



Exercise to Learn, Learn to Exercise!

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This curriculum unit is recommended for:
Kindergarten, fourth, and fifth grades

Keywords: brain, BDNF, cells, exercise, grow, learn, improve, recess, intentional movement, improvement, healthy, lifestyle, activities, integration

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: The benefits of exercise have been known for some time. It is not enough to know that exercise is beneficial. Knowing why it is beneficial is most important. It is never too early to begin building a life of healthy habits and exercise. Children should be encouraged to begin healthy habits as soon as possible. As they grow older, these healthy habits will be a part of their lifestyle. Beginning healthy habits early can help cut down on the possibility of disease and other health challenges as they grow older. This unit will focus on integrating exercise with the curriculum in order to encourage students to move more. The activities presented give teachers a practical way to incorporate movement into their classroom.

I plan to teach this unit during the coming year to 300 students in grade K, four, and five.

I give permission for the Institute to publish my curriculum unit and synopsis in print and online. I understand that I will be credited as the author of my work.

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Rationale

The obsession for healthier lifestyles has surged over the last ten years. Specialized gyms with promises of improving health and increasing strength have become increasingly popular. Advertisements with muscular men and women offer hope to those wanting to lose weight and improve their health.

Studies have shown the need for children to engage in more activities not involving a television. Children are facing obesity and other health challenges that threaten their quality of life. Even our government has chimed in by creating laws stating that students must receive at least 30 minutes of physical activity a day (1). In a time of technological and medical advancement it is disheartening that the overall health of our youth has seemed to decline.

Throughout the new millennium a surge of students diagnosed with ADD and ADHD has arisen almost simultaneous to the reduction of physical education programs. Could this be a coincidence or correlation? (2).

Studies suggest that exercise improves your brain by stimulating your brain to create new brain cells. This, in turn, can help you improve your mood or possibly help students improve their grades (3).

Introduction

Barringer Academic Center is a National Magnet School of Excellence located on the west side of Charlotte, North Carolina. BAC, as it is affectionately called, is an elementary school in the Charlotte Mecklenburg School District and serves students in grades K-5. Currently BAC has approximately 600 students. Though most of the students are African American, BAC does have a diverse population that includes Caucasian, Indian, Hispanic, Asian, and Multiracial students. This year BAC is also a Title 1 school.

A variety of clubs are offered throughout the school for all grade levels to enhance students' learning experiences beyond the classroom. Clubs meet during designated times before and after school during the week. Some clubs such as Science Olympiad, Chess, Cyber Kids, Chorus, and Odyssey of the Mind offer students the opportunity to

compete with their peers regionally and statewide. Our students have also competed and won first place in the regional Fire and Safety Bowl for the past two years.

Students in the third through fifth grades have the opportunity to serve on our school student council. Barringer's student council is currently working toward improving the air quality in the school in conjunction with a Green schools grant. Students in grades four and five who have outstanding academic records are invited to be inducted into the honor society.

Barringer is a unique school. Though it is a magnet school, not all of the students are a part of the magnet program. Barringer is one school comprised of three different programs. Our Horizons program is a program created by The Charlotte Mecklenburg School District to enhance the learning of students working two or more grade levels above their own. Currently this program serves approximately 30 students. Individuals who desire to be a part of the Horizon's program must fill out an application, engage in a series of tests, and complete an interview. They are then invited into the program if they qualify.

BAC's gifted program serves students in grades K-5 who are working above their current grade level. Students who are a part of the Horizon's or gifted program generally come from areas that are out of our school's zone. BAC also serves approximately 400 students that live in the neighborhood surrounding the school. The majority are students who are working at or below grade level which do not qualify them to participate in the Horizon's or gifted programs. Many of these students are also economically challenged which has contributed to BAC's current Title 1 status.

All students are encouraged to participate in a school-wide Science Fair held the third week of January each school year. Students work individually, in pairs, as a group, or as a class to complete a project. The students follow the scientific method in the development of their projects. Judges, not affiliated with our school, are invited in to interview the students and judge the projects using a rubric for the students, grades 3-5, who have completed an individual, partner (pairs) or group (three people) project. The top 12 projects are sent to the regional Science Fair held at the University of Charlotte each February.

As the Science Facilitator, I serve every student at BAC. I have been challenged to build a comprehensive science department that builds confidence in students who previously did not have much exposure to science and to challenge students who come with a vast background of science knowledge. My challenges also extend to breaking down a mindset that only *some* students are able to engage in science experiments. Breaking this mindset has not been easy. I have taught my students that everyone is able to engage in science experiments and inquiry, not just some students. When I first arrived, many of my students were shocked that they would have the opportunity to engage in

scientific experiments. Students who were previously disinterested in science have now become fascinated with it.

