



***Learning through Movement:  
Applying Exercise Education and Movement Activities in a Library Setting***

by Deborah Yu-Yuk Jung, 2015 CTI Fellow  
Winding Springs Elementary

This curriculum unit is recommended for:  
Media and Information Skills, Grades K-5

**Keywords:** Exercise—Physiological Effects, Kinesthetic Learning, Mind and Body, Yoga

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

**Synopsis:** Appropriate movement, noise, and stillness are things teachers and students struggle with throughout the school day. Generations of librarians have tried fruitlessly to enforce library silence. Learning to incorporate movement into instruction accomplishes a number of things. Movement helps create paired associations in the brain, aids in transition from one activity to another, releases stress and anxiety, and bathes the brain neurons in neurotransmitters and neurotrophic factors strengthening neuropathways so that students can learn. As librarians begin to turn towards a learning commons and/or MakerSpace environment for learning, we need to provide for areas of active learning. This means not only incorporating technology and re-designing facilities for flexible grouping, social learning, and increased noise, but also providing areas for safe movement. Just as important as the design of a library facility to support creativity, imagination, and learning, is the design of the learning environment you create as a teacher-librarian. Understanding why the brain needs the body to move during instruction is one crucial part of lesson design. This curriculum unit offers some strategies and classroom management resources to incorporate exercise or movement activities into library lessons for grades K-5 while at the same time, teaching core content. So, embrace the fidgeting.

*I plan to teach this unit during the coming year in to 880 students in Media & Information Skills classes.*

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

**Learning through Movement:  
Applying Exercise Education and Movement Activities in a Library Setting**

*Deborah Yu-Yuk Jung*

**Introduction**

It was during a cool breezy morning swim in a rooftop pool, watching the fog dissipate as the dawn strengthened into full daylight that I realized that I was experiencing joy. Happiness is ever an elusive state and as a confirmed couch potato, it took me a few seconds to interpret the sensations bombarding my brain. An Easterner visiting the West Coast, I had risen early to exercise, not realizing that my early morning swim had become a positive addiction in itself, a quiet moving meditation that set the tone for the day, improved my mental and emotional resilience, strengthened muscles, and improved my cardiovascular system. It was in that moment that I realized how much that habit had changed me as a person. I had never been an athlete, growing up painfully nearsighted with poor eye-hand coordination. PE class had been the bane of my childhood and it had been my habit to avoid any and all physical exercise, even as a spectator. However decade ago, I had turned to water exercise and art as ways to cope with job related stress, not realizing that it would be a turning point for personal self-development. After a few months of thrice-weekly water aerobics classes, I added exercise machines to my routine, along with the occasional free-weights workout. Admittedly, I have not been as faithful to the land workouts as I have to the water ones. If land exercise releases stress, then water exercise washes it away. Two years ago, I became a certified water fitness instructor, which is a fun social activity that guarantees I will be in the pool once a week. However, one of my great pleasures is still watching the changing light of sunrise sparkling through the water as I take my solitary morning swim.

The benefits of exercise for me are not only a healthier body and a little weight loss. More importantly, exercise yields a great emotional/mental health benefit. It makes me pleasantly exhausted so that I can rest at night, eases stiff muscles and joints that have been standing or sitting still too long. When I am alone in my lane, there is no competition, not even with myself. The chatter of my brain with its incessant to-do lists quiets. Under the water in the early morning hours, there is little noise; conversation and music slide over me as I surface, then are muffled by the water. In concentrating just on movement and breath, I can momentarily set aside worry and doubt. I can find peace.

## **Rationale for Incorporating Exercise in the Library**

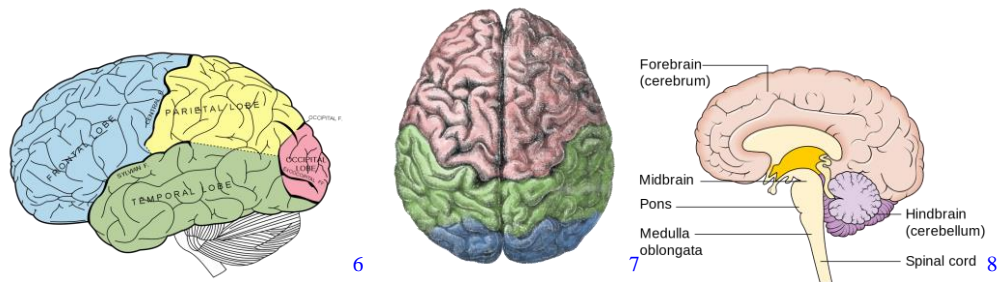
I teach in a large urban school inside Charlotte's beltway where over 91% of the students live in poverty. About half of the student population have lived in poverty for two or more generations, while the other half, recent immigrants, would be considered relatively poor when compared to their neighbors, living in trailer parks not far from newly built subdivisions. It has been well documented that poverty contributes not only to stress, social and emotional challenges and lags in cognitive development, but also health and safety issues.<sup>1</sup> Reaction to stress may appear as rude or apathetic behavior while deficits in emotional intelligence appear as inappropriate impulsive behavior such as "acting out" in class. More troubling are the cognitive lapses--the differences in key areas of brain processing: language, memory, working memory, spatial cognition, cognitive control, visual cognition, and reward processing.<sup>2</sup> Almost the entire brain is negatively affected by poverty, specifically the temporal and frontal areas of the left brain, the hippocampus, and amygdala, the posterior parietal cortex, the prefrontal cortex, and the occipital region. There is no doubt that environmental influences greatly affect the brain and performance. The question then becomes how best to support learning while working to build memory, attention, processing, sequencing, social and problem-solving skills. Key to mitigating the environmental influences according to Jensen is to recognize the behavior signals, changing the school environment and empower students by teaching social skills and modeling appropriate behavior.<sup>3</sup> While teachers can do little to combat environmental stresses outside the school, Jensen suggests that reliable relationships, peer socialization and the quest for social status are strong drives that teachers can use to support students emotionally in the classroom. The question then becomes how best to support learning while working to build memory, attention, processing, sequencing, social and problem-solving skills.<sup>4</sup> Jensen suggests targeting a set of skills, such as fluid intelligence, which is applying knowledge to new situations, so this unit will focus on building just one skill in each activity.

