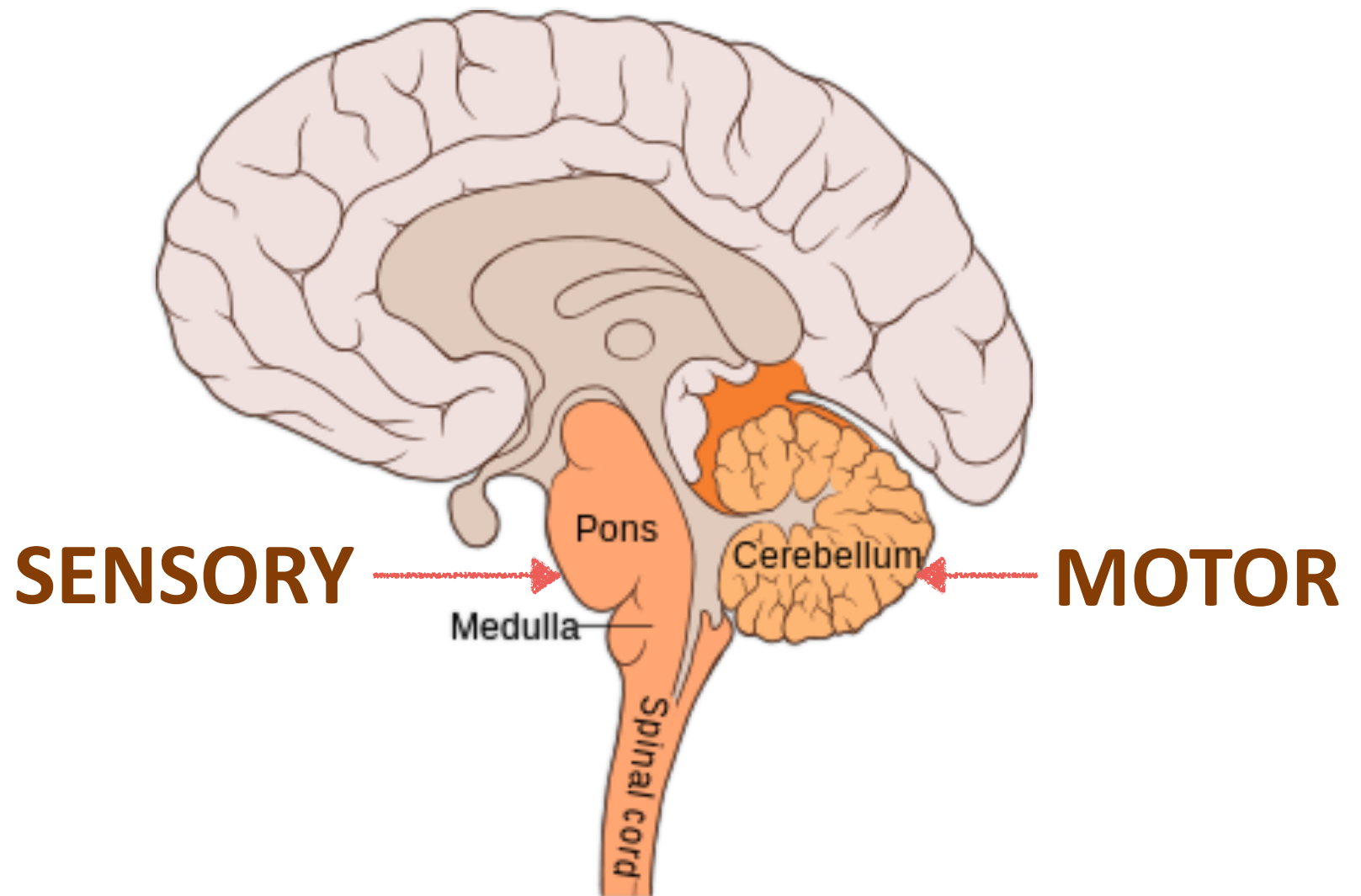


NEUROGENESIS

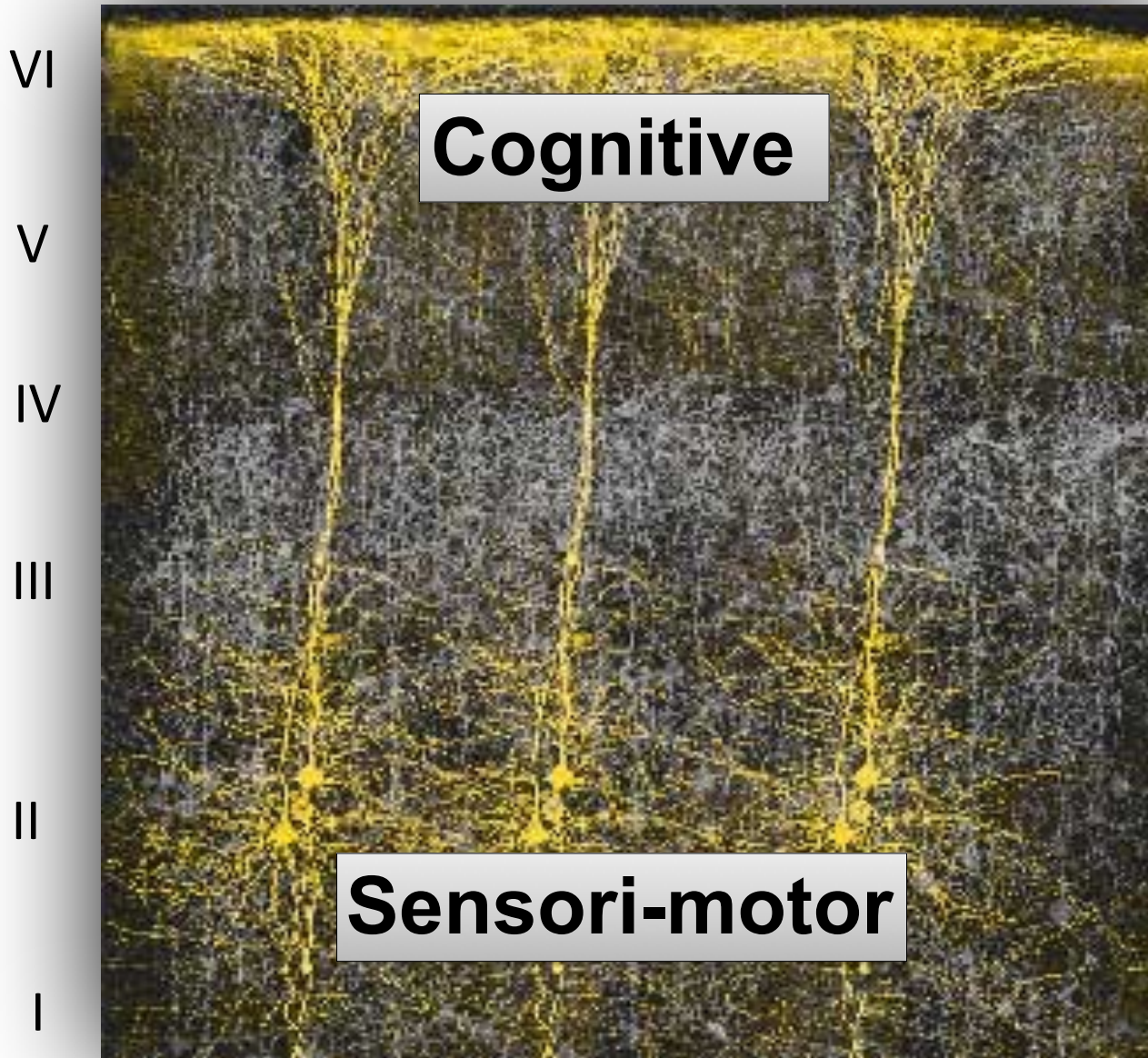


Processes, labels and stores information as memories

SENSORY-MOTOR DEVELOPMENT



NEUROGENESIS



Brown, J. Cooper-Kuhn, C. Kempermann, G, Van Praag, H. Winkler, J, Gage, F. & Kuhn, H.
“Enriched environment and physical activity stimulate hippocampal but not olfactory bulb
neurogenesis. *European J. of Neuroscience*, 17 (10), 2042-2046.

