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An examination of physical activity on academic achievement in elementary school children

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AN EXAMINATION OF PHYSICAL ACTIVITY ON ACADEMIC ACHIEVEMENT IN ELEMENTARY SCHOOL CHILDREN

A Project

Presented to the

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ABSTRACT

The purpose of this project is to substantiate the need of a curriculum for primary grade students that connect physical activity and state standards assignments and to evaluate a curriculum designed for third grade students that will focus on intertwining physical movement and daily assignments. There is a strong emphasis on academics in elementary schools, while physical education is regulated to a "time out" from academics. More schools are eliminating physical activity from the curriculum to increase scores on tests. Teachers should realize that physical activity is integral to learning and is vital in student success in academics as research shows the connection between physical activity and how it affects academic achievement. The first part of this project looks at what current research says about physical education and how it is connected to academic achievement in elementary school age children. The second part of this project is a curriculum unit consisting of a variety of lessons for third grade classrooms using physical activity in alignment with the state curriculum.

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CHAPTER ONE

LOGICAL REASONS FOR A STUDY

Introduction

Teachers today are faced with the growing concern over student achievement and state test scores. Teachers focus on increasing student engagement in the lessons and decreasing inattention and negative social behaviors. In her research, Vail (2006), stated that education together with action is what is necessary for learning. She also adds that in doing physical exercises, students are able to deepen their concentration and focus more attentively. This deepened concentration, she attributes directly to physical activity. A logical conclusion from this indicates that physical activity could increase motivation and investment in school. When students are participating in activities, they want to succeed; to do well (Vail, 2006). Students who participate in exercise and sports are invested not only in their academics but in school life itself (Vail, 2006). It is a means of belonging and doing well at something.

It is not a coincidence that students who are more physically fit seem to get better grades than those who are not as fit. Harris (2008) explains the relationship

between physical activity and academic achievement when he said regular exercise constructs significant health benefits. In a study done by Trudeau and Shepard (2008) it was found that students who are active in a sports program are more physically fit than those students who are not participants in sports programs. He also found in his research that not only does academic achievement increase with exercise, but so does memory and concentration. Therefore, exercise is indirectly related to better academic achievement. While teachers in the United States place a high value on academic achievement, they should also value physical activity and good health.

Currently physical education standards are not part of the core curriculum embedded in the No Child Left Behind program (NCLB; Cook, 2005). While it does appear to have many benefits, the state does not recognize physical activity as a help in gaining academic achievement. It appears that time spent away from learning important things, such as Math and Language Arts, is time wasted. There are physical education standards, though, and they are defined in the Physical Education Model Content Standards K-12 (California Department of Education, 2006). There are five highlight standards in physical education in grades K-8. These include demonstrating motor skills,

demonstrating knowledge of movement concepts, assessing and maintaining a certain degree of physical fitness, demonstrating knowledge of physical fitness concepts to improve health, and finally demonstrating and utilizing psychological and sociological concepts that apply to the performance of physical activity (California Department of Education, 2006). In elementary school, physical education standards place an emphasis on the way students move through space, in time, and in various environments, while manipulating objects and themselves in relation to other students (California Department of Education, 2006).

There are many benefits to integrating physical activity into the curriculum. Blaydes (2001) found that exercise affects many areas in the academic realm. Structured physical activity increases mental focus and concentration levels in young children (Blaydes, 2001). It also improves short-term memory, creativity, and reaction time (Blaydes, 2001). Exercise allows for specific changes in the body that aid in information retention and processing information. Not only does exercise allow the brain to organize itself for maximum learning, but it also aids in eye-hand coordination and balance (Blaydes, 2001).

Taras (2005) also agrees that physical activity increases cognitive abilities and because of an increase

of blood circulation through the brain, there is an increase in hormones that reduce stress levels. In his research, Taras (2005) found that when students participated in regular routines of balance, and rigorous, cardiac exercises, academic scores went up. Researchers have also studied what activities students enjoy participating in. This is vital when considering a curriculum that will incorporate daily routines in academia and exercise. Teachers could choose activities that allow children to move freely around their environment and that they look forward to participate in. Teachers could also incorporate activities that students enjoy, as well as activities that provide a means for further academic achievement.

According to Sherman, Collins, and Donnelly (2007), physical activity inside and outside of the classroom should be meaningful and fun. There are many ways for teachers to incorporate activities in the classroom that will not only make the students move around, but will also improve attention and make the lessons more meaningful to the students. Sherman, Collins, and Donnelly (2007) share some ideas that will help incorporate exercise inside the classroom. Students can take a break from the lesson, or these ideas will be used during transaction times.

Students will jog in place, jump with two feet, hop on one foot, and do jumping jacks. These exercises will increase the heart rate, increasing blood flow to the brain, which increases brain activity. Some outdoor activities students may participate in are skipping, galloping, trotting, and jogging. Team activities include relay team games; follow the leader, and juggling (which incorporates cross-lateral exercises). This research completed by Sherman, Collins, and Donnelly (2007) concludes that in getting children to participate in activities that they enjoy, students will be more actively participant, while developing skills for healthier bodies.

The intent of this project will be to develop a curriculum designed for third grade teachers and their students. This curriculum will entail California State standards for third grade from the core standards in No Child Left Behind (NCLB), as well as the California State physical education standards. Included in this project is a manual that teachers can use to implement lesson design to incorporate physical activity and required academic subjects. This project will augment current policies on fighting obesity in childhood due to the fact that they are not getting enough physical activity during the day. Lastly, this project will provide empirical support that

physical activity not only relates to academic achievement, but heightens it.

As previous research indicates, children who have exercise incorporated into the curriculum, during the school day, will perform better academically than students who are not involved in daily curricular-embedded exercise. This study will address student needs academically, culturally, and physically. This project will also incorporate third grade California State core standards with third grade California State physical education standards in a teacher guide book.

This project will include a curriculum designed for third grade teachers to integrate physical education into the classroom along with the core standards required. It will introduce a program of physical activity and academics combined during the school day. Unlike regular sports activities that take place after school hours, this program will be implemented in the classroom as part of the curriculum. It involves both exercise and learning as a means to achieve better academic outcomes. It is a unique curriculum as it is designed specifically for third grade students in the state of California. Its uniqueness comes from incorporating exercises inside the classroom;

into the regular curriculum, not just outside during recess or physical education classes.

CHAPTER TWO

REVIEW OF LITERATURE

This literature review will examine research on physical education from various child and educational aspects. The first section will focus on the current physical education curriculum that is being implemented today in the school systems. Then a closer look will be taken at how students in the United States are falling into patterns of unfitness and obesity and the problems that poses for educational purposes. Next, physical activity will be considered from a kinesthetic perspective. It will review research findings on how exercise influences academics and the connection between being active verses not being active and school achievement. Included will be some background information that will be presented as a means of linking physical activity and brain functions, which current research indicates leads to academic success. Specific focus will demonstrate what happens in the body, specifically in the brain, when the body is active. Then, physical activity will be examined as an educational tool for increasing academics. Finally, physical activity will be examined as a methodology for educators today in the classroom.

Physical Education Curriculum

Physical education not only allows students to exercise but contains a holistic approach to education. With proper physical education, "students gain confidence, independence, self-control, resilience and positive social skills", claims Board of Education president Glee Johnson, (California Department of Education, 2006). "In physical education class students also learn to assume leadership roles, develop skills in cooperation, accept responsibility for their own behaviors, and improve academic performance", says State Superintendent of Public Instruction, Jack O'Connell (California Department of Education, 2006). High quality physical education significantly contributes to students' well-being, good health, motor skills, and provides an opportunity for increased levels of physical fitness (California Department of Education, 2006).

The physical education curriculum standards for the state of California are comprised of different components. There are five highlighted standards for grades K-8. The first standard involves movement concepts. Students will learn body management, locomotor movements, manipulative skills, and rhythmic skills (California Department of Education, 2006). Activities that incorporate these skills

are chasing games, rolling forwards and backwards, jumping rope, catching, throwing, kicking, foot-dribbling and hitting, line dancing, and circle dancing. The second standard involves movement concepts as well. Students will learn manipulative skills, the difference between stationary versus a moving target, rthymic skills, and the vernacular to describe how speed and direction allows movement (California Department of Education, 2006). Activities that incorporate these skills are catching a ball at mid-line, above the head, and below the knees, describing rolling versus throwing, and defining terms used when line dancing or circle dancing. The third standard involves fitness concepts. Students will learn warm-up and cool-down exercises, aerobic capacity, muscular strength/endurance, flexibility, body composition and assessment (California Department of Education, 2006). Activities that incorporate these skills are lifting and carrying properly, 3-4 days of vigorous exercising using large muscle groups, pull-ups, sit-ups, lunges, climbing the vertical rope, stretch large muscle groups (hips, hamstrings, quadriceps, triceps, biceps, neck), measure and record improvement in physical activity. The fourth standard involves fitness concepts as well. Students will learn what physical health means, what happens to the body

when one exercises, aerobic capacity, muscular strength and endurance, flexibility, and body composition (California Department of Education, 2006). Activities that incorporate these skills are warming up and cooling down, discussing why drinking fluids is important, discussing the relation to heart, lung, muscle, blood and oxygen to physical activity, discussing which muscles do what activities, how a strong heart pumps more oxygen, which exercises are not safe for joints, and learning about the ability to consume calories if you are active versus inactive. The fifth standard involves self-responsibility. This standard consists of creating goals, social interactions, and group dynamics (California Department of Education, 2006). Activities that incorporate these skills are collecting data to meet a goal, discussing the positive and negative repercussions of following rules in game play, showing respect for teams during team play, and learning to work in groups and pairs to meet a goal.

Obesity in Middle Childhood

In a study completed by Pyle, Sharkey, Yetter, Felix, Furlong, and Poston in 2006, 31% of children 6-19 were at risk for obesity in 2002, and 16.5% were obese already.

