



Exercise and Learning



THE REVOLUTIONARY
NEW SCIENCE OF EXERCISE
AND THE BRAIN



Supercharge Your Mental Capacity by
Boosting Your Energy, Sharpen Your Thinking, and Boost Your
Brain Power, Memory, and Mood

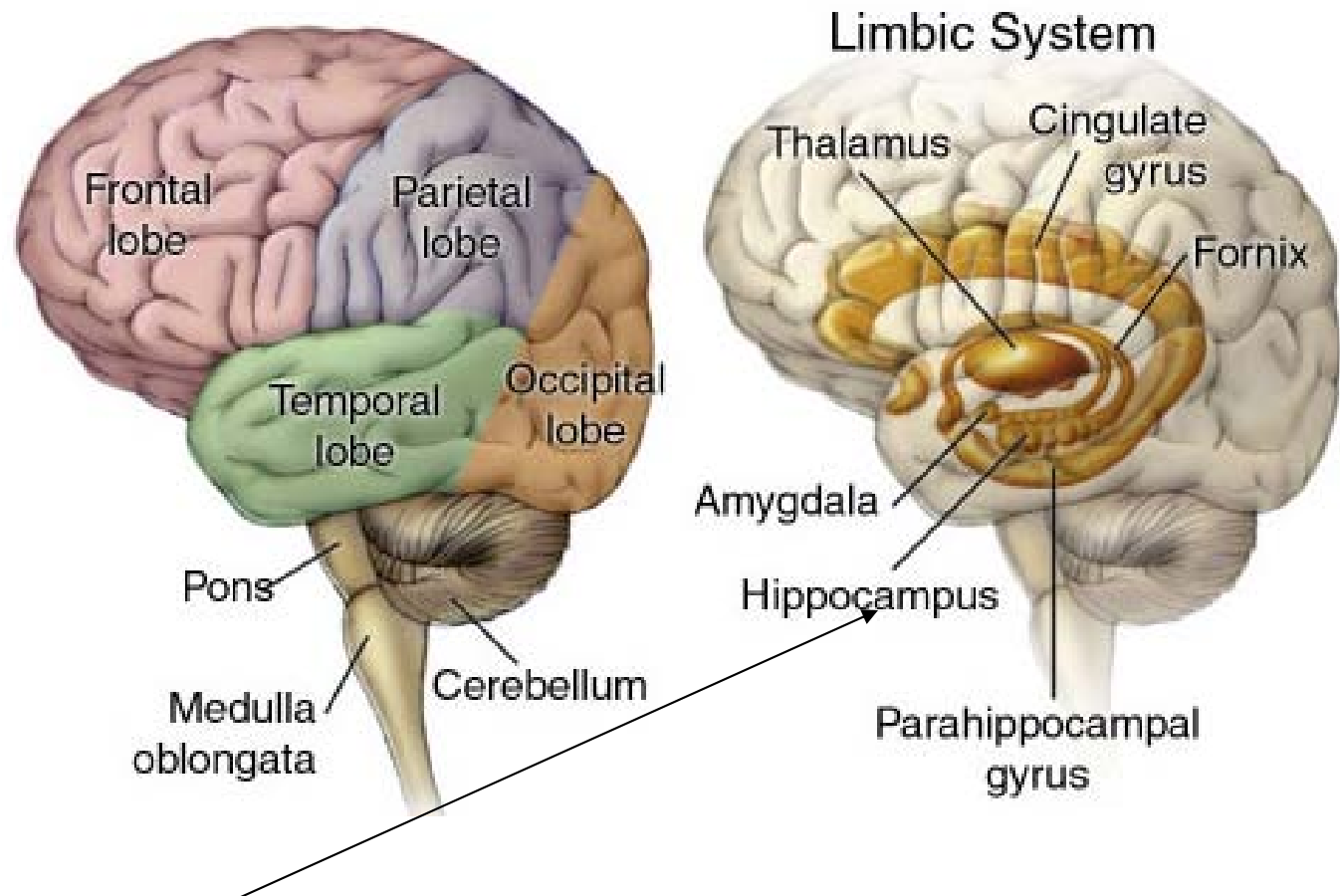
JOHN J. RATEY, MD
with **ERIC HAGERMAN**

“There’s sort of no question about it now,”
said **Dr. John J. Ratey**, a clinical
associate professor of psychiatry at
Harvard Medical School. “The exercise
itself doesn’t make you smarter, but it puts
the brain of the learners in the optimal
position for them to learn.”