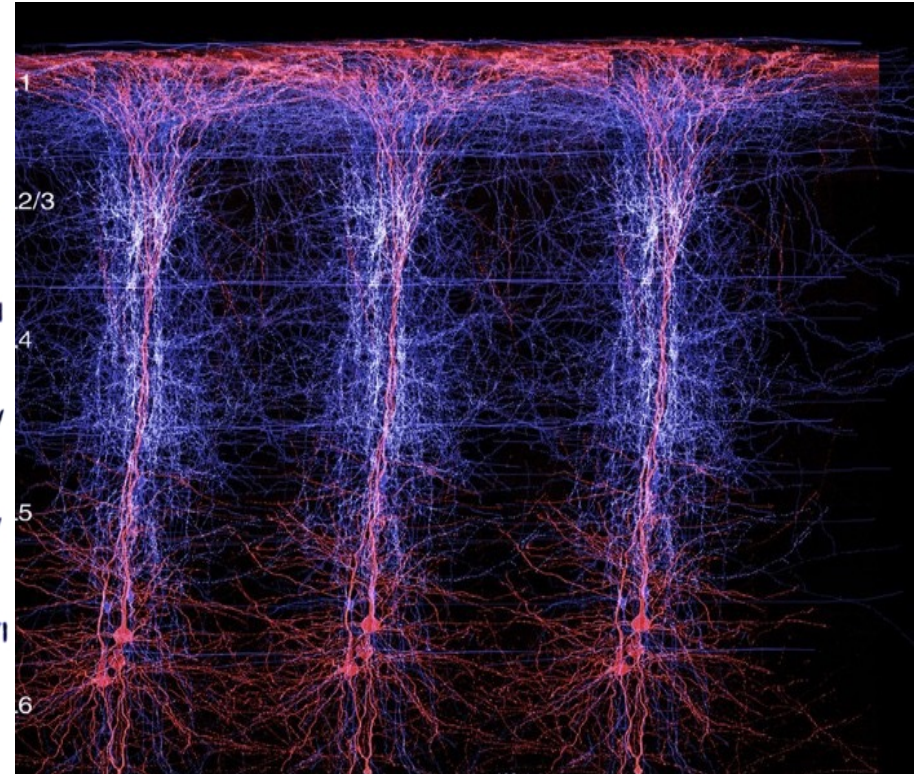
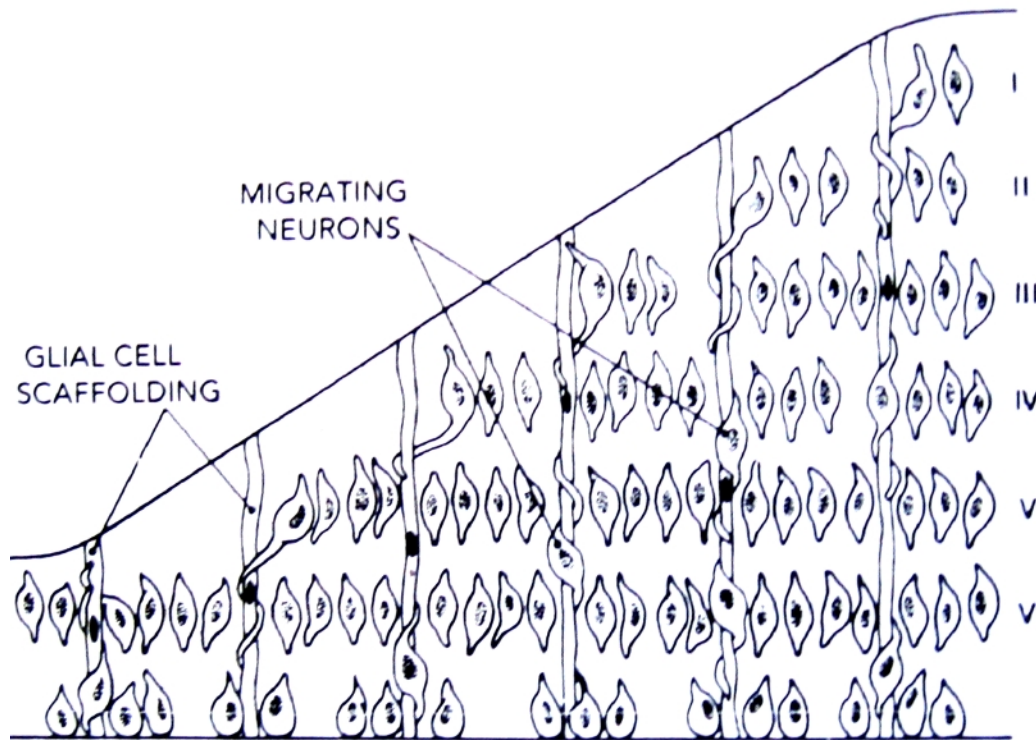
Mature Frontal Lobe Functions

- Envision the future
- Dream big dreams
- Set goals
- Make plans
- Detect problems
- Solve problems
- Manage emotions
- Control impulses
- Consider consequences
- Learn from mistakes



CEREBRAL CORTEX

Six Cell-Layers



Diamond, Marion and Hopson, J.
Magic Trees of the Mind. New York: Dutton, 1998.

MOVEMENT and the BRAIN

***Movement:
Active and Stimulating***

Exercise:

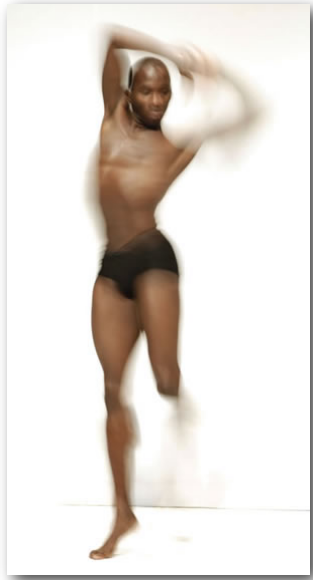
Movements you already know how to do



Benefits:

- Brings oxygen rich blood to the brain
- Elevates serotonin for balanced moods
- Improves mental clarity
- Reduces stress
- Improves cardio-vascular health
- Stimulates neurogenesis