### **A Brief Introduction to the Structure and Function of the Brain**

An athlete might tell you that success is partially a mind game and a brain change. Weighing in at around three pounds, the brain is an incredible adaptive organ, the central processing unit for the entire body. And like your computer's CPU, it decodes information, retrieves information, stores information, and chemically at the molecular-cellular level executes new activity along the body's circuitry. Unlike a computer, the brain has the ability to create new circuitry and strengthen often used paths, while seldom used circuits atrophy. We need to look at the structure and function of each part of the brain in order to better understand how the brain works.

The central nervous system (CNS) is composed recognizable masses, the forebrain, midbrain, hindbrain, and spinal cord. The forebrain is the anterior portion of the brain, its outermost layer is also known as the cerebral cortex, is wrinkled, providing increased

surface area for the dense layers of neurons that transmit information. These layers of tissues are folded upon each other, each unit processing a specific type of input and responding with a particular kind of chemical output, much like living IDE cables, those long flat cables that unfold to impossible lengths when a computer's housing is opened. A deep fissure divides the brain into right and left hemispheres that control the function of the physical body on the opposing side. Each hemisphere also controls aspects of perception and creativity. Thus, when describing the structure and function of this organ, anatomic references will be made to the plane or orientation from the anatomical neutral position. The forebrain is made up of the frontal, parietal, occipital, and temporal lobes. The frontal lobe is located within the anterior part of the skull. It is thought to control voluntary cognitive behavior, such as perceiving, planning, thinking comprehension, such as the understanding language as well as personality.<sup>5</sup> Located above the occipital lobe and directly behind the frontal lobe is the parietal lobe, which connects the frontal, occipital, and temporal lobes. The parietal lobe controls response to physical stimuli and attention. The right side controls recognition and orientation, while the left processes language.



The midbrain, positioned beneath the forebrain and above the hindbrain, consists of three structures the cerebral peduncle, the corpora quadrigemina, and the cerebral aqueduct, which divides the two. The cerebral peduncle transfers motor signals from the brain to the muscles while in communication with the cerebrum<sup>9</sup>. These processes occur in two pairs of ridges that comprise the corpora quadrigemina called the colliculi that transmit auditory and visual stimuli to the thalamus<sup>10</sup>. The thalamus is a doubled walnut-sized structure in the center of the brain with nerve endings that stretch out in all directions<sup>11</sup> to relay to different areas of the CNS. The superior colliculus is responsible for the transmission from the retina and visual cortex, while the inferior colliculus receives auditory input.<sup>12</sup> The cerebral aqueduct allows for the flow of cerebrospinal fluid (CSF) deep within, that protects the brain<sup>13</sup> from injury.

The hindbrain, the oldest part of the brain, located posterior and inferior to the forebrain, responsible for many autonomic nervous system processes such as respiration, digestion, and circulation, is located at the top of the spine and consists of the medulla oblongata, the pons, varolii, and the cerebellum. The largest of these, comprising two-

thirds of the mass of the organ, is the cerebellum. Located at the posterior of the brain above the spinal cord, the cerebellum controls walking, posture, coordination, and balance.<sup>14</sup> Gait and fine motor coordination deficits are examples of two indicators of possible developmental disorders<sup>15</sup> that can easily be observed during play that are controlled by this part of the brain.

The circuits of the brain are composed of neurons, brain cells that communicate with other neurons as well as muscles and glands. Neurons are composed of a cell body, dendrites, and the axon. The axon extends from the cell in a long lumpy line that ends in nerve terminals that transmit signals to other cells. Dendrites are shorter branching extensions that rise from the main body of the cell and receive signals from other cells. The point of communication between an axon and a dendrite is called a synapse. An electrical impulse is generated by the soma or cell body that is carried down the axon to its synapse. At that point a chemical neurotransmitter carries the message to the next cell's dendrite where that cell converts the signal from chemical energy back to an electrical impulse. The primary neurotransmitters are glutamate and gamma-aminobutyric acid (GABA), which acts as start/stop signals. When these two neurotransmitters act upon a dendrite, the pathway between the two cells is strengthened. This change is known as long-term potentiation (LTP) because each time this pathway is activated, the synapses become stronger and the transmission becomes more efficient. Other neurotransmitters such as dopamine, serotonin, and norepinephrine (NE) affect brain function by inhibiting or amplifying the glutamate/GABA interaction as well as acting upon the dendrites themselves. Dopamine influences attention, movement, and satisfaction signals, while serotonin influences mood, anger, and impulsivity. Norepinephrine influences attention as well as perception and motivation. Physical exercise has been shown to balance these neurotransmitters as well conventional psychiatric medications such as Prozac<sup>16</sup>, a strategy for teachers to consider in attempting to relieve the chronic stress of poverty in their classrooms.

