



## National Association for Sport and Physical Education

an association of the American Alliance for Health,  
Physical Education, Recreation and Dance

**NASPE Sets the Standard**

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## **PHYSICAL Activity and the Brain**

Excerpts from *Spark*, by Dr. John Ratey

The Revolutionary New Science of Exercise and the Brain

“...[T]he real reason we feel so good when we get our blood pumping is that it makes the brain function at its best, and in my view, this benefit of physical activity is far more important—and fascinating—than what it does for the body.” (p. 3)

“...[T]oxic levels of stress erode the connections between the billions of nerve cells in the brain....[C]onversely, exercise unleashes a cascade of neurochemicals and growth factors that can reverse this process, physically bolstering the brain’s infrastructure.” (p.5)

“It turns out that moving our muscles produces proteins that travel through the bloodstream and into the brain, where they play pivotal roles in the mechanisms of our highest thought processes.” (p.5)

In a study conducted by Dr. Charles Hillman of the University of Illinois, the electroencephalogram (EEG) showed more activity in fit kids’ brain, indicating that more neurons involved in attention were being recruited for a given task. (p.25)

In a 2007 study of humans, German researchers found that people learn vocabulary words 20 percent faster following exercise than they did before exercise, and that the rate of learning correlated directly with the levels of Brain-Derived Neurotrophic Factor (BDNF). (p. 45)

Exercise improves learning on three levels: “first, it optimizes your mind-set to improve alertness, attention, and motivation; second, it prepares and encourages nerve cells to bind to one another, which is the cellular basis for logging in new information; and third, it spurs the development of new nerve cells from stem cells in the hippocampus.” (p.53)

“The more complex the movements, the more complex the synaptic connections....The prefrontal cortex will co-opt the mental power of the physical skills and apply it to other situations.” (p. 55-56)

“The superintendent of schools in Kansas, City, MO decided to establish daily physical education throughout the district after seeing how it reduced violence and improved test scores nearly overnight at one of his inner-city elementary schools.” (p. 269)