Play and Learning: What Do We Really Know?

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In order to succeed in life, God provided man with two means, education and physical activity. Not separately, one for the soul and the other for the body, but for the two together. With these two means, man can attain perfection. Plato
What is the Difference?

Physical activity is:
- A behavior
- A voluntary movement of any type
- Unstructured

Physical education is:
- A curricular area that teaches about PA
- Teaching skills to participate lifetime activities
- Specific, structured, and progressive
Recommended vs. Reality

  - Elementary School: 150 min/week
  - Middle school & High School: 225 min/week

- Daily PE in only:
  - 4% of elementary schools
  - 8% of middle schools
  - 2% percent of high schools
The doctor said he needed more activity. So I hide his T.V. remote three times a week.
Who are the Presidents?
Movement Based Activity
Movement, Activity and Brain Adaptation

Neurobiology of learning
Brain of a Female Middle School Child

- Soap Opera Center
- The “Ohmigod!” Area
- The homework particle
- Sense of direction neuron
- Attention span
- Indecision nucleus
- The independence neuron
- Jealousy center
- Listening center
- Shopping Area
- Telephone skills
- The “He’s so hot!” Gland

Footnote: The “You can tell me; I won’t tell anyone else!” Gland was too large to put on this diagram because it obscures everything else.
Brain of a Male Middle School Child

- The “I didn’t do it” cell
- Toilet Aiming Cell
- Room cleaning area
- TV and remote control addiction center
- The “But I was only” cell
- The homework particle
- Listening particle
- Attention span
- Lame excuses gland
- Hormone Center
- Hormone Center Powerpak
- Sports
Exercise Impact on Brain

- Triggers release of BDNF, brain-derived neurotrophic factor, which boosts cognition by helping neurons' communicate with one another. (Kesslak et al, 1998)

- Can enhance social skills, emotional intelligence, and conflict resolution ability.

- May increase catecholamines (brain chemicals like norepinephrine and dopamine), which typically serve to energize and elevate mood (Chaouloff, 1989).
Brain Imaging Provides Insights

- Functional magnetic resonance imaging (fMRI)
  - Support for parallel roles of cognitive structures and movement structures such as the cerebellum.
  - Learn to predict (think about) our movements before we execute them (move)
    - Enhanced control

- Hypothesis: motor activity is preceded by quick thought processes that set goals, analyze variables, predict outcomes, and execute movements.
  - (Flanagan, Vetter, Johansson, & Wolpert, 2003)
Effects of PA on Learning

“Exercise itself doesn't make us smarter. Instead, exercise makes us more able to learn and focus and optimizes the brain for learning.”

John Ratey, author of: Spark: The Revolutionary New Science of Exercise and the Brain
Current Research

California Study
• Comparing academic & fitness scores of students grades 5, 7 & 9

North Carolina Study
• Effects of a Classroom-Based Program on PA

SPARK Study
• Effects of PE program on PA and Fitness in elementary students
North Carolina Study

Program was effective for increasing daily in-school PA
• Intervention group took significantly more steps throughout the day

Improved on-task behavior during academic instruction
• Significant improvement especially in the students who were the least on-task

SPARK Study

Elementary schools randomized
1. SPARK PE instructed by classroom teachers
2. SPARK PE instructed by PE specialists
3. Controls – usual PE

Increasing PE from 32 to 98 or 109 min/week did not reduce academic performance

Every student at Madison Junior High completes a computer-based fitness test.

Students spend one day a week in the school's state-of-the-art fitness center.

A revolutionary PE program has transformed the student body by making them perhaps the fittest in the nation with Zero hour PE.

Among one entire sophomore class, only 3% were overweight, versus the national average of 30%.

In 1999, Naperville District 203 scored #1 in science and #6 in math on TIMSS (Trends in International Mathematics and Science Study)
Healthy Children are Better Learners

Children who are physically active may have:

- Improved attention span
- Improved attendance
- Improved behavior
- Increased concentration
- Reduced disruptive behaviors
All things being equal, a physically active child will have an **ADVANTAGE** in learning and an inactive child is at a **DISADVANTAGE** for learning. (Hesslow)
Punctuation Station
Group Activity
Integrating Activity into Academics

"We’ve had a hard time keeping physical education in our curriculum."
School-based Interventions

- Brain Gym
- Active Based Learning

PawPALS & Academics
- Brain Gym
- Active Based Learning Program
- Brain Breaks