<http://www.johnratey.com/site/default.aspx>



THE BRAIN – exercise and neuroscience



HIPPOCAMPUS - PRIMARY LEARNING AND MEMORY AREA



The Connection between the Hippocampus, Exercise, and BDNF

BDNF - Miracle-Gro for the Brain

BDNF – Brain-Derived Neurotrophic Factor – a Protein that makes brain cells grow and maintains the circuitry, both of which are required for learning.

Sprinkle BDNF on neurons in a petrie dish, and synapses of neurons grow larger branches and voltage increases.

1995 – UC Irvine “Institute for Brain Aging” studied exercise and BDNF in mice. Upon exercise, BDNF showed up in the hippocampus.

2007 – German researchers found that humans learn vocabulary 20% faster following exercise, and rate of learning correlated directly with BDNF levels



Naperville Community Unit School District 203
Naperville, Illinois



PE Department – “In our department, we create the brain cells, it’s up to the other teachers to fill them.”

- Per pupil spending is ½ of other top area school
- Revolutionary Fitness Program placed 19,000 student School District first in the world in science, 6th in math (TIMMSS)
- Sophomores – 3% overweight versus national average of 30%
- Literacy class incorporates exercise – “Learning Readiness PE”
- “Each school in the district looks like you are in state of the art health club”
- Choices – Climbing Walls, Video game based aerobic machines, Trifit assessment machine, square dancing, tap dancing,
- Graduation – 14 page health assessment – cholesterol, blood pressure, etc.



Naperville Community Unit School District 203
Naperville, Illinois



PE Choices

- Soccer
- Swimming
- Volleyball
- Basketball
- Badminton
- Dance concepts
- Gymnastics
- Square Dancing
- Bowling
- Kayaking
- Tennis
- Flag football
- Team handball
- Floor hockey
- Tap dance
- Aerobics
- Dance of the decades
- Wall climbing
- CPR training
- Ultimate frisbee



Unionville Sports

Philosophy and Facility for the Future

National Center for Education Statistics

<http://nces.ed.gov/pubs95/web/95741.asp>

Students who participate in extracurricular activities perform better academically, have better attendance rates, and have fewer discipline problems, than students who do not participate. As adults, they are more successful and contribute more to the community.

Therefore, a school district should provide an environment for extracurriculars that is consistent, safe, uncrowded, and meets generally accepted standards and expectations for current and prospective participants



SPORTS & PHYSICAL EDUCATION

Philosophy ↔ Facility

**Fit for Life
Better Students
Better Citizens**



The Case for High School Activities

National Federation of State
High School Associations

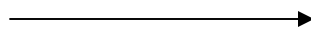


Students who participate in activity programs have

- higher GPA's
- better attendance
- lower drop-out rates
- fewer discipline problems

Co-curricular activities are inherently educational and provide valuable lessons

- Teamwork
- Sportsmanship
- winning
- losing
- hard work



Qualities
for responsible adults and productive
citizens

http://www.nfhs.org/web/2004/01/the_case_for_high_school_activities.aspx

Over 30 cases by academic and non-academic bodies that support co-curricular activities



The North Carolina* study

Three year, statewide study of academic performance of high school student athletes found significant differences between athletes and non-athletes in five criteria areas:

	<u>Athletes</u>	<u>Non-athletes</u>
GPA:	2.86	1.96
Average # absences	6.52 days	12.57 days
Discipline referrals	30.51%	40.29%
Drop-out rate	0.7%	8.98%
Graduation Rate	99.56%	94.66%

* North Carolina High School Athletic Association.

