**PhysEd Minded**

**The Neuroscience of PE**

Handout Notes

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**The Brain**

* The lambic system controls emotion and motivation
* The amygdala is a pair of almond-shaped structures that reacts to fear, danger, and treat. Regulates the emotional state by acting as the “security guard” for the brain.
* The hippocampus, twin semicircle shaped bodies in the central brain area. Assists in managing our response to fear and treats, and is a storage vault of memory and learning.
* Prefrontal cortex is the learning, reasoning, and thinking center of the brain. Controls your decision making, focuses our attention, and allows us to learn to read, write, compute, analyze, predict, comprehend, and interpret. Information from the lambic system is fed to the PFC.

**Amygdala**

* Some actions can occur when the amygdala blocks the flow of sensory input to the PFC and unconsciously reacts.

**Nerve Cells**

* Nerve cells carry messages through electrochemical signals
* The soma house the nucleus which act as the neuron’s control center
* Dendrites receive information.
* The axon relays the signal from the dendrites to the nerve ending.
* The information is then transferred from the nerve ending to another neuron
* Neuron connect axon to dendrite, passing message along via gap-jumping electrochemical called synapses.

**Dopamine**

When dopamine release is triggered:

* Vesicles empty their dopamine
* Receptors in receiving cell are activated
* Receptors pass the massage forward across synapse

**Neurotransmitters**

* Dopamine plays a role in motivation, pleasure, and addiction, and influences paying attention, planning and moving the body
* Serotonin contributes to the regulation of appetite, sleep, aggression, mood, and pain.
* Norepinephrine is important for retentiveness, emotions, sleeping, dreaming, and learning.

**BDNF**

* Sustains the viability of neurons
* Increases dendritic arborization and the number of synapse
* BDNF in surprised by stress
* Decreased levels lead to neural atrophy and death
* Exercise increases BDNF levels
* Active in hippocampus, cortex, basal forebrain; vital in learning, memory, and higher thinking

**Resources**

* Mind Up- <http://thehawnfoundation.org/mindup/>
* Action Based Learning- <http://abllab.com/>
* The Kinesthetic Classroom by Mike Kuczala
* Teaching with the Brain in Mind by Eric Jensen