Throughout my tenure at BAC I have successfully enhanced the science program through bringing many programs and extending opportunities to my students. For the past two years our 5th grade students have participate in a federal program known as STARBASE (4). STARBASE is a program that allows students to engage in hands on experiments that align with common core standards for science. Fourth grade students participated in an engineering pilot program known as Efficacy for Engaging Elementary Engineering (E4) that introduced students to civil and electrical engineering. This program was designed to gather data to determine how well elementary school students respond to engineering curriculum. Two years ago our second graders had the opportunity to go on a field trip to Discovery Place, Charlotte's premier science center, made possible through a Target field trip grant. Our embryology study is another program I have brought to the school through a partnership with 4H. The students study the life cycle of quail or chickens. After the eggs hatch the live foul is returned to the 4H office and then given to a local farmer (5). Each of these programs has helped to enhance the learning experience of the students at Barringer.

This year Barringer will participate in the Achieve 225 grant. The purpose of this grant is to increase student movement through structured recess and tracking daily steps (6).

Objectives

The purpose of this unit is to explore the idea of incorporating exercise into everyday instruction with the belief that students will see an improvement in their academics and health. It is my belief that students will experience more success in their academic studies when encouraged to include exercise. It has been widely studied that students who consistently and intentionally engage in exercise are healthier, more focused and excel academically above their inactive peers (7). This unit will explore the possibility that exercise is beneficial to the health of the body and brain. Throughout this unit students will participate in activities that incorporate movement with learning.

This unit is suitable for grades K, 4, and 5 and can be easily adaptable for any grade. The objectives highlighted in this unit will be for the grades aforementioned. I have chosen these grades to show how movement can easily be incorporated into the curriculum for any grade level.

As a Science teacher, I have found that when I have the students move, especially my younger students, it helps them to remember the content of the lesson better. In kindergarten, everything is just about new for the students. This is especially true for students who did not participate in a preschool program. It is my plan to create a unit that

incorporates movement and song with some of the content area of the Kindergarten science curriculum. I would like to use this unit in Kindergarten because they are at the beginning of their school career. In the past, when I have used movement along with my lessons, my students remember the concepts taught well into the future. I have often had students walk up to me and tell me what they remember while showing me the movement. Movement coupled with learning is not a new concept. The North Carolina Department of Instruction publishes a classroom tool that helps teachers incorporate science, math, and physical activity (8). I would like to incorporate this same ideology in the unit I create, with the thought that movement positively affects learning. I am optimistic this will impact my students greatly. I would like to use this unit in Kindergarten since they are at the beginning of their school career.

Nutrition and the Body Systems

Students in grade 4 learn about nutrition and how to make healthy food choices. Students in grade 5 learn about the body systems and their function. All students have health objectives specific to their grade level. In this unit I would like to emphasize the importance of exercise, nutrition and healthy food choices.

Teaching students to exercise is important. Teaching them why they should exercise can prepare them for a lifetime of healthy decisions. The brain is a complex organ. It is responsible for the overall function of the body. The brain sends signals throughout the body telling it when to grow, how tall you will grow, when you are full, when you have to urinate, and signaling pain when something is wrong in your body. It is interesting that the brain itself does not have pain receptors but can send pain signals to every other area of your body.

Exercise and Learning

By the end of this unit, there are several questions I would like students to be able to answer.

Questions for students to consider:
How does exercise help me learn?
How does my body feel after I exercise?
Does exercise help me stay alert in class?
Am I able to think more clearly after I exercise?

Exercise and Young Learners

Including objectives that focus on motor skills will be beneficial because I plan to incorporate movement while teaching science concepts. This will help reinforce what

they are learning in their physical education class while showing them clever ways to remember science concepts.

All students are given a fit testing the fall and spring of the school year. I will compare these scores and see how students fared at the beginning of the year versus the end of the year. It is my belief that students will show improvement.

Intentional Movement

The overarching idea of this unit is to include intentional movement into everyday teaching. Movement will be incorporated in the beginning of lessons and as students are learning.

Strategies

One strategy I will use is KWL charts. In the beginning of the unit my older students will be asked to complete a KWL chart on exercise. The K section is where students record what they know. Students record what they want to know about exercise in the W section. As students' progress throughout the lesson, they can include knowledge learned in the L section (see appendix 4).

I will begin by teaching about the brain, its parts, and their function. Fifth grade students will learn about the body systems.

