

Physical Activity Enhances Learning

Moving and thinking are connected

The largest area of the brain is the cerebrum, which is the thinking part of the brain, but it also has an area that controls the voluntary muscles.¹

The cerebellum is an area of the brain commonly linked to movement because it controls balance, movement and coordination, and plays a role in thinking.¹

Physical activity is necessary for efficient brain functioning²

When a person is active, the number of breaths taken each minute increases and breathing becomes deeper. Blood, now rich with oxygen, moves through the system more quickly. This increase in oxygen to the brain improves focus and concentration. When one is sitting for a long period of time:

- Blood pools in the hip area
- Breathing becomes shallow and slow
- Less oxygen enters the blood stream, thus less blood reaches the brain

Brain function is less efficient after long periods of sitting, and as a result, one's learning and performance can suffer. In addition, under these conditions it is increasingly difficult to collect and remember additional information. The hippocampus, which receives and temporarily stores all explicit information, shuts down when it receives too much information.³

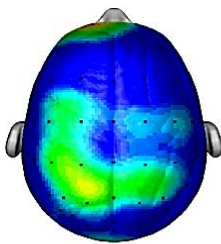
To optimize learning, combine a 20-minute learning segment with 2-5 minutes of movement.⁴

Physical activity maximizes brain functioning:

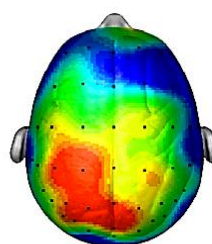
- Exercise prepares the brain to receive and retain additional information.²
- Movement stimulates growth and greater connections between nerve cells.⁵
- In a recent study, 10 elementary school students walked for 20 minutes while another 10 sat quietly. Then, all 20 students took the same test. Conclusions indicate a single bout of moderately intense aerobic exercise (e.g. walking) improves the cognitive control of attention as a contributing factor for increasing **attention** and **academic performance**. These data suggest that single bouts of exercise may be necessary for effective functioning across the lifespan (see above brain scan image).⁶

Average Composite of 20 Students Taking Same Test

Brain after sitting quietly



Brain after 20 minute walk



Research/scan Dr. Chuck Hillman University of Illinois, 2009

“One of the best ways to maximize the brain is through exercise and movement,”

-Dr. John Ratey, renowned brain researcher⁷

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School-Based Physical Activity Provides Health and Learning Benefits

Health Benefits:

Studies demonstrate that physical activity in schools is associated with increased:

- Energy use or expenditure of calories^{8,9,10}
- Flexibility^{11,12}
- Muscular Endurance^{12,13}
- Knowledge about exercise, nutrition, and fitness¹¹
- Participation in physical activity outside of school⁹



Classroom Behavior Benefits:

Physical activity has been associated with better classroom behavior, which facilitates an optimal classroom environment.¹⁴

Physical activity improves student behavior.

- Providing recess to 8- to 9-year-old students is associated with better teacher ratings of class behavior scores.¹⁵
- Eight of eight studies found one or more positive associations between recess and indicators of student cognitive skills, attitudes, and academic behavior including attention, concentration, and/or on-task classroom behavior.¹⁶
- Exercise affects mood, vitality, alertness, and feelings of well-being.¹⁷

Learning Benefits:

Research studies found increasing physical activity improves classroom behavior, concentration, time on task, and academic achievement.^{15,21-26}

There is a strong positive relationship between physical fitness and the academic achievement of students.¹⁹⁻²⁰

- Physical fitness may enhance academic achievement of children by improving their attention and memory skills.^{18,19}
- Students passing all health-related fitness tests tend to score higher on academic achievement tests.²⁰

Providing more opportunity for increased physical activity during the school day does not lead to a decrease in academic test scores and may even result an increase in test scores.^{21,22,26}

- Increasing physical activity in school
 - ✓ Improves academic achievement^{21,22}
 - ✓ Improves classroom behavior²³
 - ✓ Increases concentration²⁴
 - ✓ Increases time on task^{15,21,23,25,26}



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