Equally important to the functioning of neurons is maintenance of the soma itself. Crucial for the life-span of the neuron are a set of proteins called neurotrophic factors. These proteins maintain the neuron's cell infrastructure and the primary one is known as brain-derived neurotrophic factor (BDNF). BDNF causes synaptogenesis as well as strengthening the existing synapses and increasing neurotransmitter release. Quite simply, BDNF prolongs the life of the neuron and supports its function. For years scientists believed that the adult brain cells did not produce new neurons. As research has shown the creation of new neurons (neurogenesis) does occur through the transformation of stem cells in the hippocampus, an important consideration when designing learning activities because of the unique effects that exercise has upon the brain. It is the knowledge that the brain can develop new neural pathways in response to a change in environment or compensate for injury and disease (neuroplasticity) and neurogenesis on which this curriculum unit is based.

## The Effects of Exercise on the Brain

In recent years, scientists have affirmed what athletes have known for years, that a regular regimen of exercise has positive physical and mental benefits. In general, the brain benefits from exercise by increased blood flow and the increase of oxygen and nutrients, but particular areas of the brain are greatly affected by exercise. Research on the brain showed that BDNF not only increased during the acquisition and assimilation of new information by the brain, it increased during exercise<sup>17</sup> and that LTP and BDNF were linked in a complimentary cycle when learning was paired with exercise. If LTP was stimulated then there would be a corresponding increase in BDNF and if BDNF was increased there was an increase in LTP. Studies that looked at decreased BDNF observed a decrease in LTP<sup>18</sup>. It became clear that physical exercise supported the infrastructure of neurons by increasing the amount of BDNF in the body as well as increasing the rate of learning. What was not known until 1998 was that the human brain can produce new neurons through the transformation of stem cells in the hippocampus. Exercise increases the number of these budding neurons, but does not increase their survival rate<sup>19</sup>. However, exercise does increase the “length, complexity, and spine density”<sup>20</sup> of a neuron’s dendrites, increasing the total volume of the dentate gyrus. Spine density in parts of the hippocampus is significantly increased during exercise. Learning, that is LTP, increases the number of activated neurons. So, exercise combined with learning is the key to increasing the number and function of neurons.

A cascade of chemicals is released as an effect of exercise: oxytocin, which enhances social bonding,<sup>21</sup> dopamine, which activates the amygdala, the reward center of the brain and GABA, which enhances focus and memory. GABA allows the brain to tune out distractions and focus. Fine controlled movement such as yoga and tai chi increase the amount of GABA available to the brain.<sup>22</sup> Activities that engage both right and left hemispheres of the brain simultaneously, midline movements, activate focus. Consequently, adding both types of movement would be beneficial in a classroom setting.

Another aspect of exercise is learning new reactions to stress. Jensen cites chronic stress as a condition of poverty. Exercise can be used to teach new positive reactions to increased heart rate and other physiologic stress reactions. If the new positive experiences are used to form new associations to stressors, could that increase emotional resiliency and introduce healthy strategies to deal with emotions?

## **Teaching Strategies**

How does all the information about the brain apply to classroom instruction? If there is a correlation between smaller hippocampus volume and intelligence<sup>23</sup> in children of poverty, how can instructional practices overcome physiology? Although schools cannot control the home environment, teachers can and do control the culture of their own classrooms in matters of attitude, relationships and purpose<sup>24</sup>. Jensen suggests using movement to raise energy and increase effort, foster positive mind-body states, increase focus, create social bonds within the classroom, and relieve stress. Hannaford states that movement is essential to the learning process, especially coordinated balanced movements<sup>25</sup>. The activities in this curriculum unit support what Hannaford calls “interactive” focus for group work as well as inner focus for concentration and study.

## **Classroom Activities**

Of all the disciplines taught on the elementary level, Media & Information skills are the most abstract and in my opinion, the least popular. Information skills such as Cornell note-taking, taught without a connection to classroom content or life experience are meaningless and un-enjoyable for both instructor and students. Learning about the care of books would be more fun if it was related to the parts of the body. Introducing movement activities may be a solution to dry and dusty lessons, using movement to “anchor” thought.<sup>26</sup> There are three levels of activities I plan to implement in this unit that I hope may help with classroom management, content retention, and stress reduction in Media classes. Some lessons will be directly related to content, such as learning letter forms, clock hand positions, and cardinal directions. Other activities, will help in transitions and focus during instruction. Other activities such as the research or story-time, will only touch on information presented in the Exercise and the Brain seminar. Finally, I would like to use some movement when I cover morning work during the first 90 minutes of the day in the homeroom classrooms.

## **Grade K- 2 Yoga| Stillness and Movement Related to Stories**

### *Content Objectives*

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

PE. K.MS.1.1 Execute recognizable forms of the basic locomotor skills.

### *Key Questions*

In what position are your hands and feet?

Whose actions and words are you responsible for?