One of the strategies I will include is implementing the Achieve 225 grant. I will serve as the contact person for my school. My responsibilities include designating a team liaison for each team at our school. Each liaison will be responsible for rotating the pedometers to each class on their team. Classes will walk four consecutive days. Each team leader will also log data into the Welnet online system. Welnet is an online portal that allows teachers to track their students' exercise progress. Teachers will keep track of their classes' steps. As a class they will graph their total steps on each of the four days. Older students will keep graphing journals to track their steps. Kindergarten students will keep a class graph with each individual student name. I will collaborate with the Physical Education teacher at my school as well as the team liaisons.

Another strategy I will use is miming. This will help students to learn to use movement in conjunction with their learning. The students will be taught movement that correlates to a concept they are learning in science. I will introduce some concepts first through movement only. I will then have the students identify what I am. This strategy is especially useful for introducing new concepts to younger students.

I would also like to incorporate movement with popular music. I will use popular music to introduce position, direction, and help strengthen the students' motor skills.

Students will learn about nutrition through our Food corps program. This program helps teach students about the benefits of eating vegetables and fruits and shows them how to grow their own food. This coupled with exercise helps students live healthier lives. Classes will sign up with our Food Corps (8) contact to learn about making healthy food choices and how they benefit their brain and overall health.

Our school also has a program called Tracking your Trekking (9). This program was created to help students learn about North Carolina geography and encourage students to move more. Students choose a place in North Carolina and determine how far it is from Charlotte.

One useful strategy I plan to incorporate is note booking. Students will respond to each activity in their notebooks. This allows students to refer back to previous activities and recall information learned. This is also a great way to improve students' writing skills.

Activities

Fit Testing (all grades):

Students will take a fit test in their Physical Education Classes. The data from their test will be uploaded into Welnet. Welnet is an online portal that keeps track of students' physical fitness. The students will repeat the same fit test in the spring. Their results from the fall and spring will be compared to determine if they have shown any improvement over the course of the school year.

Intentional Steps (all grades):

Each class will choose a destination in North Carolina (the destination must be outside of Charlotte and its neighboring cities at least 50 miles or more from Charlotte). Students can choose a place they have visited before or somewhere they would like to visit one day. The class must agree on a destination since they will be working together to accomplish their goal. The students will research how far their destination is from Charlotte. The distance to their destination will serve as their mileage goal. Each week the class will visit our neighboring park. The approximate distance to the park and back is one mile. Students will track their progress as a class. The distance traveled for each trip to the park will be one mile x the number of students in the class. This will count towards their mileage to their destination (i.e. $1 \times 24 = 24$ miles traveled). As the class make progress towards their goal (10).

Graphing:

The students will take their step data and graph it into their journals. Step data will be taken at the beginning of the year in the fall and again in the spring. Students will be able to compare their step data from the beginning of the year to the end to determine if they have made progress. Younger students will graph their data together on a line plot and then convert the line plot into a bar graph.

Show What You Know (kindergarten):

Students will learn about the brain and its importance. Kindergarten students will share what they know about the importance through a guided think aloud. A think aloud is when students share ideas aloud about a particular subject, in this case the brain. As a class we will come to a conclusion about why we should take care of our brains and the best way to do so. All students' ideas will be added to a large drawn brain.

The Model Brain (grades four and five):

Fourth and fifth grade students will diagram the brain. We will highlight the pituitary gland (because they are beginning puberty). The students will also identify the parts of the brain and their function.

Step Tracking (all grades):

Each student will be given a pedometer to track their steps for 45 minutes. This will be repeated for four consecutive days. After the four days, the students will upload the data from the pedometers to Welnet. Welnet is an online portal to keep track of fitness for students.

Intentional Movement Introduction (kindergarten):

The students will respond to the following requests using movement.

Show me how a leaf falls from a tree.

(Students can fall straight down, whirl around to the ground, or zig zag to the ground).

Show me how a dog wags its tail (students can shake their rear from side to side).

Show me how a cat pounces (students can jump up and then down).

Show me how a giraffe eats leaves from a tree (students can stretch their necks and even stand on their toes).

Miming Weather (kindergarten):

The students will use movement to model the weather.

Show me with your fingers what drizzle looks like.

Show me what thunder looks like.
Using your hands, show me what thunder looks like.
Using your body, show me wind.

Dramatic Role Playing (kindergarten):

Note to teacher: Before beginning this activity, make sure you ask students to spread out and move away from furniture.

The students will create a short skit that uses movement to show the life cycle of a plant.

Teacher: using your body only (no talking), show me what the seed of a plant looks like.

Students: Students will show how a seed looks

Teacher: Show me how a the bud of a plant looks

Students: Students should simulate the plant beginning to bud by moving around, slightly opening their bodies, etc.