Obesity is measured by body mass index (BMI) which estimates body fat by assessing a weight to height ratio. Children are at risk if their BMI is above the 85th percentile. If it is over the 95th percentile, they are classified as obese (Datar & Sturm, 2006). This growing epidemic seems to be more prevalent in girls than boys, and minority and low SES populations (Pyle et al., 2006). It also seems to be prevalent in children who are given fewer opportunities for productive activity and who spend more time after school watching television or doing other non-active things (O'Brien, Nader, Houts, Bradley, Friedman, Belsky, & Susman, 2007). Less than 25% of students get 30 or more minutes of physical activity a day (Satcher, 2005). The risks of children being obese carry over into the classroom as well. Obese children miss almost 4 times as much school as students with normal weight (Satcher, 2005). There is also a 70-80 % risk that overweight children will become obese adults.

There is a new wave of attention surrounding childhood obesity and fitness. Statistics from the Centers for Disease Control and Prevention (CDCP) show that more than 9 million children and teenagers age 6-19 are overweight and/or in danger of becoming obese (Cook, 2005). This number has tripled since 1980. The definition

of overweight, given in a study from Ohio that was conducted by Murnan, James, Telljohann, Dake, and Boardley (2006) is an imbalance between caloric intake and energy expenditure. In this study 95% of parents believed that health education should be provided in school for at least sixty-seven minutes per week. One hundred percent of the parents believed physical education should be provided for 109 minutes per week, yet only 46% of parents thought that vigorous exercise for 20 minutes a week would benefit children (Murnan et al., 2006). While 69% of parents thought it is very important to teach the benefits of healthy eating, only 43% want to control what their children eat (Murnan et al., 2006). According to the U.S. Department of Agriculture, and the U.S. Department of Health and Human Services, children should have 60 minutes of exercise daily (Cook, 2005). This will help to balance the caloric intake and energy expenditure and therefore lessen the amount of students who are becoming, or who are, obese.

There are many links to why children are becoming more obese. O'Brien et al. (2007) shows that there is a rise in fast food and soft drink consumption, and a decline in daily physical activity. There is an increase in the availability of video games and television, but a

decrease in closely monitoring what children are consuming at high levels. While these links to child obesity are prevalent, there are three main factors giving way to obesity. The first factor is the socio-cultural factor, which includes demographics such as income, education, ethnicity, family structure, and sex (O'Brien et al., 2007). The second factor includes the intra/inter personal factor, which is defined as one's home environment. The home environment involves the mental health of parents, and the quality of parenting a child is receiving. The third factor is environmental; having to do with where the child spends most of his/her time. Child care, levels of physical activity, how much television is watched, and safety in the neighborhood all have a role in linking children to obesity. Satcher (2005) believes that there are a variety of reasons for obesity. Blaming slim to no physical activity, fast food and vending machines are easily assessable, too much time is spent on video games, computers, and watching television, while schools are cutting back on recess time, physical education class time, and after school extra-curricular activities. Not only are schools suffering but health care facilities feel the burden of the rise in obesity in children as well.

Pyle et al. (2006) found that the state of California spends approximately $87 million - $77 billion of annual medical spending on obese-related patients. This includes both adults and children. That is 6% of the total health care costs in the whole United States (Pyle et al., 2006).

Obese children also need a lot of health care due to the many problems that come along with obesity. In the study done by Pyle et al. (2006) obesity was linked to many health hazards. Children with obesity are prone to hypertension, cardio vascular disease, gallbladder disease, orthopedic complications, polycystic ovary disease osteoarthritis, menstrual irregularities, infertility, sleep apnea, and hypoventilation. Hypoventilation means the child does not breathe sufficient oxygen when asleep or awake. Having obesity means high triglyceride levels and elevated blood pressure, along with atherosclerotic plaques and coronary injuries in patients as young as 10 years old (Del-Rio-Navarro, Velazquez-Monroy,Lara-Esqueda, Violante-Ortiz, Fanghanel, Perez-Sanchez, and Berber, 2008).

There are many physical and mental challenges that go along with child obesity as well. Datar and Sturm (2006) research indicates that obese children have lower self

esteem and poor body image. It is harder to concentrate and be attentive, and there is an increase in sick days from school. There are not only physical but social, emotional, academic and societal ramifications that go hand in hand with obesity. According to Pyle et al (2006), academically, children who struggle with obesity tend to have lower math scores and do poorer in reading in grades K-1. In the same study, Pyle et al. (2006) also found that along with obesity came depression, eating disorders, low self esteem, sadness, loneliness, and anxiety. Obesity also leads to more behavioral and emotional problems.

Taken together, the research shows that obesity in children negatively affects academic achievement as well as other social and emotional aspects of education.

Physical Activity

While theorists and educators alike agree that activity is important in educating children today, movement has to be defined clearly to set up parameters in the classroom. Activity cannot simply be lifting a pencil from a desk into a child's hand. It must entail actual elements so teachers can use movement to help students retain important information. Physical activity can be broken down into movement, physical fitness, or exercise.

Examining these levels will help educators find what will be most beneficial in their classroom with their students.

Movement is defined by Blaydes (2001) as navigating around the environment; not sitting still. In the classroom environment, this would include getting up to sharpen a pencil, pass out papers, walk to recess and get a backpack. Movement is limited to simply not sitting still. Therefore, students who are constantly needing to move, are prone to do better academically if they are allowed to move throughout the classroom on a regular basis (Vail, 2006). Research has shown that while movement is good, it has the least influence on academic achievement of the three types of activity. This movement does not effectively raise the heart rate, which would increase blood flow to muscles and the brain.

Regular activity is any voluntary, active movement done in class or outside of a classroom setting (Blaydes, 2001). This might include a math or spelling game where you have to move around the room. Regular activities are those activities that teachers allow students to do for a break, or free time. These activities, while not vigorous, allow the students to move freely about the room or area and get the blood flowing through the body and brain at a faster pace, increasing brain activity (Blaydes, 2001).

These activities also allow the students to be more involved in their own academics, taking charge in centers, group activities, and other kinesthetic means of learning.

Physical fitness can be defined in a variety of ways. Tomporowski, Davis, Miller, and Nagliere (2008) state that physical fitness or exercise can be fitness training, aerobic training, motor skills training, or just regular PE class. As long as the body is moving, the heart rate is increased, and the blood flow to the brain and body is increased, physical fitness is occurring. However, classroom physical fitness can simply involve various types of movement. Researchers have given a definition for physical fitness in the classroom. Vail (2006) states that physical activity is simply moving about the classroom and not being sedentary. For example, a teacher might have her students play a game to demonstrate the rotation of the moon around the earth, or to show a simple subtraction problem. This allows the students to move about the classroom, actively engaging them in learning.

While the aforementioned activities are beneficial to student success in the classroom, the most valuable type of activity is exercise, involving vigorous activities that increase the heart rate. Exercise has been defined as physical activity that accelerates the heart rate or gets

the heart rate in the target zone (Blaydes, 2001). This would include playing soccer, basketball, jogging, and tag. This would usually occur during recess, free time, or a Physical Education class period. Exercise brings the body to a "homeostatic state", which brings about a balance of brain chemicals, hormones, electricity, and system functions (Blaydes, 2001). In another study (Hillman, Castelli, & Buck, 2005) research showed that students, who were already physically fit, academically outperformed the students who were not already fit.

Exercise Influences Brain Activity

Researchers believe that due to physical activity, many changes in the brain take place, enabling students to achieve better in school. Researchers, Tremarche, Robinson, and Graham (2007), have shown through research that when students are engaged in physical activity on a daily basis the brain activity in increased during that time. This increase in brain activity occurs after exercise and lasts for up to an hour after. Jensen (2005) has shown that with exercise the brain regulates cortisol, allowing the students to feel less stress and making them more able to do higher order thinking. This happens during exercise and lasts for up to an hour after as well.

Whether researchers show that the increased brain activity occurs during exercise or after, for my purposes the link is vital regardless of when it happens. There is some kind of positive effect that helps students.

The important link between physical activity and brain function is the improvement in student academic achievement after exercising on a regular basis. According to researchers Trudeau and Shepard (2008), physical activity is positively associated with better cognitive functioning in children. Chomitz et al., (2008) also demonstrates that exercise and fitness improve cognitive functioning. Taras (2005) shows in his research that there is a positive relationship between physical activity and academic achievement. When students do exercise a definite and positive reaction occurs in the brain (increase in brain activity and blood flow to the body) which influences mental capacities. This relationship is vital in understanding the connection between exercise and higher academic achievement in students.

When the body is active, within certain parameters, the brain is at a higher arousal state, which leads to increased attention span, higher levels of concentration, and reduction in boredom (Coé, Pivarnik, Womack, Reeves, & Malina, 2006). These parameters include exercising to

elevate the heart rate and increase blood flow throughout the body at a faster rate than normal. When bodies are healthy and are in the habit of exercising, the body is in a homeostatic state. This means the body is balancing oxygen, brain chemicals, hormones, electricity, and system functions (Blaydes, 2001). After exercising, the body can stay in an aroused state (appropriate for the retention and retrieval from memory) from thirty to sixty minutes, depending on the student. By default, it could be claimed that students do not participate regularly in exercise; their bodies are not in a good learning state due to the lack of equilibrium of all the elements in the body.

Researchers have found that physical activity affects the whole brain in a positive way. Studies done by Hillman et al. (2005) also found similar findings, that with physical activities; students had an increase in attention focusing, working memory, and response speed. Physical activity also enhances brain function and cognition and has shown physiological benefits. Physically fit students showed faster neurocognitive processing and developed a greater portion of attention and working memory (Hillman et al., 2005). Other research shows that physical activity stimulates neural development which increases neural synapses and produces higher capillary volumes in the

blood (Chomitz, Slining, McGowan, Mitchell, Dawson, & Hackerk, 2008). Just like a car needs gas, the brain needs nutrient-rich blood. Exercise provides more oxygen-rich blood to the brain at greater rates. At normal resting state, 90% of oxygen in the brain is stale until deep breathing occurs through exercise (Blaydes, 2001). Blaydes further explains that normally, humans exchange 10% of his normal oxygen during a breath. This means that 90% of the blood is "stale" or lacking oxygen, until we deep breathe or exercise (which causes deep breathing). This lack of oxygen-rich blood leads to confusion, fatigue, sluggish behaviors, and a decrease in concentration and memory problems (Blaydes, 2001). This happens with students sit still for long periods of time without moving around in their environment.