Appropriate movement, noise, and stillness are things students struggle with throughout the school day, as direct instruction requires children to sit still, be quiet, and listen in order to learn. Years ago, a colleague told me that I spent 85% of my time in direct instruction. That is a lot of time children have to spend still, “safe,” and silent. Research has shown that most listeners lose their attention after 15 minutes.<sup>27</sup> For story-time, a movement activity such as yoga can be used to redirect the attention of students. Other librarians have also used yoga with young children as either a stand-alone program led by a certified yoga instructor or a simple series, such as the one I use as part of a story-time program. In recent years, yoga has become a popular public library program with both senior citizens and small children. The rationale for including a yoga routine is to introduce routines that teach self-control and stillness while at the same time reducing stress.<sup>28</sup> For years I have fallen back on a wiggle-erasing yoga routine that I teach all my kindergarten classes. My current yoga sequence is a fairly active one that incorporates warrior poses, triangle, and forward bends to stretch limbs that have had to be still too long. First, I will expand my yoga repertoire by working with a certified instructor to address some behavior problems such as sitting still, focus, and remaining inside one’s personal space during story-time with Grades K-1. I will tie the routines to specific attitudes, stories or units of study to enhance learning. In her book, *The intenSati Method*, Patricia Moreno couples affirmations with aerobic routines, believing that spoken affirmation influences thinking and attitudes towards fitness. Jensen also writes about creating a positive classroom climate encouraging teachers to use affirmative self-talk. Taking the next logical step, I intend to link an affirmation to each pose. The warrior is a popular motif in both popular culture and within the school as we used to be a military magnet using the concepts of responsibility, respect, and citizenship in our code of conduct. Our mascot is the eagle, which is appropriate because the Eagle pose (Garudasana) as well as Garuda mudra in yoga are variations of the BrainGym™ Hookup, a midline stress-reducer that calms then activates both hemispheres of the brain. The first quarter series, with a modified affirmation from Moreno would look like this:

Pose

Affirmation

Tadasana (Mountain)  
 Improves posture  
 Strengthens quadriceps



“I am ready.”



Urdhva Hastasana  
(Upward Salute)  
Stretch



“I am a leader.”

Hridayanjali Mudra  
(Prayer hands)  
at forehead,  
at chest,  
at knees



“I am responsible for my  
thoughts,  
my words,  
my actions.”<sup>29</sup>

Uttanasana (Standing  
forward bend)  
Hamstring stretch  
Virabhadrasana II  
(Warrior 2)  
Energizer  
Hip and shoulder stretch  
Develops balance



“I have self-control.”

Virabhadrasana I  
(Warrior 1)  
Develops core



“I am courageous.”

Prasarita Padottanasana  
(Wide legged forward  
bend)  
Hamstring stretch  
Calms the mind

Utthita Trikonasana  
(Triangle)  
Energizer  
Inner Leg stretch



“I am strong and flexible.”

Prasarita Padottanasana  
(Wide legged forward  
bend)  
Hamstring stretch  
Calms the mind



“I am responsible for my  
happiness.”

Vrksasana (Tree)  
Strengthens posture

Urdhva Hastasana

Hridayanjali Mudra  
(Prayer hands)



“I am responsible for my  
thoughts,  
my words,  
my actions..”

Garudasana  
(Eagle)  
Improves balance



“I am an eagle.”

Urdhva Hastasana

“I am a leader.”

(Mountain)  
Tadasana

“I am ready.”

Developing four progressive routines, adding a new one each quarter will be a manageable approach. In addition to the one described above, there will be a seated sequence as well as simplified sun and moon salutations. These can be found in the Appendix. Photos of dance team members will be projected on the whiteboard so students can see the poses, while I assess for form.

### *Content Objectives*

PE. K.MS.1.1 Execute recognizable forms of the basic locomotor skills.

### *Key Questions*

What are the rules of the game?  
What is the name of that pose?  
Can you show me that pose?

Yoga games will be part of a review in the third quarter of the year. Games such as Yoga Memo, a concentration card game will be one of the Kindergarten centers. In this game, students must not only locate the matching pose cards, they must perform the pose in order to keep the set. The student who wins the most sets will win the game. Students will peer assess during this activity.

Grade K Midline Movements| Practicing letter forms: a,c,d,q,b, p and the number 8

### *Content Objectives*

PE. K.MS.1.1 Execute recognizable forms of the basic locomotor skills.

### *Key Questions*

Can you draw the letter \_\_\_\_\_ in the air?

Movements that cross the midline of the body are important because they engage both right and left hemispheres of the brain. Brain Gym™ exercises such as “Lazy 8s” and “Elephant” can be used to activate the brain for focus before independent work. These exercises ask participants to draw an infinity symbol in the air with their arms fully extended. The “Elephant” requires the student to lay his/her head on her arm in a sidestroke swim position. The movement begins in the shoulder and requires the student to bend at the knees and sway the body from side to side as the figure is created, while

“Lazy 8s” merely require a shoulder rotation. The “Alphabet 8” variation or Longhi’s “Skywriting” in which students use their fingers and toes to replicate letter forms will be used in library lessons before students are sent back to their seats to work.

Grade K Parts and More Parts| Practicing proper care of books

*Content Objectives*

K.CG.1 Understand the roles of a citizen

*Key Questions*

What happens when the spine is damaged?  
Why do you turn pages gently?  
Can you demonstrate how to turn gently?

This all-purpose standard is employed to teach about rules and expectations regarding behavior in and outside of the classroom. This “parts of books” lesson begins with Ted Arnold’s Parts, of course. Compare the spine of the book to the spine in one’s body. Students will be asked to locate their spine with their fingers, then trace the arc of a rib. The covers of the book protect the delicate papers of the stock, much in the same way that the ribs protect the delicate organs inside the body. When new books are handled for the first time, the spines must be carefully stretched before reading. Students will be shown some stretches and will practice the stretches. When readers turn the pages of the book, the pages are grasped gently at the corner and flipped, just as students would with their partners when they switch places in a “California Twirl”.

Grade 2 -3 Making connections | Moving from Concrete Experiences to Abstract Ideas in terms of Numbers and Time

*Content Objectives*

CC.K-12.MP.4 Model with mathematics.