Teacher: Show me the leaves of a plant

Students: Students will most likely open their arm or spread their fingers

Recess Redefined (all grades):

Students will engage in structured recess weekly. Structured recess is a way to show students how to intentionally move during recess by providing them with game ideas and the proper equipment to play those games.

You Are What You Eat (grades four and five):

The students will participate in a class on nutrition. The students will learn the benefits of proper nutrition and how to grow their own vegetables. The students will be given a seed of a pea pod. Each student will plant their own pea pod in our class garden.

Input Versus Output (grade four):

The students will find the calorie count for their favorite meal. They will need to include an appetizer, a main dish, dessert, and their drinks (if they are drinking soda, tea or lemonade). The students will then determine, through research, how much movement they will need to do to burn the calories equivalent to what they ate (see appendix IV).

Conclusion

Exercise is important. No amount of dieting, pills, or teas can replace the need for exercise in our lives. Choosing to live a healthy lifestyle through exercise and nutrition can benefit our overall health as we age. Teaching students the benefits of exercise and nutrition will aid them in making good decisions when it comes to taking care of their

body. This in turn helps them to take care of their brain, not just academically but also physically.

Endnotes

1. National Association of State Boards of Education, retrieved September 30, 2015, http://www.nasbe.org/healthy_schools/hs/bytopics.php?topicid=3120
2. Ratey, John J., and Eric Hagerman. *Spark: The Revolutionary New Science of Exercise and the Brain*. New York: Little, Brown, 2008.
3. Reynolds, Gretchen. *The First 20 Minutes: Surprising Science Reveals How We Can Exercise Better, Train Smarter, and Live Longer*. New York: Hudson Street Press, 2012.
4. "STARBASE," retrieved September 10, 2015, <http://dodstarbase.com>
5. "4H," retrieved October 10, 2015. www.4-h.com
6. "Achieve225," October 10, 2015, <http://www.cmshe.com/achieve-225.html>
7. "Energizers," retrieved September 10, 2015, from www.dpi.state.nc.us
8. Reynolds, Gretchen. *The First 20 Minutes: Surprising Science Reveals How We Can Exercise Better, Train Smarter, and Live Longer*. New York: Hudson Street Press, 2012.
9. "Foodcorps," retrieved November 7, 2015. www.foodcorps.org
10. Adapted with permission by Mondanaro, April and Passe, Mindy from Barringer Academic School

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“Achieve225” October 10, 2015, <http://www.cmshe.com/achieve-225.html>

This website provides some information about the Achieve 225 grant.

“Energizers,” North Carolina Department of Public Instruction, September 20, 2015
<http://www.dpi.state.nc.us/docs/curriculum/healthfulliving/resources/policy/healthychildren/sbepolicymanual.pdf>

This resource provides teacher’s examples of exercises they can do while teaching the curriculum.

“National Association of State Boards of Education,” September 30, 2015,

http://www.nasbe.org/healthy_schools/hs/bytopics.php?topicid=3120

This website provides information on the requirements for physical activity by state.

Ratey, John J., and Eric Hagerman. *Spark: The Revolutionary New Science of Exercise and the Brain*. New York: Little, Brown, 2008

This is a wonderful and easy to read book that provides a plethora of information about the brain, how it functions, and different attributes of the brain.

Reynolds, Gretchen. "How Physical Fitness May Promote School Success - The New ..."
Accessed December 1, 2015. <http://well.blogs.nytimes.com/2013/09/18/how-physical-fitness-may-promote-school-success/>.

This article suggests that physical activity is good for the brain and promote schools focusing on ensuring students receive an adequate amount of physical activity.

Reynolds, Gretchen. *The First 20 Minutes: Surprising Science Reveals How We Can Exercise Better, Train Smarter, Live Longer*. New York: Hudson Street Press, 2012.

This book scientifically suggests that exercise can have long-term positive effects.

“STARBASE,” retrieved September 10, 2015, <http://dodstarbase.org/>

This website gives an overview of the federally funded STARBASE program. It shares the Mission of STARBASE and how their goal is to increase knowledge of STEM in economically disadvantaged schools.

Appendix 1 Implementing District Standards

K.P.1.2 Give examples of different way objects and organisms move to include falling (to the ground when dropped):

- Straight
- Zigzag
- Round and round

K.P.1 Understand the positions and motions of objects and organisms observed in the environment.

K.E.1 Understand change and observable patterns of weather that occur from day to day and throughout the year.

K.L.1 Compare characteristics of animals that make them alike and different from other animals and nonliving things.

Incorporating movement with concepts will help students recall what they have learned. Students will be able to associate a movement with a concept and better be able to recall information.