Researchers have also found that exercise affects the whole brain in positive ways. Physical activity improves circulation, increases blood flow to the brain, and increases levels of norepinephrine and endorphins, which reduce stress (Taras, 2005). Researchers have found that students who exercise regularly have faster cognitive responses, have quicker reaction times, and have increased speed in processing information, memory span and problem solving (Blaydes, 2001). Also with exercise, a greater

number of neurotransmitters and endorphins are released and neural networks are developed. Due to exercise, the students learn because of movement repatterning. This repatterning can be defined as students learning to move in new ways, which helps them access parts of the brain that were previously unavailable to them (Tremarche et al., 2007). According to Blaydes (2001), physical activity puts the body in prime condition for learning. She also shows that physical activity affects motor fitness, mental focus, and concentration levels. Exercise strengthens areas in the brain such as the basal ganglia, the cerebellum, and the corpus callosum. Exercise affects the frontal lobe (the brain area that controls mental concentration, planning and decision making), short-term memory, creativity, and reaction time. Exercise also promotes brain cell regeneration and growth.

Physical activity affects the brain in a variety of ways. Researchers have been studying the brain to provide an understanding of children's brain development and the relation of specific brain regions to performance on cognitive tasks (Tomporowski et al., 2008). Developmentally speaking, there is a dramatic increase in gray matter volume in infancy and early childhood, which is followed between age 7 and young adulthood by decreases

in gray matter in the frontal cortex and an increase of myelination and connectivity after the age of seven (Tomporowski et al., 2008). Plainly spoken, this means that from infancy to early childhood, gray matter (the center of the spinal cord and the thin outer layer of the cerebral hemispheres) grows. But upon middle childhood to adulthood, this gray matter decreases because the white matter (myelin sheathing that covers the axons of the same neurons to enable them to conduct nerve impulses more rapidly) increases. This leads to circuits in the frontal lobe becoming more specialized with continued development (Tomporowski et al., 2008). This increase of myelination of axons enhances a child's processing speed. This refining of the frontal cortex improves the speed of processing, working memory, response control, and strategy utilization.

Physical activity not only influences the frontal part of the brain but other parts as well. Exercise also affects the hippocampus. The hippocampus is the part of the brain that controls memory and learning. Studies have also found that exercise stimulates the hippocampus in three different ways (Trudeau & Shepard, 2008). Exercise increases the formation of new neurons right after exercising. It also aids in superior neuronal transmission

and creates a "favorable environment" for long-term potentiation (LTP). LTP is the enhancement of nervous influx following the first series of stimuli. LTP leads to an increase of synaptic efficacy following an increase of synaptic transfer (Trudeau & Shepard, 2008). Exercise helps the hippocampus form larger concentrations of neuroprotective factors like brain derived neurotrophic factor (BDNF) and growth factors like insulin-like growth factor, which regulates neural development. The release of BDNF enables one neuron to communicate with another (Blaydes, 2001). When students sit too long (longer than 20 minutes), they have a decreased level of BDNF, which leads to slower transmissions in the brain.

Another part of the brain that is affected by exercise is the cerebellum. Exercises that include tracking, the use of manipulatives, and navigation give support to the vestibular system and the cerebellum. These two parts of the brain work with the reticular activation system (RAS), which is critical in developing and keeping levels of attention span (Blaydes, 2001). These types of exercises also help turn thinking into action and coordinate movement. Actions that include balancing and tracking also influence brain activity. For example, many children today enjoy watching television or playing video

games, wherein staring at the television screen allows the eyes to be locked in distant vision for long periods of time. This allows the eye muscles to atrophy (Blaydes, 2001). Basically, if a child is involved in activities that entail movement, children's eyes will not get "lazy" from staring at a screen. While this is just one of the dysfunctions that occur due to inactivity, there are other dysfunctions that physical activity can improve in respect to academic achievement.

Different types of exercise affect the brain as well. Cross lateral exercises (exercises that involve arms and legs crossing the midline) better integrate the two brain hemispheres and enable the brain to organize itself properly (Blaydes, 2001). In other words, the brain is in better shape to handle learning. Also through cross lateral exercises, the blood flows to all parts of the brain faster, making students more vigilant and energized for learning. This type of exercise also unifies the cognitive and motor regions of the brain and stimulates neurotrophins, which increase the number of synaptic connections, making faster switches in the brain. The activities children do in physical education integrate crossing the midline and involve coordination of body

systems. Daily quality physical education then becomes crucial for best possible learning (Blaydes, 2001).

Many studies have found that students who engage in physical activities during the school day do not have a decline in academic outcomes, even considering the fact that minutes are taken from curriculum and spent doing physical activities (Coe et al., 2006; Taras, 2005; Trudeau et al., 2008; Chomitz et al., 2008; Tremarche, Robinson & Graham, 2007). Therefore, based on current research, physical activities during the school day improve students' overall health, attitude, energy level, motivation, attention, and academic achievement.

Academic Achievement and Exercise

Research has shown that there is a positive relationship between physical activity and academic achievement. In 2002, the California Department of Education did a study on the association between academic achievement and fitness in 9th graders. They found a positive correlation between aerobic fitness and academic achievement (Hillman, Castelli, & Bucks, 2005). Additional research indicates that daily, quality physical activity impacts performance and elevates test scores (Blaydes, 2001). Students, who are involved in sports in school or

out of school, tend to have generally higher grades than those who are more sedentary. In a study of three groups of students conducted by Blaydes (2001), the group that engaged in vigorous aerobic exercise improved short-term memory, creativity, and reaction time. In another study, academic scores went up when physical education time was increased to one-third of the school day (Blaydes, 2001). Mental focus and concentration levels in young children improve significantly after engaging in structured physical activity. As exercise leads to increased arousal levels, this leads to increased attention span and concentration, and a decrease in boredom in the classroom, which in turn, leads to higher academic scores. Exercises that elevate the heart rate, such as running, jumping, and aerobic game playing have a definite impact on children's frontal lobe primary brain area for mental concentration, planning, and decision-making (Blaydes, 2001). Aerobic conditioning seems to assist in memory as well.

Taras, (2005), found that exercise over a long period of time led to fitness gains as well as increased cognitive abilities. In a study completed by Vail, (2006), it was found that students who participate in physical activities have higher levels of concentration and focus, as well as have lower levels of stress, anxiety, and

depression, which are factors that affect school performance. Trudeau and Shepard (2008) showed that not only did physical activity during the school day reduce disruptive behaviors, but it also improved memory, concentration, and behavior. In a study completed by Coe et al. (2006) students who participated in vigorous physical activities during the school day got higher grades than students who did the regular allotted time for Physical Education. They also found that having a decrease in instruction time due to an increase in physical activity did not decrease test scores. In fact, participating in physical activity increased what other researchers have found as well, attention span, concentration, and arousal. Chomitz et al. (2008) found that as well as attention, there was also an increase in favorable interactions between the learning environment and cognitive development with students who participated in physical activities. Other researchers such as Tomporowski et al. (2008) have found similar results in students who are involved in physical activity during the day. While exercise showed to have no effect on intelligence, exercise positively affected perceptual skills, math tests, verbal tests, response time, creativity, and accuracy.

Other researchers agree that physical activity leads to academic achievement. It is important to consider the following research because of its population size and variety of students and other variables. This study showed that with consistent physical activity students of all ethnicities, SES levels, academic levels, and attitudes toward learning, academic achievement increased. The major focus of this study was the variety of students, yet all took the same physical fitness tests, all took the same academic achievement tests. The correlation shows that all students improved academically.

Grissom argued that there is a consistent positive relationship between overall fitness and academic achievement (2005). This study was completed in 2002 with over 888,000 students. It was completed in the California public school system and it compared reading and math scores to scores on the Fitnessgram test. This fitness test entails five different tests: aerobic capacity, body composition, trunk strength, upper body strength, and flexibility. The results of this study show that as fitness scores increased, so did academic achievement scores. Along with other researchers, Grissom agrees that healthy bodies lead to healthy minds. He also states that

mental and physical processes are mutually dependent on each other (Grissom, 2005).

One interesting finding from the Grissom study showed that academic scores were higher in females than males, and that SES impacted academic scores (2005). The higher SES, the higher the likelihood of exercise; and this leads to higher outcomes of academic achievement.

Similarly, Martin and Chalmers (2007) did a study comparing the Iowa Tests of Basic Skills and the President's Challenge (fitness) Test. In this fitness test there are eleven separate tests, with five chosen for the students to participate in. These exercises include curl ups, run/walk, v-sit reach, shuttle run, and pull ups or flex arm hang tests. The Iowa Test is a norm referenced standardized achievement test. Overall, Martin and Chalmers (2007) found a direct relation between physical fitness and academic achievement, albeit it weak. It seems that research has shown that students achieve best when they are physically fit.

Academics and Exercise for Special Needs Students

Teachers teach all students. This includes students ranging from what tests show as high achieving to underachieving. This section will focus on students with

special needs. While many special needs students are placed in special education classrooms, some are placed in regular classrooms where teachers are expected to incorporate regular lesson planning and testing. Teachers consider many factors when looking at student achievement and student need. Researchers show that even students with special needs benefit from exercising regularly (Blythe, 2005).

Researchers have found that neurological dysfunction was a significant factor underlying academic achievement. In looking at children with special needs, it has been found that daily physical activity improves body functions (Blythe, 2005). Blythe looked specifically at special needs children and found that three primitive reflexes were retained due to pathology. These reflexes are asymmetrical tonic neck reflex (ATNR), symmetrical tonic neck reflex (STNR), and tonic labyrinthine reflex (TLR). All of these reflexes are connected to the functioning of the vestibular system (made up of the spine, ocular and cerebellar systems). The ATNR controls hand-eye coordination, tracking while reading and hand control while writing. The STNR controls coordination of the upper and lower body together, postural control, attention, the speed of refocusing between different visual distances,

and copying. The TLR controls vestibular and proprioceptive functioning (head righting reflexes), eye movements, and posture. In doing daily physical activities, these special needs children improved in all of these reflex areas (Blythe, 2005). All of the exercise moves were based on prenatal movements (simple movements infants can do) and were changed every six weeks based on improvement.