MOVEMENT and the BRAIN



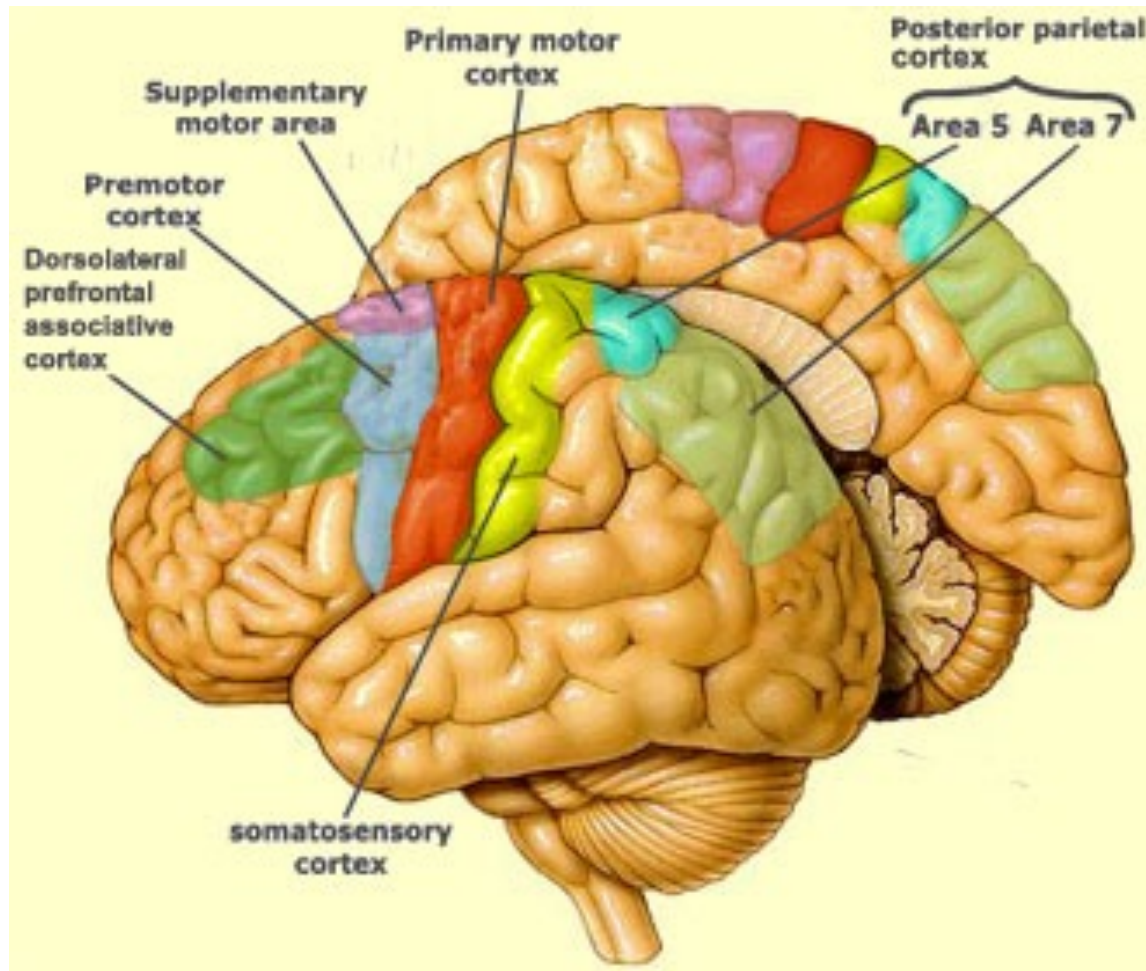
***Movement:
Active and Stimulating***

Stimulation:
Movements that are new to you

Benefits:

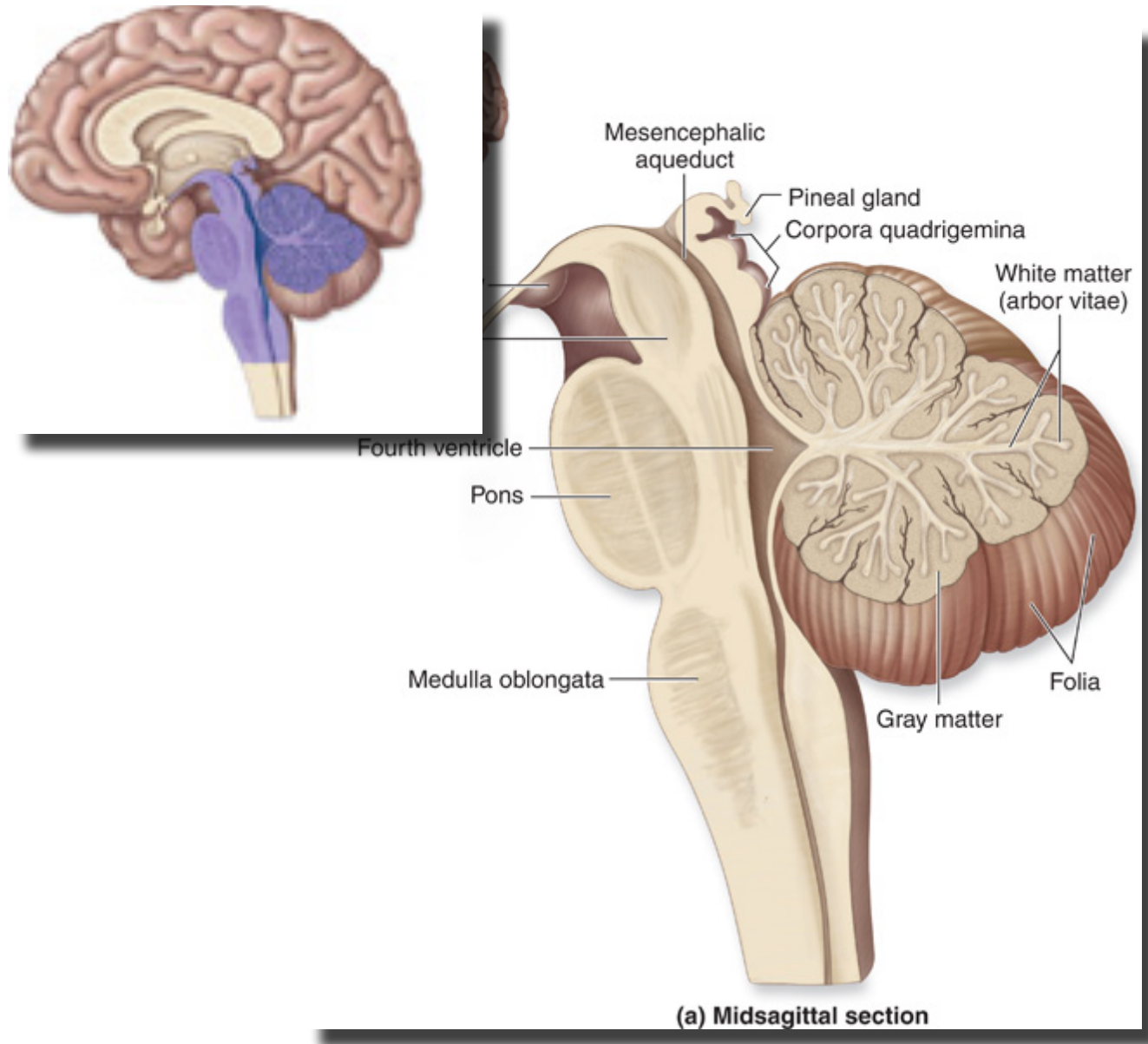
- Provides neural growth
- Builds neural capacity
- New movements are accompanied by novelty, challenge, and feedback
- Builds foundation for higher learning