K.MS.1 Apply competent motor skills and movement patterns needed to perform a variety of physical activities

Focusing on this objective will be beneficial since I plan to incorporate movement while teaching science concepts. This will help reinforce what they are learning in their physical education class while showing them clever ways to remember science concepts.

4.L.2.2 Explain the role of vitamins, minerals and exercise in maintaining a healthy body

Promoting healthy lifestyles can encourage students to begin to maintain a lifestyle of health at an early age. I included this objective because it is related to my unit. Students should understand how health, nutrition and exercise are related and how it benefits them.

5. L1.2 Compare the major systems of the human body (digestive, respiratory, circulatory, muscular, skeletal, and cardiovascular) in terms of their functions necessary for life.

Our brain is the control center for the rest of the body. Understanding how important each body system is will give the students a better understanding of how important our brain is and the major role it plays in our lives.

Appendix 2 Reading list for Teachers

Books and Articles

Ayan, Steve. "Smart Jocks." *Scientific American Mind*: 42-47.

Jensen, Eric. *Teaching with Poverty in Mind What Being Poor Does to Kids' Brains and What Schools Can Do about It*. Alexandria, Va.: Association for Supervision and Curriculum Development, 2009

This book is a useful resource for any educator that teaches children in poverty. It helps educators understand how the development of a child in poverty differs from a child who has plenty of resources. It gives insight to educators on how to help children in poverty achieve academically.

"Making Your Mind: Molecules, Motion, and Memory | HHMI ..." Accessed December 1, 2015. <http://www.hhmi.org/biointeractive/making-your-mind-molecules-motion-and-memory>.

This poster explains how neurons work.

Raine, Lauren B., Hyun Kyu Lee, Brian J. Saliba, Laura Chaddock-Heyman, Charles H. Hillman, Arthur F. Kramer, and Sonia Brucki. "The Influence of Childhood Aerobic Fitness on Learning and Memory." *PLoS ONE*: E72666.

This article suggests that students have improved memory when engaged in aerobic activity.

Ratey, John J., and Eric Hagerman. *Spark: The Revolutionary New Science of Exercise and the Brain*. New York: Little, Brown, 2008.

This book is a great tool to understand the brain better and how exercise can help brain growth and development. It also shares about how the brain functions. This book also look at how different brains function. It gives insight to why some of our students may behave the way they do and how we can appropriately respond to them as educators.

Reynolds, Gretchen. "How Physical Fitness May Promote School Success - The New ..." Accessed December 1, 2015. <http://well.blogs.nytimes.com/2013/09/18/how-physical-fitness-may-promote-school-success/>.

This article was written to support the need for keeping physical activity in schools by suggesting that physical activity helps students succeed in school.

Reynolds, Gretchen. *The First 20 Minutes: Surprising Science Reveals How We Can Exercise Better, Train Smarter, Live Longer*. New York: Hudson Street Press, 2012.

This book discusses the benefits of exercise. It explains the science behind a lifestyle that incorporates exercise and how it can benefit your body, especially your brain.

Websites for Teachers and Students

www.cmshe.com

www.cms.wikispaces.net

www.brainbreaks.com

www.edutopia.org/classroom-exercise-video

www.fit4theclassroom.com

www.cfitkids.com

www.educationworld.com

<http://www.pecentral.org>

These websites are beneficial for finding activities to help incorporate movement into the classroom. Each website provides a great starting point for teachers who want to implement exercise activities into their classroom instruction.

Appendix 3 Materials List

These materials will be useful to implement this unit successfully:

Pedometers

Pedometer data trackers

Data recording sheets

Model brain

Brain diagrams

Science notebooks

Computer

Internet access

Chart paper

Appendix 4 Additional Resources

Sample KWL chart

Know	What to Know	Learned

Sample Data tTracker

This sheet can be used for students to track the number of steps they are walking each day during data collection. Students can use the total to create a class graph.

Day one	Day two	Day three	Day four	Total

Sample Meal and Calorie Count (You Are What You Eat)

Food item	Calorie count
Garden Salad with Italian dressing	140
Baked chicken (4 oz.)	184
Green beans (1/2 cup)	24
Corn on the cob with a slab of butter	115
Chocolate cake 1/8 piece	200
Lemonade 8 oz.	120

Total:

Sample of exercise needed to burn off the calories consumed

Exercise	Distance/Amount	Calories burned
Running	1 mile	107
Jumping jacks	30 mins.	75
Biking	5 miles	175
Roller blading	1 hour	360
Hiking/Walking	1 hour	551
Playing basketball	1 hour	300