Research showed that in working with students with reading difficulties, like Dyslexia, doing daily physical activity brought academic growth that was long-lasting in speed and fluency (Reynolds & Nicolson, 2007). These gains are due to cerebellar stimulation and vestibular system stimulation. Some exercises that are beneficial for these students are standing with eyes closed, standing on one foot while eyes are closed, and standing on a cushion with eyes closed. These exercises help develop the visual, vestibular, and somatosensory systems. In a study done on children with Dyslexia, researchers found that students who participated in physical activities had a decrease in inattention, and an increase in reading scores (Reynolds & Nicolson, 2007). The study also found an increase in postural strength, agility, phonological skill, and fluency. There was also a general improvement in

attention, concentration, motivation, self-esteem, and self-efficacy in the students. Reynolds & Nicolson (2007) found that long-term exercise had a positive effect on attention and reading skills in children with Dyslexia. Long term exercise is defined here as in relation to lifestyle; active, doing exercises for an extended period on a daily basis (Reynolds & Nicolson, 2007). Long-term exercise also affected cognitive performance in fluency and phonology. In another study done on students with Dyslexia, researchers Rack, Snowling, Hulme and Gibbs, (2007) found that exercise positively affected balance, working memory, and helped speed up simple tasks such as rapid naming and semantic fluency.

In another study done by Blythe (2005) who looked at students with special needs, research showed that students who participated in an exercise program daily, improved significantly on tests for balance and coordination, as well as showing small gains in reading. In children, primitive reflexes (postural reflexes) lead to automatic control of balance, posture, coordination, and eye movement. In students with special needs, these reflexes are retained (children do not progress after developing these sole reflexes) and therefore they have neurological dysfunction. This exercise program was intended to

stimulate and inhibit specific reflexes (Blythe, 2005). They tested different functions; balance and coordination, abnormal reflex activity, visual, and spatial. Along with the tests for functionality, they developed four different types of movements to practice daily. These movements (exercises) were based on the progression of the student and advanced about every six weeks. The results of this study showed a significantly positive decrease in retained reflexes as well as a highly significant improvement in balance and coordination. This study shows that with exercise, brain activity increases even in students who are functioning below normal levels.

For students who are functioning at below normal levels of physical activity, there are recommended exercises to increase heart rate, and incorporate cross-lateral exercises that will improve brain function. Sherman, Collins, and Donnelly (2007) recommend ideas for inside and outside the classroom to further develop these areas. Students may jog in place, jump with both feet together, hop on one foot, do criss-cross legs, and jumping jacks to increase heart rate inside the classroom. For outdoor activities students could skip, gallop, trot, jump, hop, and jog to increase heart rate and incorporate cross lateral exercises.

Taken together, these studies support that exercise positively affects the brain in all students with special needs; and enhances brain activity and academic achievement. Exercise also stimulates neurological connections, improves balance skills and reflexes, and enhances concentration levels in special needs students.

Social and Emotional Benefits of Exercise

Students who participate in regular exercise tend to have less negative distresses concerning the areas of self esteem and social behaviors inside and out of the classroom. Students participating in exercises have less health issues, are more cooperative, and less likely to create disruptions in the classroom (Tremblay, Inman, and Willms, 2000). Although very different, these elements tie into social behaviors in the school setting where students spend most of their time with peers and where academic achievement is stressed.

In looking at academic achievement, focus is placed on self esteem, health issues, and social behavior inside the classroom. Researchers Tremblay, Inman, and Willms (2000), did a study correlating physical activity; self esteem and academic achievement. It was found that participation in physical activities improves health;

strengthens cardio function, reduces risk of diabetes, hypertension, and hyperlipidemia (high levels of lipids in the blood stream), and positively influences choices about nutrition and drug addiction. As reviewed earlier in this paper, when children do not exercise, they are at a greater risk for cardiovascular disease, obesity, hypertension, and high blood cholesterol levels even at young ages. It is believed that these factors can lead to sedentary behaviors, which further increase the risk of lower self esteem due to obesity.

Self esteem is an underlying factor that determines student motivation, persistence and academic success. Physical activity levels are directly related to self esteem. The higher the levels of physical activity are, the higher the levels of self esteem will be. Studies also have shown that increased activity levels affect self esteem in a positive way, which also affects academic achievement (Coe et al., 2006). In an article written by Covino (2003) conducted by the California Department of Education, it was confirmed that "fit kids perform better academically". Students who get regular exercise tend to be healthier and make healthy choices. Therefore, when students are healthy physically, they also tend to be healthy mentally. This is a direct correlation to self

esteem. If students are mentally healthy they will have higher levels of self esteem (Coe et al., 2006). In a study completed by Blaydes (2001), students who participate in daily physical activity show superior academic performance and higher levels in attitude toward school. When students enjoy going to school and feel successful, their levels of self esteem are higher. When students are involved in physical activity, their brains are able to move out of a "survival mode" into a more focused mode. This focused mode allows students a deeper level of concentration, therefore allowing students to feel successful academically. When students feel successful their levels of self esteem are higher. In earlier research done by Taylor, Sallis, and Needle (1985) it was found that physical activity alleviates some symptoms of depression, and has beneficial effects on self image, social skills, and cognitive functioning.

In looking at emotional health, exercise has a positive effect on students who suffer from various emotional stressors. These emotional stressors can range from anger to mental disruptions. Overall, it was found that vigorous exercise was a preventative measure for many things, such as being less susceptible to other factors that might produce lowered self esteem and other mental

illnesses. Physical activity in children also reduces anxiety levels and lessens the appeal for alcoholism and substance abuse (Taylor et al., 1985). Also, students who are involved in daily physical activity show a reduction in levels of stress, situational phobias and panic attacks, and muscle tension. Finally, physical activity led to improved sense of well being, an increase in tolerance of frustration and a decrease in anger (Taylor et al., 1985).

Aside from self esteem and other emotional issues, classroom behavior is also an important factor in looking at academic achievement and physical activity. Behavior may be defined as the way one acts or controls one's self. In the classroom, this would look like students being on task, doing work, being actively engaged in the learning process; without major disruptions.

Blaydes (2001) shows that young children improve significantly in their school behavior after engaging in structured physical activities. Students who are physically active during the day tend to be more helpful in class, work together cooperatively, are less disruptive, and pay attention more (Vail, 2006).

Students who are active usually tend to be involved in extracurricular activities as well as sports, in and

out of school. Trudeau et al. (2008) found that with daily physical activities, students achieved better than students who did not participate, and had a stronger competence of learning. Students who participate in physical activities in school have an increased motivation to learn and a higher investment in school. Most extracurricular activities require students to maintain a certain grade point average (GPA) to remain in the activity. Students are more interested in completing assignments and studying for quizzes to maintain good grades. They invest more time and energy taking ownership for their academics. Students become more task orientated, and develop skills to problem solve and make decisions (Coe et al., 2006). They also have increased attention spans, and decreased behavior problems inside the classrooms.

In looking at studies of self esteem, emotional health, and social behavior in and outside of the classroom, the body of work supports research showing that exercise positively impacts social and emotional health of students. Students who regularly participate in exercise tend to be emotionally, socially, and behaviorally stable and focused.

Programs that Implement Exercise and Education

Schools have a major role in moving children away from obesity and toward healthy living. While fitness programs should be expanding, physical education is being forced to take a backseat because it does not have a place in the core curriculum in NCLB (Cook, 2005). In a study conducted by Brown, Akintobi, Pitt, Berends, McDermott, Agro, and Purcell, (2004) cafeterias sell non-healthy foods because children like it and will eat it, therefore, creating revenue for the school.

It is important for schools to play a role in influencing students' healthy lifestyle message through health education, physical education, nutrition services, health promotions for staff members, counseling services and community involvement (Brown et al., 2004). President Bush proposed the gradual elimination of the Carol M. White Physical Education Program (PEP), the only federal effort supporting development of physical education programs, his reasoning was to save money so children can learn academics (Cook, 2005). The fallacy of this assumption is that students need only core curriculum to be educated. Students have a more difficult time learning, though, if they are unhealthy.

Some districts are trying new things to try to curb unhealthy student choices. Some schools have changed vending machines by adding fruits and healthy sandwiches. Yet, the intake of unhealthy food from vending machines is not the sole culprit to child obesity. Cook, (2005) showed that from 1991-2003; the number of students taking physical education classes declined by 14%. Only 6-8 % of schools nationwide provide daily physical education for the whole year. When schools are not meeting state standards, the first thing to be cut is usually the physical education programs (Cook, 2005). While a 2002 study from the California Department of Education linked physical fitness to academic achievement, many programs have been cut due to NCLB (Cook, 2005). This statistic is highlighted in The National Association for Sport and Physical Education which recommends 150 minutes a week for elementary students and 220 minutes a week for high school students. Ironically only 78% of schools nationwide meet these criteria (Cook, 2005).

There are programs that are tying physical education, fitness, health, and academics together for more healthy lifestyles, especially for children who are obese. PATHWAYS, created in 2003, is a program through which children can change their diet, increase physical

activity, have family involvement and create a classroom curriculum about the importance of health for grades 3-5 (Pyle et al., 2006). The Be Smart Program, started in the UK in 2003, involves a lunchtime club where children can eat smart and play smart for 5-7 year olds (Pyle et al., 2006). The Eat Well & Keep Moving program, started in 1999, is a social marketing approach that infused behavioral goals with the curriculum for 4th and 5th grade students (Pyle et al., 2006). The Planet Health program, developed in 1999, is an interdisciplinary program that incorporates physical education and core areas. It gives education about cognitive and behavioral skills as a means of change and increase in physical activity and healthy eating. It was designed for 6th and 7th grade students (Pyle et al., 2006). In 2003 the New Moves Prevention Program focused on factors that affected health in high school females. Some of these factors included socio-environmental, personal and behavioral (Pyle et al., 2006). Satcher (2005) finds that with these programs and putting more time into physical education classes during the school day there will be an increase in test scores in math, increased concentration, and a general increase of academics in other subjects overall.