MOVEMENT and the BRAIN



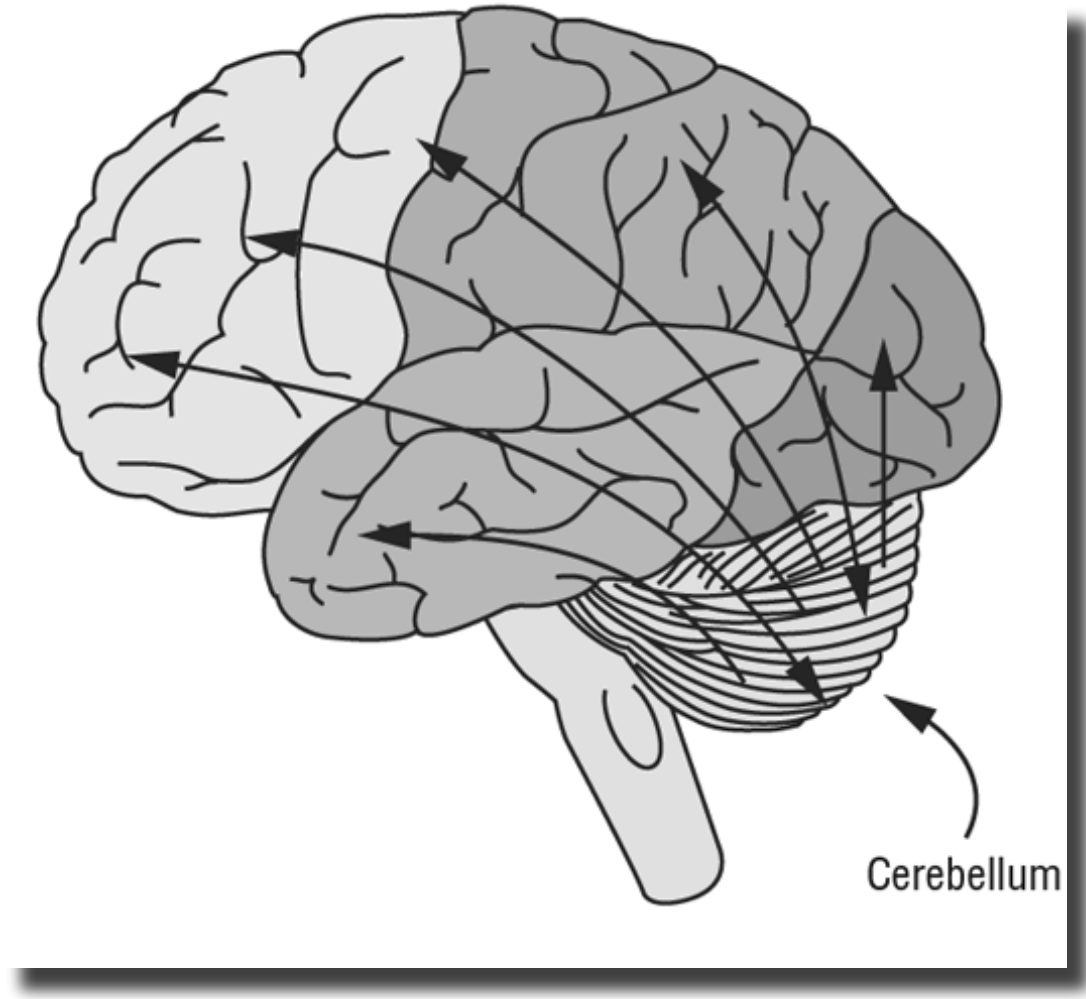
**Areas of the Brain
Involved in Movement**