National Federation of State
High School Associations





Academic testing studies –SAT, ACT

- The American College Testing Service (ACT) compared the value of four factors in predicting success after high school..... The one yardstick that could be used to predict later success in life was achievement in school activities. Not as useful as predictors were high grades in high school, high grades in college or high ACT scores.
- The College Entrance Examination Board's Scholastic Aptitude Test (SAT) was examined in much the same way. It was found that having a high SAT score did not necessarily indicate success in a chosen career. The best predictor of later success, the study showed, was a person's independent, self-sustained ventures. Teens who were active in school activities, had hobbies or jobs, were found to be most likely to succeed at their chosen profession and make creative contributions to their community.



Nemours | Health & Prevention Services



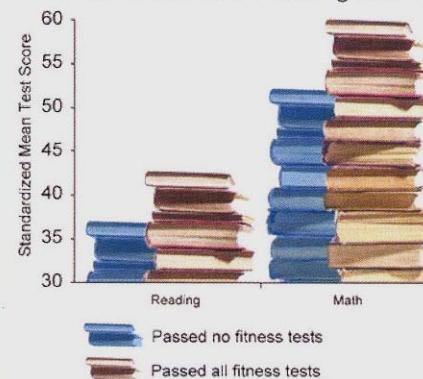
- *Childhood Obesity Prevention & Type II Diabetes*
- *Emotional & Behavioral Health*
- *65% of adults are obese, 10% have Type II diabetes*

Students who are more physically active tend to have better grades and achieve higher test scores.

According to a 2007 report from The California Endowment, focused on the importance of physical education in schools, students with higher fitness scores had better SAT scores for reading and math.

The value of physical activity was not lost on California school administrators who believe that "high quality physical education" can enhance concentration (69%), decrease discipline problems (63%), and improve academic performance (63%) (San Diego University, 2007).

Students with Higher Fitness Scores Have Better Scores for Reading and Math



Note. From Physical Education Matters. Activity Matters For California Kids Policy Brief, p. 2. Copyright 2007 by The California Endowment. Adapted with permission.



- Epidemic of overweight children in California continues to grow.
- Most serious public health problems facing California today:
 - unhealthy diets
 - low levels of physical activity among our children.
- Unless forcefully addressed, Californians will face skyrocketing rates of preventable chronic diseases and rapidly escalating costs of medical care, workers' compensation, and lost productivity
- Percentage of overweight children in grades 5, 7, and 9 increased 6% over three years (28.1 per 100 children)
- In 65% of California counties, at least one in four children was overweight.



Congress Awards 75.7M in PEP Grants for 2008

Carol M. White Physical Education Program

AHA – 20% of children are overweight

- Addresses Epidemic of Childhood Obesity
- Since 2001, \$500M awarded in 1000+grants

PROGRAM DESCRIPTION

This program provides grants to initiate, expand, and improve physical education programs for K–12 students in order to help them make progress toward meeting state standards for physical education.

TYPES OF PROJECTS

Funds may be used to provide equipment and support to enable students to participate actively in physical education activities. Funds also may support staff and teacher training and education.



CONESTOGA HIGH SCHOOL

200 Irish Road
Berwyn, PA 19312
610-240-1000 FAX: 610-240-1055



11/07 - The Best High Schools of 18,790 in 40 states

...a great high school must serve all its students well, not just those who are bound for college, and that it must be able to produce measurable academic outcomes that show the school is successfully educating its student body across a range of performance indicators, including a break down of economic groups and ethnic groups

**Conestoga
was ranked**

79

In country!

Conestoga - STRONG IN SPORTS –

- Highest athletic participation rate
- Substantial athletic budget (3x Unionville)
- Club & Intramural Sports

Top Schools
in PA

Conestoga - #79
→ **Central Bucks E.**
Wyomissing
Central

Bristol
Lower Merion
Girls
Carver

Harrilton
Radnor
Masterman