Physical Education

While physical education is vital in maintaining a healthy lifestyle for some students and advancing academic achievement, there are some drawbacks. With physical education being limited to once a week for 45 minutes students are not getting enough physical activity. Stevens, To, Stevenson, and Lochbaum (2008) found that having physical education only one or two times a week is not enough to make a significant difference in academic performance. They also found that having weekly physical education periods neither improves nor detracts from academic achievement (Stevens et al., 2008). In a study done by Ha, Johns, and Shiu (2003) one third of the students, from twenty-five different schools, would not choose physical education if it were an elective course. Students from this study felt that teachers did not know or cared very little about what was important to them in regards to physical education (Ha et al., 2003). The researchers concluded that these feelings consequently were a result of teachers and administrators failing to design a meaningful and positive experience through physical education (Ha et al., 2003). Clearly the implications are if students are allowed to choose the activity, it is more meaningful and motivational to them.

Another limitation in implementing physical education in schools lies in the professional development realm. Some teachers are not leaving the collegiate region equipped to properly instruct a physical education class. In a study done by Hill and Brodin, (2004) where they assessed physical education teachers from Washington State in their readiness to teach, many teachers felt ill-prepared to do a qualified job. In the Physical Education Teacher Education (PETE) program, a teacher must take classes in liberal arts, have a major in Physical Education, and have pedagogical knowledge (methods of teaching, curriculum, management, discipline and assessment), field experience, and a teaching internship under a master teacher (Hill & Brodin, 2004). The study found that some teachers were not well equipped to teach physical education. Due to their background, researchers speculated that the teachers were not adept at class management, assessing student performance, or adapting the curriculum to limited facilities and equipment (Hill & Brodin, 2004).

Since the 1980s there has been a push to teach more holistic health in university courses, in addition to physical education classes. But what is happening is that professors want to add first aid, safety, health issues,

healthy living, and wellness to the curriculum as a part of physical education, leaving less time for curriculum and traditional physical education (Hill & Brodin, 2004). Due to these additions, there is a 50% decrease in courses that address performance skills and teaching methods. Hill and Brodin (2004) also found in their Washington study that 40% of teachers received no instruction regarding how to integrate movement into other academic subject areas. Another 40% of teachers found discipline and management difficult, due to demographics, scheduling, budget cuts, and administrative support (Hill & Brodin, 2004).

Taken together, the physical education curriculum has been based on National Standards. In 2005, California adopted physical education standards to meet the needs of students in California. Education codes state that elementary students must receive a minimum of 200 minutes of physical education every ten days (California Department of Education, 2006). In most schools, specifically the school where I am conducting this research project, all 200 minutes of physical education are not met. Physical education teachers are stretched to the capacity of giving every grade level adequate PE time weekly. But according to the instructional minutes mandated that teachers follow by NCLB, PE time has to be

cut by 50 minutes. In order to meet NCLB standards, physical education has taken a cut in minutes to make the most of valuable curriculum minutes in the classroom.

The important thing about this information is that there are 50 minutes of physical education that students are not getting weekly that teachers should be providing. These mandated additional 50 minutes of physical activity will be the highlight of this project. Teachers will complete these additional 50 minutes of physical activity with their students during regular curriculum time. By doing so, teachers will use the activities and strategies provided during the physical activity time that are needed to complete the 200 hours mandated by the state of California. They will incorporate them inside or outside the classroom, during the core curriculum period minutes. This guide will give the students experiences that are familiar to them and teachers a reference when delivering standards based physical education. This project is different than others in that I will be utilizing some instructional time by focusing on physical education time (along with Math and Language Arts information-based games). In the long run, it will not appear that students are losing instructional time, but are gaining the knowledge through actions that stimulate the brain,

therefore making it easier to retain and gather information.

This curriculum guide is designed with teacher instructions. It tells the teacher what the activity is, what extra materials are needed, how long each activity should last, and ways to differentiate the game for various reasons. (Reasons for differentiation would be rainy days, special needs students, or students who need constant redirection from the teacher). The teacher will set aside 10 minutes in the morning and 10 minutes in the afternoon for each activity. This allows the students to have two activity times, while each set time is shorter; allowing for the teacher to utilize much valuable curriculum instruction time. Students remain standing at their desks or may gather in a circle to complete each activity. All activities include aerobic exercises that elevate the heart rate. All activities also include core curriculum standards for third grade students. During these activities students will not only exercise and have fun, but they will learn math skills, reading and spelling, geography, social studies, and science skills.

Choosing an appropriate time for each activity can vary from teacher to teacher and class to class. Teachers will choose a time when students feel "sluggish" to raise

their energy and attention levels. Teachers will also choose a time close to an examination to stimulate brain function and focus. A good time to perform an activity is during a class switch; for example when switching from reading comprehension to word work. There is no incorrect time to do physical activities in the classroom when the teacher is prepared and the students are eager to participate. Physical activity is an integral part of education and this curriculum guide is the way to help teachers implement this activity into regular class time.

Therefore, the purpose of this project was to test the utility of integrating 50 additional minutes of Physical Education in the 3rd grade classroom with academic subject matter such as Language Arts and Mathematics. This project will examine if the students' weight, height, and BMI change as a result of participation. Finally, this project will examine the student report, via survey, to determine the students' perception of how successful the intervention was as a means of socially validating the results.

Taken together, this study examined the relationship between academic test scores and physical fitness following a six-week classroom intervention. The academic test scores were expected to be related to the amount and

degree of physical fitness the students participated in during the six-week program study. It was also expected that when comparing academic test scores and physical fitness after a 6-week program, that students who participated in a rigorous physical fitness program would achieve higher on academic tests scores.

CHAPTER THREE

FINDINGS AND RESULTS

Method

The current study was conducted as part of this Master Project for students in elementary school. Students entered this study in April, 2010 and were tracked for six weeks. Testing began on Monday, April 12 and ended on May 21. Only third grade students were chosen for this project. Students were chosen from my classroom, as I am a third grade teacher at Rio Vista Elementary School in San Bernardino, California. Students were sent home with a permission slip written in the home language according to the student record file. Written permission from the student and parents were required to do this study. IRB approval was documented at the beginning of this project study. This project included a pretest, posttest, and physical activities to be performed during class time, not PE class. It also included an attitude survey and pre and post tests of student BMI.

Participants

The current study included 20 third grade (male = 9, female = 11) students from a Title I school on the West side of San Bernardino, California. The participants' age

ranged from 8-10 years, with a mean age of 9. Of the participants, 45% were male, and 55% were female. The participants were all of Hispanic and African American descent; 80% were Hispanic, and 20% were African American. Recruitment of the participants for the project was done through a letter sent home in the parents' native language. The letters included a brief statement of the goal of the project as well as a short summary of what the project entails. Participants were not compensated for their participation in the project. Participants were not endangered while completing any of the activities during this project study. Students voluntarily signed a third grade level consent form stating that they would participate in the program for six weeks.

Measures and Materials

Academic Achievement in Math and Language Arts.

Academic achievement was measured by pre and post tests given from a specific standardized question bank generated from the math and language arts book series Harcourt®. The program used was Exam View Test Generator from Harcourt. On the CD Exam View, there was a bank of standardized questions ranging from the first to fifth grade curriculum. All questions were chosen from the third grade question bank. Questions were also chosen from key

standards highlighted by the district that are emphasized on the California State Test. The questions measured a broad spectrum of skills the students have covered throughout the year. The pre and post tests were given at the end of the year to allow the students the opportunity to become familiar with the test format as well as to be proficient in the skills. Test questions were chosen in language arts and math to give variety to the project as some students do better in math or in language arts. In testing the students in both academic areas I am eliminating a bias as well as giving the students the opportunity to demonstrate proficiency in all academic subjects.

The pretest given to the students comes from the Exam View CD that coincides with the Harcourt math and language arts curriculum guide. All questions on both the math and language arts tests are multiple choice, numbered from 1-25. The math test will be divided up into 5 different skills the students have been taught since the beginning of third grade. These five skills include Number Sense, Algebra and Functions, Statistics, Data & Probability, Measurement and Geometry, and Word problems. The five skills covered in the language arts section are Reading Comprehension, Literary Analysis, Word Analysis, Word

Conventions, and Spelling. All students will be given a pretest in math, followed by a language arts pretest a day later. (Teachers may give the language arts test first, followed by the math test the next day). This pretest is to be treated like any other test- taken seriously with dividers up on desks so students will not copy each other's work. The pretest is for grading and percentage points only. Teachers are not to review the test in any manner or correct the tests with the students. It will be a "cold read" for the students. After the teacher has graded the tests the scores should be kept in a private and secure location.

Physical Activity Curriculum. This curriculum was designed to give teachers and students a break from curriculum instruction with a specific physical activity to take its place. Current physical education curriculum allows for students to participate in 200 minutes of PE weekly. Students are missing 50 minutes that PE teachers cannot make up. Classroom teachers can make up these missing 50 minutes of PE time while incorporating academics by using these physical activity curriculum games. These activities range in time from 10-20 minutes. Teachers can do one long activity a day or two shorter ones. It is recommended to take two breaks and do two

different activities daily to give students a variety in activity and also in academics. The activities consist of games incorporating physical fitness and academic skills.

The physical education curriculum stemmed from the Physical Education State Standards of California found in the California Department of Education (2006). The core subjects' curriculum stemmed from the State Standards of California. The project guide stemmed from the Elementary Physical Education Teacher's Supplementary Lesson Guide and ideas of my own. No activities in the project curriculum require any extra supplies; with the exception of a pack of UNO cards.