THE CEREBELLUM

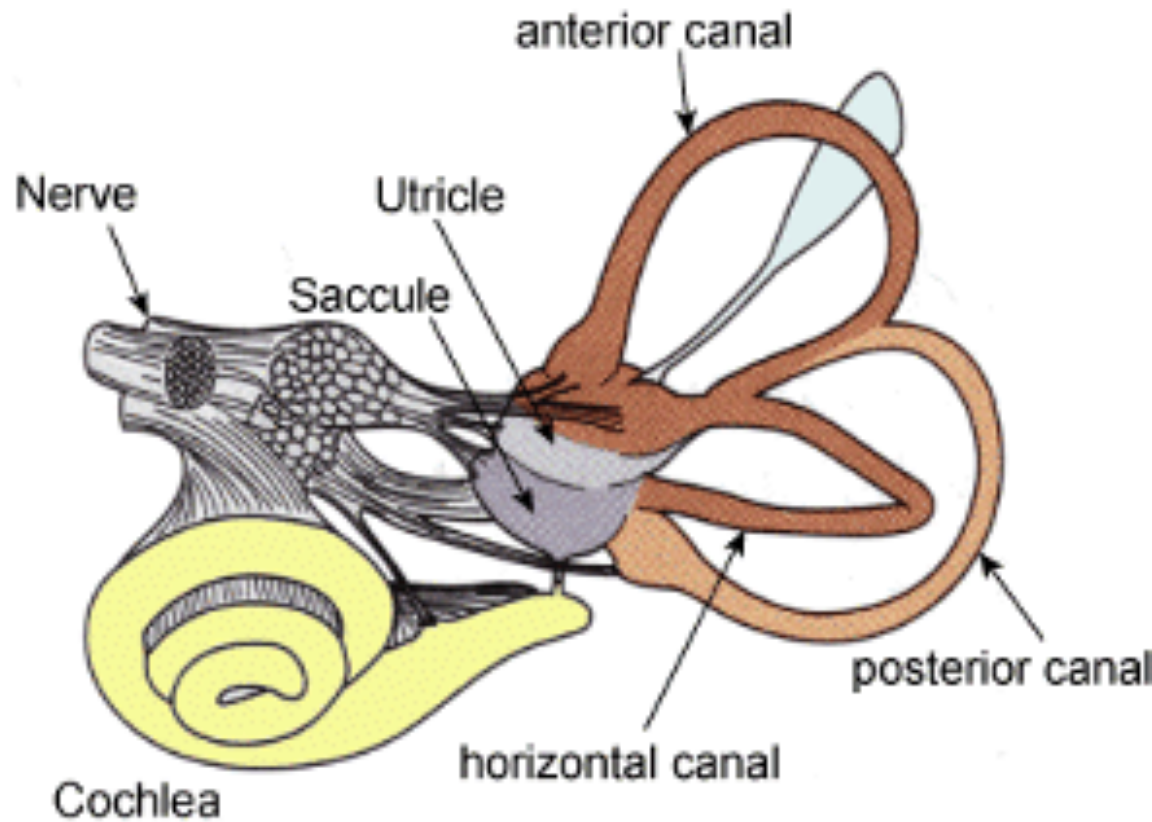


Movement, Posture, Coordination

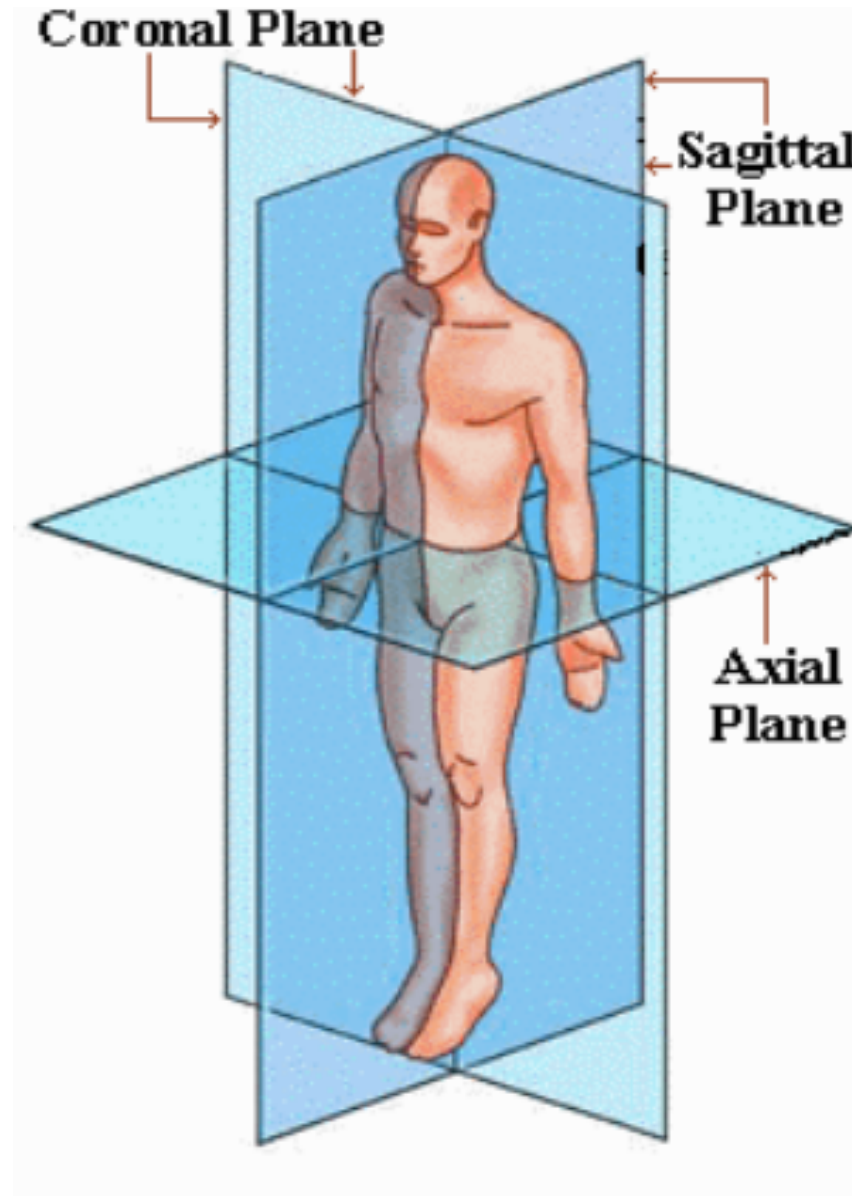
THE CEREBELLUM



THE VESTIBULAR SYSTEM



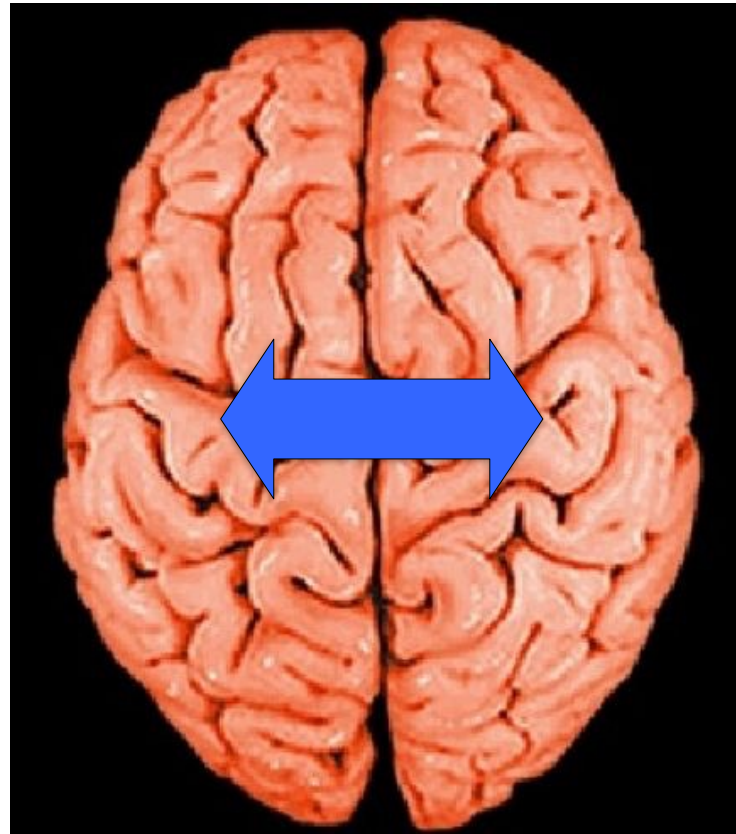
THE MIDLINE PLANES



Right-Left Hemisphere Functions

LEFT BRAIN FUNCTIONS

Small Picture
Verbal Communication
Small Muscle Control
Intelligence Quotient
Word Reading
Math Calculations
Processing Information
Conscious Actions
Positive Emotions
Receiving Auditory Input
Linear and Logical Thinking
Curious and Impulsive Actions
Like Routine/Sameness
Activates Immunity

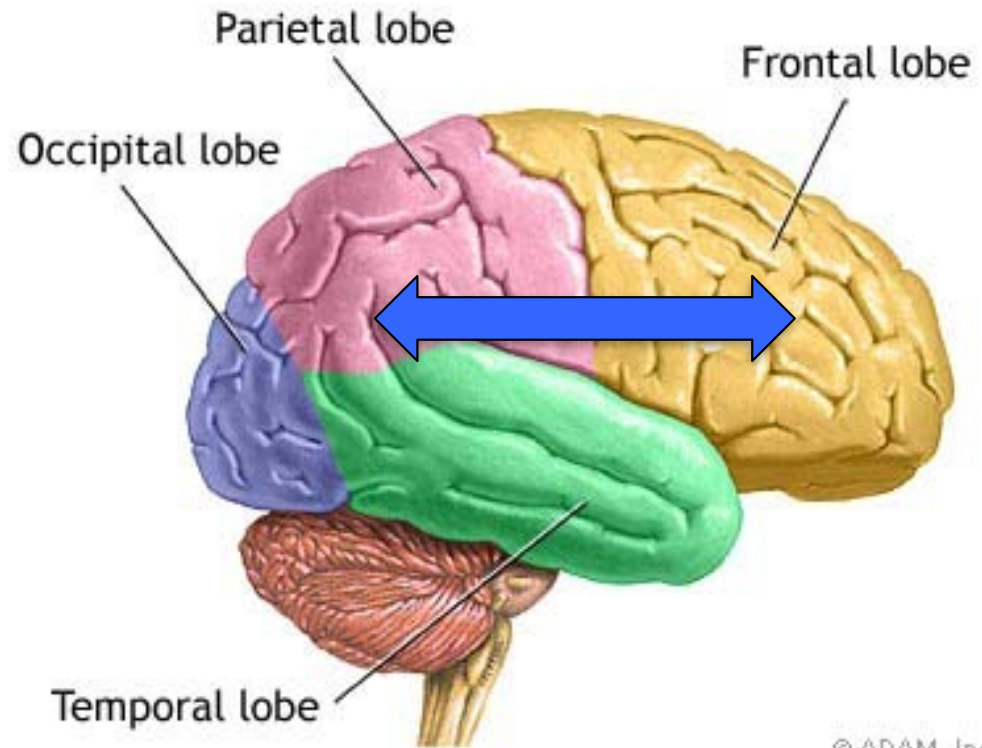


RIGHT BRAIN FUNCTIONS

Big Picture
Nonverbal Communication
Large Muscle Control
Emotional Quotient
Comprehension
Math Reasoning
Interpreting Information
Unconscious Actions
Negative Emotions
Interpreting Auditory Input
Gets Abstract Concepts
Cautious and Safe Actions
Likes Newness, Novelty
Suppresses Immunity