*Key Questions*

Can you show me (tens, ones)?  
Show me how to add \_\_\_\_ and \_\_\_\_.  
Show me how to subtract \_\_\_\_ from \_\_\_\_.

Learning is embodied.<sup>30</sup> According to neurophysiologist Carla Hannaford, sensory information as well as emotion is linked with content by the brain. Yet it takes motor neuron activity or movement to make the thought concrete. As students move towards

developing logic, how can I support that with movement that connects a sensory concrete experience of the world with abstract thought? While teaching Dewey Decimal numbers using Chi Sen Bop would not be practical, practicing operational skills will be a fun “independent” work activity for second grade students to do on their iPads.

Chi Sen Bop is a finger counting method based on the abacus, where the right hand is used to count off numbers 1-9, while the left is used to track 10-90. It has been used successfully with at-risk 2nd graders as a way to understand place value and number sense<sup>31</sup>. Students will be taught to count to 100 using the system, then progress to simple addition and subtraction problems and finally to multi-digit problems. In the initial lesson, the concept will be demonstrated using a document camera. Students will then practice on iPads using FingerMath Chisenbop by Our House Interactive. While there are limitations to this method because three-digit, multiplication and division problems require the use of some sort of additional recording method, such as paper and pencil, it does assist students in basic computation. Assessment is made by the application and registered by the touch screen.

#### *Content Objectives*

3.MD.1. Tell and write time to the nearest minute and measure time intervals in minutes.

#### *Key Questions*

What does the shorter hand represent?

Can you position yourself at \_\_\_\_\_ o'clock?

Can you go around your partner in a \_\_\_\_\_ movement?

The representation of time using an analog clock is difficult for many students and yet it is a requirement not only for Common Core Mathematics, but daily life function as the archaic analog clock is still used during testing as a way to represent time. Longhi's “Jump Around the Clock” will be used to familiarize students with the clock face as well as clock-wise and counter clock-wise movement.

#### *Content Objectives*

2.G.1 Use geographic representations, terms and technology to process information from a spatial perspective.

#### *Key Questions*

In what cardinal direction is the sun?

In what direction are you facing?

While using the compass, can you tell me how to locate \_\_\_\_\_? (your classroom, bus lot, cafeteria)

A variation of this exercise will be used to teach compass direction, part of the second grade Social Studies standard. Using a compass, students working in teams will locate the four cardinal directions. Students will then be asked to align their bodies so that the left side faces East and the frontal plane faces North. This exercise will be repeated in the morning on several different locations on campus until the students can orient themselves facing North. After students have mastered this, I will assess whether they can transfer that knowledge to a change in the sun's position, by asking them to apply what they have learned in an afternoon session.

Grades 4-5 Self-care | Learning to Sit and Move when Using Digital Devices.

### *Content Objectives*

IT.4-5.RP.1 Apply a research process as part of collaborative research.

IT.4-5.SE.1.2 Understand ethical behavior (copyright, not plagiarizing, netiquette) when using resources

### *Key Questions*

At what angle are your elbows? What should they be?

How can I adjust my workstation to meet my needs?

What is the take-away?

Got Credibility?

In almost every way, from chair height to lighting, the ergonomics of computer work is unhealthy for students, leading to stress and pain, the most common of which are lower back pain and damage to the hand.<sup>32</sup> The lesson set will begin with visuals presenting information on ergonomics when working on computers. Students will take notes using a mind maps format. Students will then discuss what they learned. Students will also be asked to describe which was more visually appealing and which presented the most information. A lesson will be presented on infographics. Infographics are visual, artistic representations of data. This ancient-modern form is used to show pertinent details, clarify information, provide additional background, and, more importantly, to draw attention to the subject.<sup>33</sup> The study and creation of infographics support information, visual and technology literacy. The steps in creating an infographic is the same for any written research project that requires students to locate, interpret, evaluate, synthesize, and organize both information and media.<sup>34</sup> Students will be asked select a topic from a choice board to create an infographic in a layer based illustration program such as Google Draw. This assignment will be loosely based on Kaitlyn Tucker's *Student Designed Infographics: Process & Products*<sup>35</sup> that includes a proposal form and a credibility check

form. Topics will include aspects of health such as ergonomics, effects of exercise, and nutrition. For more information on how to teach infographics, see Kathy Schrock's *Infographics as Creative Assessments*.

### *Content Objectives*

CSA.IA Implement proper keyboarding technique  
CSA. I. A. 1 Keying position

### *Key Questions*

What muscles are we stretching?  
How can you adjust your workstation so that your hands in the correct position?  
What did you like? What would you change?

As students are required to sit for long lengths of time using various technology, it becomes important for them to learn healthy habits. It is also a time when students begin to realize what stress is. For this set of activities, I will teach desk and chair stretches, brain energizers, and stress-busters for limited movement activities. I will also teach students yoga poses or activities that will increase focus. Students will research stretching activities. Students will then work in groups to design a stretching routine that they can share with other students. Peer assessment will be in the form of "Three stars and a wish" in which three positive comments can be made as well as one helpful suggestion.

Grades K-5 | Great Morning!

K-5 HF.3 Understand the importance of achieving and maintaining a health-enhancing level of physical fitness.

### *Key Questions*

How do you know when you need a brain break?  
What can you do when you need to focus?  
What can you do when you need to energize?  
What can you do when you need to calm down?  
Where are your hands and feet in this move? Body check!