The activities consist of 16 games that the teacher will read aloud to the students and the students will participate in the exercises. Each activity consists of four main sections: name of the activity, teacher instructions, the activity itself, and a variation section where teachers can tweak the activity if they want to. The activities are designed to incorporate physical fitness and academic skills. Each activity has exercises designed to elevate the heart rate to above resting state. Teachers may want to create a poster to go with some activities. These can be basic posters that give simple directions when the activities involve a number-activity relationship

or a color-activity relationship. (For example if the students are to do jumping jacks when they get a blue card, this could go on a poster so the teacher does not have to write it on the board every time). Although the activities are designed with a purpose in mind (to elevate heart rate and increase blood flow through the body) they are fun activities that students will enjoy doing on a daily basis.

The posttest will be the exact same test as the pretest. It will be given with the exact degree of earnestness and fairness. Students will be seated with dividers on their desks so copying cannot occur. Two tests will be given on two different days; one language arts and the other math. Teachers will grade the post tests and record scores and averages. The posttest scores will be compared with the pretest scores to see if students made significant gains due to the 6 week project.

Another aspect of this project was the survey the students took at the beginning and end of the project. It was a thirteen question survey with questions about how students felt about certain aspects of school. Some questions included how the students felt about school in general, if they felt that they were "good" in math and language arts, if they liked exercising at school, and if

they felt that they would be successful later in life. All questions on the survey were rated on a scale of 1-3. One meaning "disagree", two meaning "in the middle", and three meaning "agree". Students took the survey at the same times as the pre and the post tests.

Procedures

The curriculum project entailed the core subject areas of study as well as physical education activities that the students completed daily. The Department of Education (2005) explains content standards to be designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level. These skills that students should acquire in third grade are Language Arts and Mathematics. While Science and Social Studies do play a vital role in education, Language Arts and Math are the main focus when speaking of "core subjects".

The exercises and activities were broken up onto subject areas; activities for Language Arts and Math. The core subject areas were broken up into units along with the exercises and activities that go along with them. The exercises that coincide with the core subjects were completed daily and during instructional time. The materials used in this project came from the Elementary

Physical Education Teacher's Supplementary Lessons and my own creations as well. The Elementary Physical Education Teacher's Supplementary Lessons were put together by the San Bernardino City Unified School District in 2009. Included in the manual is the philosophy statement, standards for K-6, a teacher guide for how to use the manual, unit correlations for PE curriculum, and energizers for the classroom. The Energizers were created by the Activity Promotion Laboratory from the College of Health and Human Performances based in East Carolina University. Other active partners in this manual are NCDPI and the internet site beactive.com. The ideas for the activities came from teachers from the past, games I created, and ideas from the Elementary Physical Education Teacher's Supplementary Lessons Manual.

Implementation. The project focused on one unit that lasted six weeks. The teacher incorporated the project with the curriculum throughout the day, on a daily basis for the unit. The students were engaged in academic Language Arts and Math content, while completing physical activities. The 50 minutes taken away from PE time were used during this time. In having students do 10-20 minutes of exercise daily, inside the classroom during instruction time, the 50 minutes of PE time that were lost outside

with the PE teacher, were gained back with the classroom teacher.

Using the Physical Activity Curriculum, the teacher implemented the activities one to two times a day, while the activities lasted for about ten to twenty minutes. Each activity has directions for the teacher to read aloud to the students. During each activity, the students stood behind their desks or gathered in a circle. The whole class participated in the activities, benefiting all students. The teacher called out directions and the students did the physical exercises, which elevated the heart rate and stimulated blood flow throughout the body at a faster rate. Depending on the activity, students were exercising for the whole 10 to 20 minutes or took a break periodically to review math facts, spelling words, vocabulary terms, science facts, and social studies skills. After each activity teachers allowed students to get a drink of water and allowed 1 to 2 minutes for a cool down. After implementing the activity the class resumed with standard core curricular education.

Results

The purpose of this project was to examine the outcomes of a 6-week physical education intervention,

within the third grade curriculum, on body mass, child attitude, and academic achievement. Pre and post intervention data was collected on body mass index, math, and language arts. To compare the pre and post test scores, analyses were conducted through a series of t-tests. Because we ran multiple correlated t-tests, we adopted a more stringent criterion for significance to decrease the probability that the differences were due to chance.

When examining the outcomes of student body mass index, there was a significant decrease from pre to post test ($t = 17.603$, $p < .001$). Sixty-five percent of the students who participated in the program, showed a decrease in body mass index after the six week span. Means and standard deviations can be found in Table 1.

Academic achievement results show that students enrolled in the six week exercise program improved significantly in both math and language arts scores. Specifically, math scores increased over six weeks, ($t = 12.823$, $p < .001$) while concurrently language arts scores also increased ($t = 26.652$, $p < .001$). Decreased class time did not have a negative effect on the students' test results (See Table 2).

Another aspect of this study involved a survey recording student beliefs about how they felt about academics, physical education, and their overall capabilities in school. Students' perceptions of feeling competent in academic areas increased throughout the six week exercise program. More students "agreed" rather than "disagreed" that they felt successful in academic areas, as well as in physical education. Most students expressed that not only did they enjoy academics along with physical education, but that they were good at all areas (math, language arts, and physical education). Percentage changes of the survey data are seen in Table 3.

CHAPTER FOUR

DISCUSSION

Summary

The results of this project demonstrated positive scholastic and physical gains for students who participated in the six week program. There was a clear positive change in lowering BMI for students participating in this six week exercise program. Despite the fact that the program lasted only six weeks, students were able to exercise daily, while involved in academic activities, which led to lowering BMI for a majority of students. Although a few students gained weight throughout the course of the program, others lost some weight; both factors in calculating BMI. For the students who did not drop in their BMI some negative factors are anecdotally noted; specifically childhood obesity combined with many absences from school.

Research clearly shows that teachers who focus on state's standard curriculum and physical exercise will develop higher levels of academic achievement in students. Teachers must combine both standard curriculum and physical education in the classroom to have the most efficient student achievement possible. Right now in the

United States, only 8% of elementary schools provide daily instruction in physical education (Hall, 2007). What is needed is the integration of curriculum and physical education, which is the combining of two or more subject areas to help students understand and learn through different modes (Hall, 2007). Instead of cutting physical education classes to concentrate on core subjects, teachers can integrate physical education with core curriculum to reinforce subject matter and allow for daily physical activity. The increase of physical activity, according to Hall (2007), will impact student performance and raise test scores, while improving classroom behaviors and academic performance. Blakemore (2003) concludes that integration allows reinforcement in subject matter while providing greater access to curriculum, thereby helping students in learning, and increasing much needed time in structured physical activity. According to Wolfe (2001), integrating core subjects and physical activity allows for multiple learning styles. The more muscles activated while learning new information, the stronger the engrained pieces of information will become. The more muscle movement while learning core subjects, the stronger and more concrete the learning will become (Wolfe, 2001).

Students are unique in learning styles. While there are multiple intelligences (ways students learn), teachers tend to use oral and written instruction as the major means of teaching all students. Many students develop skills better when using a more physical means of learning (kinesthetic). Physical activity allows teachers to teach using verbal stimulations, visual cues and kinesthetic movement. Jensen (2005) concludes that students process and retain information in different ways and demonstrate intellectual ability differently. Structured physical education increases physical activity, which increases blood flow and oxygen delivery to the blood, which increases mental functioning (Jensen, 2005). When students sit still for long periods of time, stress triggers the adrenal glands to produce cortisol. Now the brain is less capable of planning, judging, problem solving, and other higher order skills. When the body has exercise, this regulates the levels of cortisol, allowing students to function at their maximal potential (Jensen, 2005).

Time taken away from physical education for core subjects does not relate to higher test scores (Wilkins, Graham, Parker, Westfall, Fraser, & Tembo, 2003). Statistics show a positive relationship between physical education and higher test scores on standard tests. The

California Department of Education (2006) shows that students that met the minimum fitness levels in three or more areas, scored higher on math and reading on the California State Test (CST), where students who scored lower on the CST did not meet the fitness tests. If educators are looking for ways to increase student performance on tests, research shows that cutting physical education time to improve scores does not elevate achievement scores (Wilkins et al., 2003). A good way for students to improve on academic achievement is through incorporating physical activity and core subject areas in the classroom.

In order to implement a program that will utilize both academics and physical education, teachers must be willing to take a chance on making time for physical activity. The purpose of this project was to examine the relationship between physical education and academics. It was implemented based on the hypothesis that students who are physically active during the day, do better academically than students who are not. Furthermore, students who are not only active, but engage in vigorous activities daily perform better in both math and language arts. Not only do active students perform well on tests, but improvements in social skills, motor and balance

skills, and self esteem are made. Physical activity does promote better overall health, student concentration, and behavior in school. It also improves motivation and mental health. It has been found to be true that physically fit students tend to perform better academically, therefore it can only be inferred that physical fitness influences academic achievement.

As research shows consistent positive relationships between physical exercise and academic achievement, the purpose of this project was to evaluate whether incorporating physical activity into the curriculum at school will improve academic achievement in students. This project did provide information for teachers who are interested in incorporating exercise into the curriculum as results showed positive student outcomes for those who participated. The curriculum utilized numerous methods for teachers to have organized exercise programs for their students that will potentially enhance general health, which will lead to better focusing, attention, problem solving and work habits. Implementing physical exercises into the daily program will allow teachers to integrate movement into the lessons, giving students the opportunity to learn in a variety of ways (not limited to spatial, visual and auditory learning styles). Previous research

indicates in participating in these exercises, students will gain not only physical strength and health, but, potentially, a desire to achieve and have pride in their abilities. Students will also gain higher levels of self esteem, behavior in the classroom, and brain functioning. Above all, the preliminary results indicated that through the implementation of this curriculum, students had healthier bodies, a positive attitude toward school, and showed higher levels of academic achievement.

While instruction is placed at the forefront of education there are some changes coming to public schools. In fact current United States President Barak Obama has placed a 9-step plan into action to help provide high-quality education (http://www.barakobama.com). He believes that public school systems provide a path to global opportunities, high-quality employment, and a strong, local community. Among his 9-step plan, President Obama intends to reward teachers with high performing students, make science and math a national priority, close the achievement gap, and reform NCLB (http://www.barakobama.com). In changing NCLB, President Obama plans to improve assessments and improve the accountability system.