THE MIDLINE PLANES

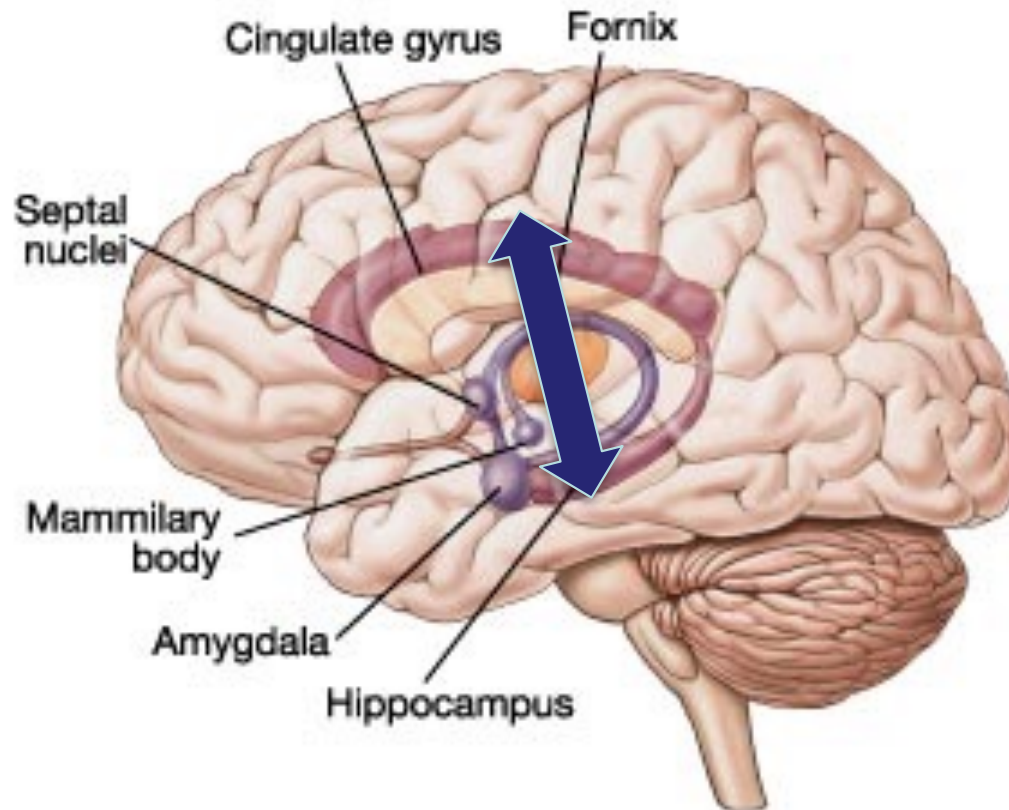
Concentration Dimension



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THE MIDLINE PLANES

Centering Dimension



MOVEMENT, RHYTHM and LEARNING

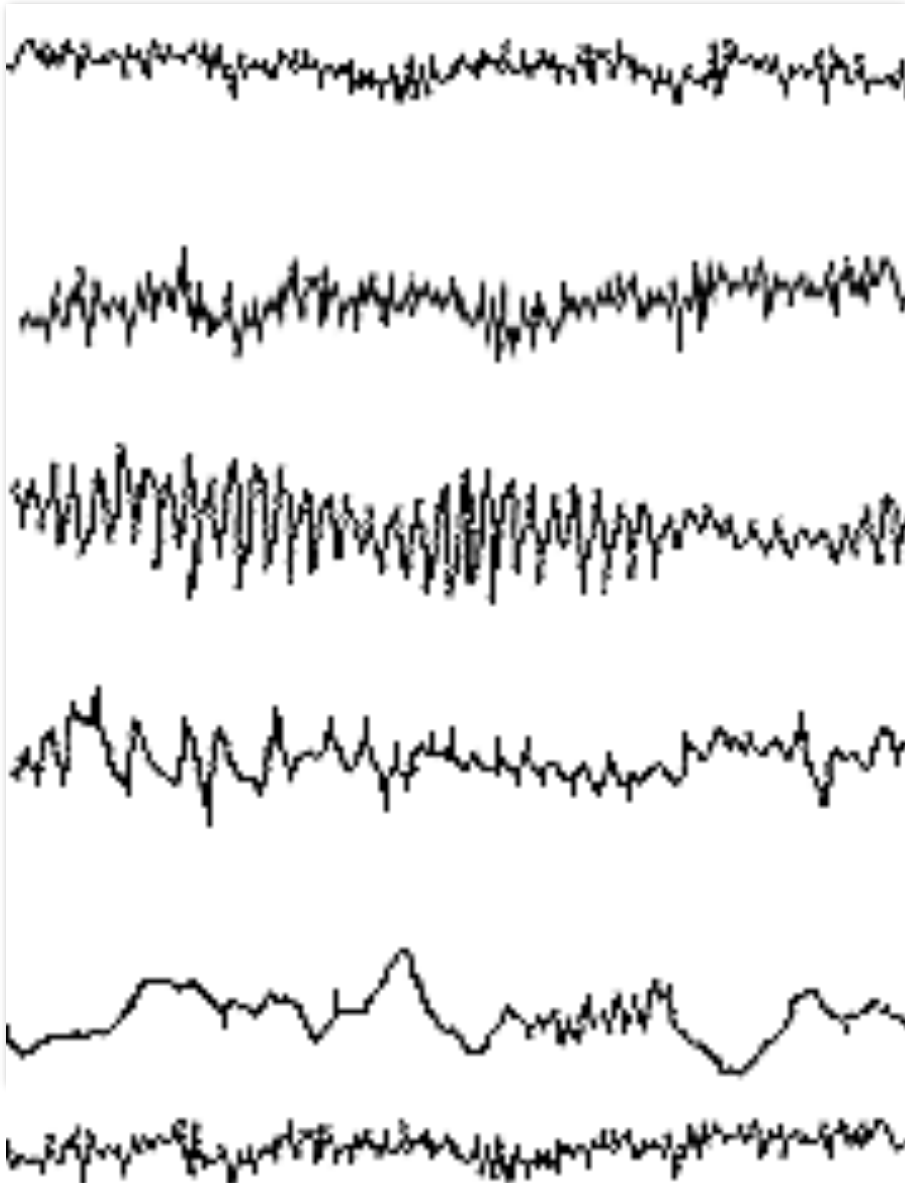
“In the inferior olive and cerebellum, two brain regions that are involved in movement coordination, the system oscillates at 10 Hz. Those particular cells trigger timing throughout the nervous system.”