I will develop a quick 1-3 minute morning routine that I can use for all grades to transition classes from (hopefully) quiet morning work in their homeroom classes, down the hall or across the schoolyard to the Media Center. Normally, this time would be used by the homeroom teacher to greet and assess the emotional and physical well-being of each student entering the classroom, however as this task falls to a rotating staff member each morning, it is crucial to me to have a routine I can quickly teach that will set a calm

and happy tone for the day, regardless whose classroom I am sent to in the morning. I have been using energizers on GoNoodle.com and Brain-Breaks.com in my Grade 2 and 3 classes as transitions before they sit down to work on the laptops. I use “Desk Space Cadets”, “My Space Bubble”, and “Mind Your Line” from Sara Longhi’s *Classroom Fitness Breaks to Help Kids Focus* to transition K-1 classes from their desks to the hallway. From this we progress to Toe-Heel walking and Cross-Crawls will help any student focus as the activities activate both hemispheres of the brain.<sup>36</sup> Students will be asked to self assess in terms of form, balance and flexibility.



## **Appendix 1 Implementing Teaching Standards**

PE.K.MS.1 Apply competent motor skills and movement patterns needed to perform a variety of physical activities. Yoga asanas will be taught as part of Kindergarten lessons to energize or quiet students as ritual part of storytime.

PE. K.MS.1.1 Execute recognizable forms of the basic locomotor skills. Kindergarten students should be able to correctly assume yoga postures as the year progresses.

CC.K-12.MP.4 Model with mathematics. Second grade students will be able to demonstrate an understanding of place value using their fingers

3.MD.1. Tell and write time to the nearest minute and measure time intervals in minutes. Third grade students will be able to jump to hour positions using the analog clock face as a reference. Students should be able to model with their arms the time using the analog clock face as a reference.

2.G.1 Use geographic representations, terms, and technology to process information from a spatial perspective. Second grade students will be able to locate the cardinal directions using the sun as orientation. Students will verify using magnetic compasses.

IT.4-5.RP.1 Apply a research process as part of collaborative research. Students will research health topics and create an infographic style drawing.

IT.4-5.SE.1.2 Understand ethical behavior (copyright, not plagiarizing, netiquette) when using resources. Students will cite their sources.

CSA.I.A Implement proper keyboarding technique. Students will model correct ergonomic keyboarding technique when typing.

CSA. I. A. 1 Keying position. Students will locate “home” position and use “piano hands” when typing.

K-5 HF.3 Understand the importance of achieving and maintaining a health-enhancing level of physical fitness. Students will demonstrate an understanding the importance of movement and stretching before and during lessons and tests by performing stretches, midline movements and brain breaks.

### Additional Quarterly Yoga Routines

Winter Routine	Spring Routine	Summer Routine
Sukhasana	Tadasana	Tadasana
Dandasana	Urdhva Hastasana	Hridayanjali Mudra
Marichyasana III	Uttanasana	Uttanasana
Balāsana	Lunge	Lunge
Dandasana	Plank Pose	Adho mukha Shvānasana
Simhasana	Bhujangāsana	Table
Anjai Mudra	Adho mukha Shvānasana	Balāsana
	Lunge	Urdhva Mukha Svanasana
	Tadasana	Adho mukha Shvānasana
		Lunge
		Uttanasana
		Tadasana

## Resources

### List of Books for Classroom Use

Gates, Mariam, and Sarah Jane Hinder. 2015. *Good night yoga: a pose-by-pose bedtime story*.

Just as the title says, this is a complete yoga sequence for calming the mind and body.

Verde, Susan, and Peter H. Reynolds. 2015. *I am yoga*.

A quiet story book that teaches de-stressing yogic practices.

Wong, Janet S., and Julie Paschkis. 2007. *Twist: yoga poems*. New York: Margaret K. McElderry Books.

A collection of poems about different poses, illustrated with beautiful southeast Asian motifs.

Yoo, Taeun. 2012. *You are a lion!: and other fun yoga poses*. New York, NY: Nancy Paulsen Books.

A fun read that will have students guessing which animal pose will be next.

### List of Materials for Classroom Use

#### Yoga 4 Classrooms Deck

Yoga 4 Classrooms®  
c/o ChildLight Yoga  
53 Washington Street  
Suite LL100  
Dover, NH 03820

This set provides multiple cards for small group work. Features poses that are easy to do in a classroom setting either seated or in a confined space.

#### Memo Yoga Game

YogaKids International  
19135 West US Highway 12  
New Buffalo, MI 49117

Phone 269-469-1300

Fax 269-469-1313

A memory or concentration game for children. In order to win the pair, students must not only find the matching cards but also demonstrate the pose.

#### Reading List for Students

Napier, Tanya, and Jen Kollmer. 2007. *Girl in a funk: quick stress busters (and why they work)*. San Francisco, CA: Zest Books.

Appealing to girls, this light read provides tips for dealing with typical stressful situations, including yoga.

Sheen, Barbara. 2015. *Yoga*. Farmington Hills, Mich : Lucent Books.

Part of the Science of Sports series, this provides an overview of the history, practice and science behind yoga.

Wong, Janet S., and Julie Paschkis. 2007. *Twist: yoga poems*. New York: Margaret K. McElderry Books.

A beautiful book of poems about basic yoga poses for children. A book perfect for sharing with students.

#### Reading List for Teachers

Bersma, Danielle, and Marjoke Visscher. *Yoga Games for Children: Fun and Fitness with Postures, Movements, and Breath*. Alameda, CA: Hunter House Publishers, 2003.

A nice resource of yoga games for yoga teachers, which can be adapted for <sup>TM</sup>use.

Biffle, Christopher. *Whole brain teaching: 122 amazing games! : challenging kids, classroom management, writing, reading, math, Common Core/state tests*. Yucaipa, CA: Whole Brain Teaching LLC, 2015.