From this project a number of positive attributes were attributed to the curriculum change. Academically, there was a clear positive change in both math and language arts scores for students in the six week exercise program. It is plausible to speculate that these students were able to perform fun activities while learning core subject content, which made it more memorable when it came to test time. Students also were performing rigorous exercise activities throughout the day, which increased blood flow to the brain, allowing them to think more clearly. There was expected increase in test scores due to natural growth during the six week period. The teacher was also giving instruction daily on specific standards the students would be tested on.

There are a few reasons that students might have performed poorly on post tests. Anecdotal review of attendance records indicated that some students missed a lot of school over the last six week period due to illnesses, family conflicts, and reoccurring tardiness. This means they not only missed out on some of the six-week exercise program, but missed out on vital teacher instruction over the curriculum.

There was also a clear positive change in student attitude for students participating in this six week

exercise program. According to the student survey, the majority of students enjoyed the six-week exercise program. In the first survey, some students showed that they did not enjoy math, language arts, or even physical education. Some showed that they did not feel successful in school, nor would they be successful in life. After the six-week exercise program, the majority of students chose they "agreed" that they liked school, could perform well in both language arts and math, enjoyed physical education, and would be successful in school. This increase in student belief was due to many factors as well. Students enjoy school more when activities are involved. All activities incorporated learning while moving around in space. All activities were learning oriented, with no prize for any winner. It was the pure enjoyment of the activity that drove students to participate. Students would benefit from this program, especially if it were extended throughout the year.

While the majority of students did perform better on both language arts and math post tests, it seems that the whole class could benefit from an extended period of this program. A significant number of students decreased in their BMI due to this six-week program. Academically, students did perform better on the post test than the

pretest in both language arts and math. Decreased class time did not seem to factor negatively in student outcomes. Changes in BMI probably would not have occurred if daily physical exercise was not integrated in the classroom.

Conclusion

While research has shown that participating in exercise programs increases student academic outcomes, this project also concludes that students who participate in regular exercise programs, tend to decrease in body mass index, and increase in math and language arts scores. Various researchers have shown that students who are involved in physical activity throughout the day, or even in after school activities, tend to do better academically, and have a body mass index within normal limits. The data collected in this project supports the literature in finding that students who are exposed to a regular exercise program in school, tend to be successful academically.

A limitation to this project is that it is hard to prove that physical activity solely impacts academic achievement. Specific types of training may facilitate cognitive function more than others, while other exercises

focus on balance, cardiovascular strength, coordination, muscle strength or motor training. It may also influence the results depending on the age and development of the students. If a student turned a year older during the study, the BMI scores will decrease due to the calculation for each age group. Also, if a student looses or gains a significant amount of weight during this six week period, this will cause the BMI scores to increase or decrease.

Another limitation is that the measurement tests used were not standardized tests. Grades given from teacher made tests could be biased and subjective. Also there was no baseline for exercise or health given to the students before the project was set into place. There was also no analysis of the frequency and intensity of each individual physical activity required of the students. What might be a heavy cardiovascular exercise for one student might be very light compared to other students.

A minor limitation was the fact that this project study did not include a control group. With a control group, I would have compared the change in student outcomes after the six week program. Yet another limitation is the population of students in the study. The class consists of only 20 students from a Title I school site, and SES plays a major role in students getting

outside and participating in physical activities. Students who are in a low SES bracket have a disadvantage in getting outside due to an increase in violence in their neighborhoods. While students in a higher SES bracket might be involved in after school sports activities, this would increase their baseline health and their ability to do harder exercises.

Attendance played yet another role in limitations for this study. Many students were recorded absent throughout many days of the six week exercise program. Some students were regularly tardy, missing from one to three hours of school on a daily basis. A few students missed some activities due to parents pulling them from class early, due to various reasons. Each tardy, early dismissal or absence affected the outcome of the student outcomes for the program study.

The environment for this project was contained to one third grade room at the elementary school. The room was spacious with desks and chairs for every student. While every testing situation was the same, participants often came to school with variables that possibly interfered with perfect testing situations. For example, some students ate breakfast and some did not on a daily basis. Some participants were easily affected by distractions and

negative emotions. A few students had difficulty paying attention for extended periods of time, while other participants did not. Intelligence levels were different in addition to the fact that multiple choice questions might not be the easiest form of test taking for all students. Physical variables included different height and weight of all students. Yet another variable included the natural abilities and talents in either math or language arts skills. These are all variables that influenced the pre and post tests on a daily basis during this project. A child survey was given to all students who participated to study student enthusiasm, choice of which subject (math or language arts) they most enjoyed, and favorite activities.

This project allows for future study in many ways. It would benefit researchers to perform this study over a year period instead of just six weeks. This study would profit also from research over a longer continuum in tracking the same students from perhaps early elementary through upper elementary (2^{nd} grade through 5^{th} grade). Future research should determine if grade levels differ to see if this exercise program works for junior high and high school students as well as elementary students. Another aspect of researching junior high and high school students would be to study if certain subjects are

increased due to continuous exercise. For example further study could focus on if academic achievement is elevated in science classes versus math or literature classes. Researchers could also test if results would remain the same if the students were tested in other school systems with different demographics. Schools with different socioeconomic status might have different results than this one. Yet another aspect of future research is to look at cultural relevance in academics. Studies can include looking at Anglo-Americans, Hispanic-Americans, African-Americans, Asian-Americans, and other groups, and does each cultural group tend to do better academically due to an exercise program? There is much need for future research in this area of study, especially when schools are being scrutinized for test scores, and teachers can use projects like this to help raise academic achievement.

APPENDIX A

STUDENT SURVEY

Student Attitude Survey Student ID:_____

How I Feel About School and PE

Circle the number that best explains how you feel.

1= I Disagree. 2= I'm in the Middle. 3=I Agree.

I enjoy going to school.	1	2	3
I like going to PE class.	1	2	3
I am good at Language Arts.	1	2	3
I am good at Math.	1	2	3
I like to exercise at school.	1	2	3
I am good at exercising.	1	2	3
I think exercise is good for my body.	1	2	3
I would like to exercise more at school.	1	2	3
I eat healthy food at home.	1	2	3
I like the taste of healthy food.	1	2	3
I feel successful at school.	1	2	3
I feel like I have friends at school.	1	2	3
I feel like I will be successful in life.	1	2	3

APPENDIX B

TABLE 1

Table 1

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
bmi	20	19.7850	4.74988	1.06211
post bmi	20	19.1550	4.86637	1.08815

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
bmi post	18.628	19	.000	19.78500	17.5620	22.0080
bmi	17.603	19	.000	19.15500	16.8775	21.4325

Significant decrease in BMI from pre to post test

APPENDIX C

TABLE 2

Table 2

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
pre math	20	14.6000	5.33509	1.19296
post math	20	15.0000	5.23148	1.16980

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
pre math	12.238	19	.000	14.60000	12.1031	17.0969
post math	12.823	19	.000	15.00000	12.5516	17.4484

Significant increase in math scores

APPENDIX D

TABLE 3

Table 3

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
pre language arts	20	16.8000	3.08818	.69054
post language arts	20	18.2000	3.05390	.68287

One-Sample Test

	Test Value = 0			
	t	df	Siq. (2-tailed)	Mean Difference
pre language arts	24.329	19	.000	16.80000
post language arts	26.652	19	.000	18.20000

One-Sample Test

	Test Value = 0	
	95% Confidence Interval of the Difference	
	Lower	Upper
pre language arts	15.3547	18.2453
post language arts	16.7707	19.6293

Significant increase in language arts scores

APPENDIX E

SUPPLEMENTARY LESSONS FOR PHYSICAL EDUCATION

Supplementary Lessons for Physical Education

A Curriculum

By

Cynthia Gail Libby

Teacher Supplementary Lessons for Physical Education

Table of Contents

Activity:	**Traveling California**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher will lead the students in a virtual tour of California. Students will perform each activity for 30 seconds before moving to the next activity. Here are the activities:

- Surf the Pacific Ocean
- Flex your muscles like Arnold Schwarzenegger
- Hit home runs at Dodger Stadium in Los Angeles
- Climb up a Redwood Tree in northern California
- March across the Golden Gate Bridge in San Francisco
- Pretend you are an actor in Hollywood and wave to all your fans
- Stomp the grapes from Napa Valley
- Pick fruit from the Central Valley
- Go rollerblading on the boardwalk along the coast
- Climb Mt. Whitney, the highest peak in the continental United States
- Crawl through the Death Valley Desert
- Ski in the Sierra Nevada Mountains

Variations: Teacher can use a map to point out the location of specific places.

Activity:	**Color Me Bad**
Grade level:	3
Location:	In classroom, at desks
Equipment:	UNO cards

Directions:

In this activity, the teacher will give each student an UNO card. The teacher will then write each color on the board and an activity next to each color. The students will match the color of the card to an activity that corresponds with it, and perform that activity for 20 seconds. The activities can include:

- Blue: washing machines, reach-outs, up high/down lows
- Red: apple pickers, dance steps, marching
- Yellow: jumping jacks, scissor/grapevine, high knees
- Green: boxing, hopping, jogging in place

When the teacher says "Color Me Bad", the students will pass their cards to the person on their right and complete the activity that corresponds to their new cards.

Variations:
Must give a multiplication fact family using old card and new card.

Activity:	**Fact Family**
Grade level:	3
Location:	In classroom, at four corners
Equipment:	None

Directions:

In this activity, the teacher labels each corner of the room with 2, 3, 4, and 5. The teacher calls out a number that is a multiple of these numbers. Students in a corner that makes a fact family with that number, have to find a different corner. While moving to another corner, the students will perform movements. These movements include:

- Jumping
- Skipping
- Hopping on one foot
- Marching
- Dancing

Example:
If the teachers calls out "20" students in corners 4 and 5 have to move to another corner. If the teacher calls out "8" students in corners 2 and 4 must move to another corner.