**Rodolfo Llinas, M.D., neuroscientist,
New York University**

**Kat McGowan, “Brainsong,”
*The Brain, Discover Magazine Special, June 2012***

BRAIN-MIND STATES

EEG Brainwave Activity



Gamma - 25-100 Hz (40hz typical).
Binds conscious perception

Beta – 13-30 Hz. Active, alert,
concentration

Alpha – 9-13 Hz. Relaxed focus, light
trance, enhanced serotonin
production

Theta – 4-8 Hz. Trance-like state;
enhanced catecholamine aids
retention of learning

Delta – 1-3 Hz. Dreamless sleep; HGH
produced

REM – Rapid Eye Movement; dreaming

CHRONOBIOLOGY



Infradian

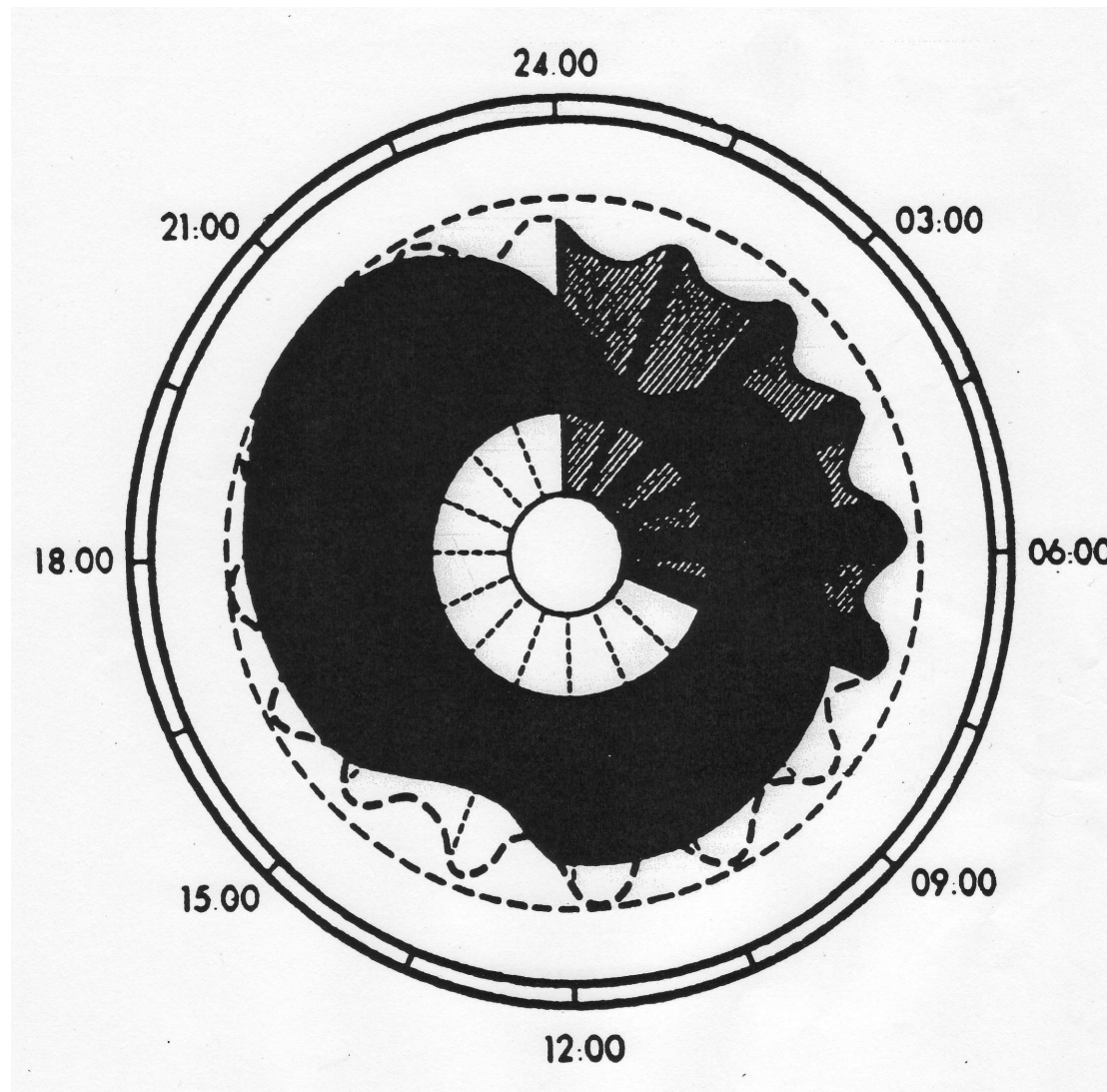
Circadian

Diurnal / Nocturnal

Ultradian

Hastings, Michael, "The Brain, Circadian Rhythms, and Clock Genes."
Clinical Review. BMJ 317:1704-1707, 19 Dec 1998.

BIORHYTHMIC VARIATIONS in the Circadian Cycle



Source: R. Broughton. "Biorhythmic Variations in Consciousness and Psychological Functions."
Canadian Psychological Review, 1975; 16: 217-239.

ULTRADIAN RHYTHMS

MODULATED MIND-BODY ACTIVITIES

MIND

Right-left brain dominance
Attention
Concentration
Learning
Memory
Sensations
Perceptions
Emotions
Dreaming
Fantasy
Imagination
Creativity
Trans-personal sense