Biffle, Chris. *Whole Brain Teaching for Challenging Kids (and the Rest of Your Class, Too!)*. Yucaipa, CA: Whole Brain Teaching LLC], 2013.

Two great resources for engaging students with classroom management strategies. While not directly related to exercise, the use of call-and-response as well as social learning and movement will increase both noise and learning in any classroom.

*Brain Facts: A Primer on the Brain and Nervous System.* 4th ed. Washington, D.C.: Society for Neuroscience, 2002.

A go-to quick reference about brain structure and function.

Flynn, Lisa. *Yoga for Children: 200 Yoga Poses, Breathing Exercises, and Meditations for Healthier, Happier, More Resilient Children.* Avon, Massachusetts: Adams Media, 2013.

While written for parents, this volume does include a chapter on how to teach yoga to children along with meditations, games, songs and chants. A very useful resource for teachers.

Hannaford, Carla. *Smart Moves: Why Learning Is Not All in Your Head.* Arlington, Va.: Great Ocean Publishers, 1995.

A proponent of Brain Gym™, Hannaford reviews why movement should be an essential component of classroom instruction. If you read nothing else, read chapter 7 which outlines the Brain Gym™ activities and why they work.

Jensen, Eric. *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do About It.* Alexandria, VA: ASCD, 2009.

Jensen, Eric. *Engaging Students with Poverty in Mind: Practical Strategies for Raising Achievement.* Alexandria, VA: ASCD, 2013.

Jensen's first volume covers the physiological damage that poverty causes to the brains of children raised in poverty and goes a long way in explaining some of the behaviors teachers see in high-poverty schools. The second provides strategies to engage these students.

Lengel, Traci, and Mike Kuczala. *The Kinesthetic Classroom: Teaching and Learning through Movement.* Thousand Oaks, Calif.: Corwin, 2010.

A very useful resource that not only outlines the rationale for providing brain breaks, but also offers brain based movement activities appropriate for secondary as well as primary grades and in different disciplines.

Moreno, Patricia. *The IntenSati Method: The Seven Secret Principles to Thinner Peace.* New York: Simon Spotlight Entertainment, 2010.

The rationale for combining affirmation with movement as explained by Moreno. This optional read is to nourish the adult within.

Ratey, John J., and Eric Hagerman. *Spark: The Revolutionary New Science of Exercise*

*and the Brain*. New York: Little, Brown, 2008.

The book that explains how and why the brain grows stronger when animals exercise regularly. Both inspirational and practical, this book explains brain science in plain English.

Rawlinson, Adrienne. *Creative Yoga for Children: Inspiring the Whole Child through Yoga, Songs, Literature, and Games : Forty Fun, Ready-to-teach Lessons for Ages Four through Twelve*. Berkeley, Calif.: North Atlantic Books, 2013.

Ready to teach lessons for the yoga instructor, complete with materials list and developmentally appropriate activities linked to content areas. A great resource for classroom teachers as well.

Suzuki, Wendy, and Billie Fitzpatrick. *Healthy Brain, Happy Life: A Personal Program to Activate Your Brain and Do Everything Better*. Dey Street Books, 2015.

This is Suzuki's personal discovery of the effects of exercise and how she applied this in her college classroom teaching. This optional read is to nourish the adult within.

## Notes

---

<sup>1</sup> Jensen, Eric. "Understanding the Nature of Poverty." In *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do about It*. (Alexandria, VA: ASCD), 2009, 7.

<sup>2</sup> Jensen, Eric. "Understanding the Nature of Poverty." In *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do about It*, Alexandria, VA: ASCD, 2009, 34.

<sup>3</sup> Jensen, Eric. "Seven Engagement Factors." In *Engaging with Poverty in Mind: Practical Strategies for Raising Achievement*, Alexandria, VA: ASCD, 2013, 7-19.

<sup>4</sup> Jensen, Eric. "Understanding the Nature of Poverty." In *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do about It*. Alexandria, VA: ASCD, 2009, 38.

<sup>5</sup> "Brain Structures and Their Functions – Serendip" - *Bryn Mawr*, 13 Sept. 2015.

<http://serendip.brynmawr.edu/bb/kinser/Structure1.html>.

<sup>6</sup> "Gray 728", Wikipedia, the free encyclopedia, [nd]

<https://upload.wikimedia.org/wikipedia/commons/thumb/1/1a/Gray728.svg/1000px-Gray728.svg.png>.

<sup>7</sup> "Cerebral Lobes." Wikipedia.[nd]

[https://upload.wikimedia.org/wikipedia/commons/8/85/Cerebral\\_lobes.png](https://upload.wikimedia.org/wikipedia/commons/8/85/Cerebral_lobes.png).

<sup>8</sup> "Diagram of the Brain Stem..." Wikipedia, the free encyclopedia. [nd]

[https://upload.wikimedia.org/wikipedia/commons/thumb/8/83/Diagram showing the brain stem which includes the medulla oblongata, the pons and the midbrain \(2\) CRUK 294.svg/1000px-Diagram showing the brain stem which includes the medulla oblongata, the pons and the midbrain \(2\) CRUK 294.svg.png](https://upload.wikimedia.org/wikipedia/commons/thumb/8/83/Diagram showing the brain stem which includes the medulla oblongata, the pons and the midbrain (2) CRUK 294.svg/1000px-Diagram showing the brain stem which includes the medulla oblongata, the pons and the midbrain (2) CRUK 294.svg.png).