Variations:
Have students in same groups say a division problem using their number and the number the teacher said. For example: if the teacher said "10", students in corners 2 and 5 would have to say "10/2=5" or "10/5=2"

Activity:	**Vocabulary Jam**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher will direct students to do an activity at their desks or in a circle for 30 seconds. These activities can include:

- Jumping
- Twisting
- Jogging in place
- Jumping Jacks
- Hopping
- High knees
- Dancing

Students continue activity until the teacher calls out a vocabulary word- at which point students freeze. The student closest to the windows must define the word, and their partner must say it in a sentence. Take turns defining the word and using it in a sentence.

Variations:
Have students take turns saying the definition and sentences so the whole class can hear. Have students spell the vocabulary word. Have students give a synonym or antonym for the word.

Activity:	**Heart Smart**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher will discuss the heart:

- Where is it located? (left side of chest)
- What size is it? (size of a fist)
- What is its function? (to pump blood to the body)
- What strengthens the heart? (exercises)
- What weakens the heart? (inactivity, smoking, unhealthy eating)

The teacher calls out a habit that either strengthens or weakens the heart. If the habit strengthens the heart- students will respond by jumping or running in place for 20 seconds. If the habit weakens the heart- students will immediately fall to the ground or squat. Here are some examples of habits:

- Riding a bike (jump)
- Eating 4 pepperoni pizzas (fall)
- Walking your dog (jump)
- Smoking cigarettes (fall)
- Never going outside/ just watch TV all day (fall)
- Dancing with your friends (jump)
- Skating (jump)
- Not eating fruits and vegetables (fall)
- Riding a scooter (jump)
- Playing basketball (jump)
- Eating fast food (fall)

Activity:	**Space Travelers**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher should review the planets with the students. The teacher will read the following story and students identify each VERB. The teacher will pause and allow the class to act out each VERB for 20 seconds. Continue until the end of the story.

"Hello, my name is R2-D2 and I live on a space ship. Today I will lead you on a tour through our solar system. First we need to **put on** our moon boots. They will allow us to **walk** through space. The first planet we will **visit** is Mercury, the closest planet to the sun. Mercury is very hot... so be careful and **step** quickly so your feet do not get burned. Mercury has many craters. Let's **jump** into one and **see** what we find. **Climb** out of the crater so we can **fly** to Venus. Venus is the second planet from the sun. It has very strong winds here, and volcanoes. Let's see if you can **walk** in this windy place and not get **blown over**. A lot of Venus is covered with lava.....**run**! Our next stop is Earth, the third planet from the sun. 71% of Earth is covered in water, so **jump** in and start **swimming**! See if you can do the **front crawl** and the **back stroke**. Our next stop will be Mars, the fourth planet from the sun. It's known as the "red" planet. The largest mountain in space, called Olympic Mons, is on Mars. Let's start **climbing**. We can **see** Jupiter from here. Jupiter is the fifth planet from the sun, and the largest in our solar system. Jupiter is made mostly of gas. **Jump** up into the clouds and see if you can **float** in them. Let's **fly** over to Saturn. Saturn is the sixth planet from the sun. it has a rocky core and there are areas of ice all over the planet. Let's **skate** on the ice. There are also rings of ice and gas around Saturn. Let's **spin around** in circles like the rings do. Uranus is our next stop. It is small and has a rocky core. Can everyone **tip toe** across Uranus without **falling** on the ice? Next let's visit Neptune. Neptune is the eighth planet from the sun. It is very far from the sun, and therefore very cold. Neptune has four rings and large storms with fast winds. It also has 13 moons! Quick! **Duck**! Here comes another one! **Dodge to the left**! **Now dodge to the right**! That was close. Are you cold? Brrrrrrrrr. **Shiver** and **rub** your hands together to stay warm. It's cold out here. **Hop** back home.

Activity:	**Multiplication Toss**
Grade level:	3
Location:	In classroom, at desks
Equipment:	bean bag or crumpled paper ball

Directions:

In this activity, the teacher will call out a number. For example the teacher will say "3". Students will start reciting the multiplication tables and tossing the bag or ball to their partner after they have finished one problem. Example: the teacher says "3" and student 1 says "3 x 1 = 3" and he tosses the bag or ball to his partner. His partner then says "3 x 2 = 6" and passes the bag or ball back to his partner. This continues until each group has completed the table until 12. The teacher then calls out an activity and students do that activity for 20 seconds. The teacher then says another number. Some activities include:

- Jogging in place
- High knees
- Dancing
- Jumping Jacks
- Boxing
- Playing the air guitar
- Dribbling the ball with hands or feet
- Twisting
- Hopping on one foot

Variations:
Students can do division facts from 1-12.
Students can do the activity for 5 seconds while their partner says the math fact.

Activity:	**The 12 Days of Fitness**
Grade level:	3
Location:	In classroom, at desks
Equipment:	Sing to the tune of "12 Days of Christmas"

Directions:

In this activity, the teacher will sing the 12 Days of Christmas tune while doing the following activities:

- 12 Jumping jacks
- 11 Raise the roofs
- 10 Knee lifts
- 9 Side stretches
- 8 jogs in place
- 7 jabs or punches
- 6 kicks in front
- 5 hula hoops
- 4 jumping ropes
- 3 muscle poses
- 2 scissor kicks
- 1 stork standing in a swimming pool

Variations:
Write the words on a poster so the students can follow along easily
Sing the song straight through to save time

Activity:	**Silent Signs**
Grade level:	3
Location:	In classroom, at desks
Equipment:	United States Map

Directions:

In this activity, the teacher will choose one student to go to the map. The teacher will choose a location and show everyone in the class, except the student the state she chose. The class must show the student the state without talking. All movements have meanings.

- To move EAST- students do knee lifts
- To move WEST- students do jumping jacks
- To move NORTH- students raise the roof
- To move SOUTH- students do squats

The teacher repeats this game with new locations and new students to guess.

Variations:
Put corresponding movements with directions on a poster or the board so students can easily remember what they are.

Activity:	**Inches, Feet, and Yards, Oh My!**
Grade level:	3
Location:	Classroom, outside on courts
Equipment:	None

Directions:

In this activity, the teacher will have students start with feet side by side and move one set of toes a head of the other set of toes to represent inches or "small".

The teacher will then have students place one whole foot in front of the other foot to represent feet or "medium".

The teacher will then have students take one giant step forward or backward to represent yards or "large".

Call out different measurements:

Example: Move forward 3 feet, sideways 1 yard, and backward 5 inches

Have all students do 30 seconds of jumping, twisting, and stretching after each set of movements is complete.

Variations:
Add different directions: forward, left, right, backward
Convert units into metric

Activity:	**Verb Ball**
Grade level:	3
Location:	In classroom, at desks
Equipment:	Ball

Directions:

In this activity, the teacher starts the game by naming a verb (an action word). Every person in the class has to perform that verb for 15 seconds until the teacher raises her hand. When the teacher raises her hand, the students stand still and wait for a turn to catch the ball. The teacher then tosses the ball to a student. That student picks his own verb and says it out loud. Now the whole class will perform that verb for 15 seconds, until the teacher raises her hand. Students stand still and wait for a turn to catch the ball. That student will toss the ball to another student and the game continues until every student has said a different verb.

Variations:
The teacher could throw the ball and one student has to spell a word. He then throws a ball to another student and the teacher gives that student a spelling word. The game continues until each student has correctly spelled a word.

Activity:	**Rio Vista Olympians**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher calls out the following sports skills for the students to mimic for at least 20-30 seconds:

- Shooting a jump shot
- Running through tires
- Batting a baseball
- Serving a tennis ball
- Downhill skiing
- Spiking a volleyball
- Throwing a football
- Dribbling a soccer ball
- Shooting an arrow
- Shooting a hockey puck
- Swimming underwater
- Fielding a ground ball and throwing it to first base
- Dunking a basketball
- Gliding on speed skates

Variations:
Integrate actions with word problems: if Ana shot 8 basketballs but missed 3, how many baskets did she make?

Activity:	**Spelling Jacks**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher will say a spelling word and students begin jumping jacks. Student 1 says the first letter, student 2 says the second letter, and student 3 says the third letter and so on until the word is completely spelled out. When the word is finished the students all say the word together. Students rest for 10 seconds while the teacher says a new word. The next student in line begins the word. If a student misses a letter, the student after him makes the correction and the game continues. The game goes on until every student has had a turn or the spelling list is complete.

Variations:
The teacher may want only the student saying the letter to jump.
The teacher may want to fashion the game as a spelling bee- each student spells one word while jumping to each letter.
The teacher may pick other activities like hopping or high knees.

Activity:	**America the Beautiful**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher will lead the class on a virtual tour of America. Students move according to the actions listed below for at least 30 seconds.

- California- surfing
- Colorado- skiing
- Florida- swimming
- Massachusetts- climbing steps in a light house
- Utah- mountain biking
- Michigan- shoveling snow
- Wisconsin- churning butter to make cheese
- Kansas- plowing the fields
- Iowa- harvesting the corn
- Louisiana- dancing
- New Mexico- jumping to catch the hot air balloons
- West Virginia- dodging white water rapids
- Kentucky- squatting in caves
- Illinois- running the Chicago marathon
- Alaska- chopping wood to stay warm

Variations:
Use a map to point out which states you are talking about.

Activity:	**Flash Back**
Grade level:	3
Location:	In classroom, at desks
Equipment:	None

Directions:

In this activity, the teacher will call out a physical activity. The students will continue to doing activity for 30 seconds until the teacher holds up a math multiplication flash card. Students immediately stop and write the problem and answer on their white boards. Students hold up white boards for the teacher to check. The teacher then has students clean the white boards and begin a new activity. Repeat until teacher has gone through a variety of flashcards. Some activities may include:

- Jumping
- Marching
- High knees
- Hopping on one foot
- Jumping jacks
- Boxing
- Twisting
- Apple pickers
- Squats
- Grape vine

Variations:
Use this game for spelling words- works great.

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