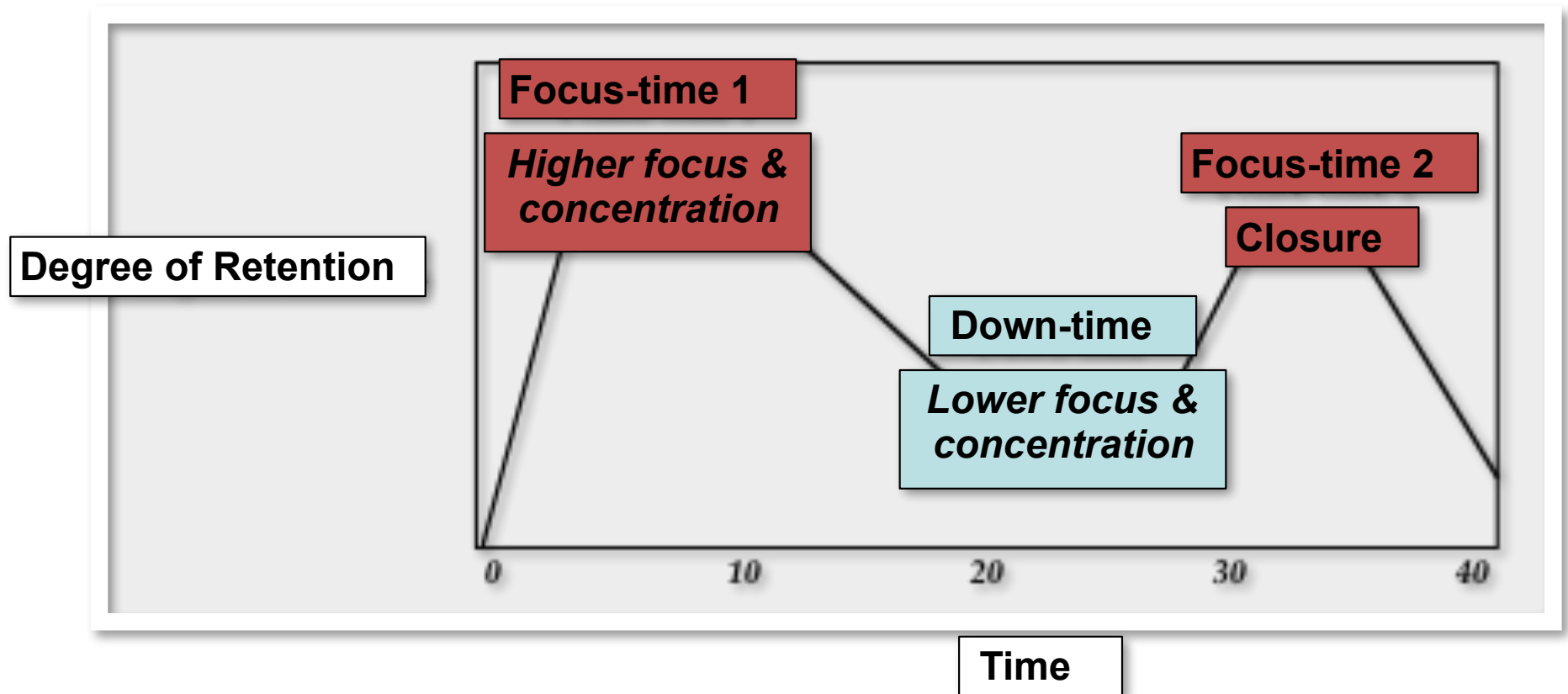
BODY

Left-right nasal dominance
Autonomic nervous system
Gene-cell metabolism
Endocrine system
Immune system
Breast-feeding
Hunger and sex
Digestion
Work and sports
Stress response
Psychosomatic response
Cellular metabolism
Drug sensitivity

Findings on Daydreaming

- About *one-third* of our time is spent daydreaming
- The brain activates several areas associated with *complex problem solving*
- Recent brain scans reveal that the brain may be most *actively engaged* when wandering
- **During daydreaming the brain makes new *associations and forges new neural connections***

Primary-Recency Effect



Retention: 40-Minute Learning Episode

BENEFITS of PLAY

- **Greater self-regulation**
- **Problem solving abilities**
- **Emotional mastery and behavioral control**
- **Impulse regulation**
- **Reduction in drop-out rate, violence and crime**
- **Higher IQ scores**

Adele Diamond, Ph.D.

Developmental cognitive neuroscientist

University of British Columbia

Interviewed on NPR, Mar 4, 2006

ELEMENTS of PLAY

- Pleasure and enjoyment
- Goals not imposed from the outside.
- Motivation is spontaneous, voluntary, and intrinsic.
- Active engagement on the part of the player.
- Attention to the means over the end product of the action or activity.

“Children’s Play,” Paul McArdle
Child: Care, Health and Development, Vol 27, No 6, 2001

STAGES of PLAY

SOCIAL STAGES

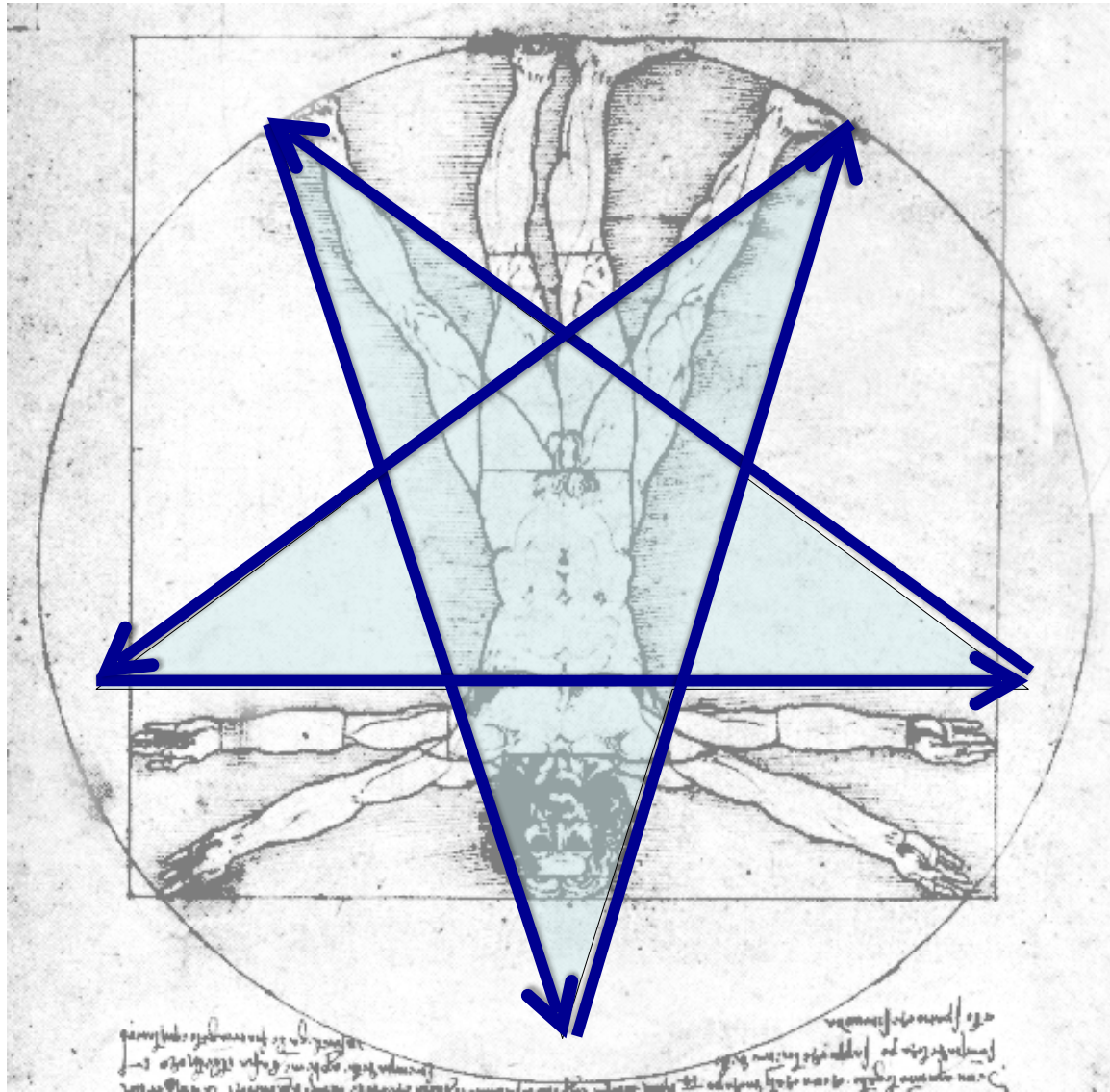
- I. Solitary
- II. Parallel
- III. Associative
- IV. Cooperative
(also called peer play, socio-dramatic play)

COGNITIVE STAGES

- I. Object play
(also called practice, exploratory, manipulative play)
- II. Functional (use of an object for its intended use)
- III. Pretend/symbolic
- IV. Games with rules.

“Harnessing the Power of Play.” Sonia Mastrangelo.
Teaching Exceptional Children, Vol. 42, no 1, 2009

Star Walk



www.TimBurnsEducare.com