<sup>9</sup> "Midbrain: Definition, Function & Structures." *Study.com*, 2015.

<http://study.com/academy/lesson/midbrain-definition-function-structures.html>.

<sup>10</sup> BrainFacts.org: Explore the Brain and Mind. BrainFacts.org. 2005. <http://www.brainfacts.org/>.

<sup>11</sup> "Thalamus ." Wikipedia, the free encyclopedia. 2011. <https://en.wikipedia.org/wiki/Thalamus>.

<sup>12</sup> "Midbrain | Anatomy." *Britannica.com*. 2015. <http://www.britannica.com/science/midbrain>.

<sup>13</sup> "Cerebral Aqueduct." *MedFriendly.com*. 2014. 26 Sep. 2015. <http://www.medfriendly.com/cerebral-aqueduct.html>.

<sup>14</sup> "Brain Structures and Their Functions – Serendip" - *Bryn Mawr*, 13 Sept. 2015.

<http://serendip.brynmawr.edu/bb/kinser/Structure1.html>.

<sup>15</sup> Clark, Jane E et al. "Developmental coordination disorder: issues, identification, and intervention." *Journal of Physical Education, Recreation & Dance* 76.4 (2005): 49-53.

<sup>16</sup> Ratey, John J, and Eric Hagerman. *Spark: The revolutionary new science of exercise and the brain*. Little Brown & Company, 2008. 37.

<sup>17</sup> Ratey, John J, and Eric Hagerman. *Spark: The revolutionary new science of exercise and the brain*. Little Brown & Company, 2008. 40-44.

<sup>18</sup> Cunha, Carla, Riccardo Brambilla, and Kerrie L. Thomas. "A simple role for BDNF in learning and memory?." *Frontiers in molecular neuroscience* 3 (2010).

<sup>19</sup> Curlik, Daniel M et al. "Physical skill training increases the number of surviving new cells in the adult hippocampus." *PloS one* 8.2 (2013): e55850.

<sup>20</sup> Suzuki, Wendy, and Billie Fitzpatrick. *Healthy Brain, Happy Life: A Personal Program to Activate Your Brain and Do Everything Better*, 109. Dey Street Books, 2015.

<sup>21</sup> Reynolds, Gretchen. "'Love Hormone' as Sports Enhancer" - *Well - The New York Times* 21 November 2012. <http://well.blogs.nytimes.com/2012/11/21/the-love-hormone-as-sports-enhancer/>.

<sup>22</sup> Hannaford, Carla. *Smart Moves: Why Learning Is Not All in Your Head*. (Arlington, Va.: Great Ocean Publishers, 1995)103.195-6.

- 
- <sup>23</sup> Jensen, Eric. "Seven Engagement Factors." *Engaging with Poverty in Mind: Practical Strategies for Raising Achievement*, 14. Alexandria, VA: ASCD, 2013.
- <sup>24</sup> Jensen, Eric. "Understanding the Nature of Poverty." *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do about It*, 31. Alexandria, VA: ASCD, 2009.
- <sup>25</sup> Hannaford, Carla. *Smart Moves: Why Learning Is Not All in Your Head*. (Arlington, Va.: Great Ocean Publishers, 1995)113.
- <sup>26</sup> Hannaford, Carla. *Smart Moves: Why Learning Is Not All in Your Head*. (Arlington, Va.: Great Ocean Publishers, 1995)103.
- <sup>27</sup> Biffle, Christopher. 2013. *Whole brain teaching for challenging kids (and the rest of your class, too!)*. [Yucaipa, CA]: [Whole Brain Teaching LLC].
- <sup>28</sup> Streeter, CC, PL Gerbarg, RB Saper, DA Ciraulo, and RP Brown. 2012. Effects of yoga on the autonomic nervous system, gamma-aminobutyric-acid, and allostasis in epilepsy, depression, and post-traumatic stress disorder. *Medical hypotheses* 78, no. 5: 571-579.
- <sup>29</sup> Moreno, Patricia. *The IntenSati Method: The Seven Secret Principles to Thinner Peace*. New York: Simon Spotlight Entertainment, 2010.
- <sup>30</sup> Hannaford, Carla. *Smart Moves: Why Learning Is Not All in Your Head*. (Arlington, Va.: Great Ocean Publishers, 1995)17.
- <sup>31</sup> Stegemann, Kim Calder, and Matthias Grünke. Revisiting an Old Methodology for Teaching Counting, Computation, and Place Value: The Effectiveness of the Finger Calculation Method for At-Risk Children. *Learning Disabilities--A Contemporary Journal* 12, no. 2 (2014).
- <sup>32</sup> "Computers and Kids' Ergonomics" *International Ergonomics* 2010. 19 Sep. 2015  
<<http://www.iea.cc/ECEE/pdfs/RMGillespie%20dissertation%20Jan%2020sm.pdf>>
- <sup>33</sup> "Infographics" Kathy Schrock's Guide to Everything. 2011. <http://www.schrockguide.net/infographics-as-an-assessment.html>.
- <sup>34</sup> "Infographics" Kathy Schrock's Guide to Everything. 2011. <http://www.schrockguide.net/infographics-as-an-assessment.html>.
- <sup>35</sup> "Student Designed Infographics: Process & Products." *CatlinTucker.com* .2013.  
<http://catlintucker.com/2013/11/student-designed-infographics-process-products/>.
- <sup>36</sup> Hannaford, Carla. 1995. *Smart moves: Why learning is not all in your head*.131-2. Great Ocean Publishers, Inc., 1823 N. Lincoln St., Arlington, VA 22207-3746