

A Thesis Presented to  
The Faculty of Alfred University

The Effects of Nature on Overall Health & Wellness:  
(A Historical and Scientific View of Exposure to the Great Outdoors)

Anastasia M. Fredell

In Partial Fulfillment of  
the Requirements for  
The Alfred University Honors Program

May 1<sup>st</sup>, 2013

Under the Supervision of:

*Chair: Dr. Andy Eklund*

Committee Members:

*Laurie McFadden  
Dr. Fred Beaudry  
Kimmy MacCrea  
Dr. Gordon Atlas*

Abstract:

From the beginning of time, people's environments have dictated their well being; both physically and emotionally. Studies have shown that increasing the amount of time spent outside promotes wellness in a variety of ways, ranging from providing an escape from the stress of one's daily tasks and occupation, to increasing the levels of Vitamin D in the human body. Additionally, exposure to the outdoors helps limit one's exposure to pollutants that become trapped inside homes and offices. It is then observed that increased exposure to the outdoors is incredibly beneficial to physical health and overall wellness.

### Historical Background:

Prehistoric humans lived in commune with nature, constantly experiencing its benefits and challenges. As technology and skills evolved, and the Earth's climate changed, our ancestors started to utilize natural resources to build shelters. People began building settlements in Egypt and Western Asia as early as 10,000 B.C.E. (what is known as the New Stone Age or Neolithic Era).<sup>1</sup> These structures were built to be more than just basic shelters; they were built as permanent dwellings with amenities such as animal pens and gardens. This shift from nomadic life eventually led to the start of agriculture, an occupation still practiced today.

Moving away from Nomadic culture meant that people had more time and energy to work because they were not traveling constantly. As a result, the newly discovered practice of agriculture became incredibly successful, especially in areas like the Fertile Crescent. Eventually, Neolithic people were able to domesticate animals as well. This allowed for the cultivation of crops and animals for slaughter. There is evidence that early Neolithic peoples chose to create settlements close to one another, forming what we would think of today as a city.<sup>1</sup> One of the earliest known cities is Catal Hoyuk, which lies on the Mediterranean Sea in modern day Turkey. Advancements in agriculture lead to a surplus of manpower. As a result, people began to adopt a variety of specialized occupations, leading to the foundations of modern day science, education and trade.

Explorers were expanding the boundaries of traditionally populated areas in the late 15<sup>th</sup> century. Columbus stumbled upon North America on his way to India. Throughout the next two hundred years, a slew of European countries began to colonize North America. Throughout this timeframe, societies remained primarily agricultural. People mostly worked outdoors and spent the majority of their days exposed to the elements. That was, until the year 1763 when industrialization began in Great Britain with the invention of the steam engine. At this time, what is today the United States was still identifies as a collection of colonies under Great Britain's authority. The notion of industrialization became planted in the minds of colonists; after the United States gained its independence from Great Britain, Americans started an industrial revolution of their own. In 1820, industrialization took hold in the northeastern United States via the textile industry. Industrialization eventually spread beyond Massachusetts to the steel industries of Pittsburgh and Cleveland.

An abundance of natural resources contributed to the growth and spread of industrialization in the United States. Although industrial expansion helped make the USA and Great Britain world powers in industry, it wasn't always a beneficial transition. The almost instantaneous change from agriculture to industrial society was incredibly detrimental to many established communities. In fact, it has been argued that the Industrial Revolution negatively affected all aspects of human life, including population, living conditions, family structures, quality of life, and social class consciousness.<sup>2</sup>



Populations in cities began to explode as individuals left the countryside, flocking to fill growing cities and newly created factory jobs. Increased migration to urban areas led to the building of inexpensive housing for workers and their families. These building, known as tenements, became overcrowded with people desperate for a place to live. Disease spread rapidly through them; as a result numerous deaths occurred. Those employed in factories worked long hours in atrocious conditions. Additionally, there was a huge financial divide between the extremely wealthy and the poorest of poor. People became divided into two main categories, the “Have’s” and the “Have Not’s.”<sup>3</sup> This huge socio-economic gap made it tremendously hard for those with less money to survive. In many ways, the lives of industrial workers were diminished for the sake of progress.

The industrial revolution produced huge advancements in technology, electricity, automation and farming. Major improvements in cultivation and harvesting meant that less people needed to work as farmers, leading to a wider variety of career choices. These new specialized occupations meant less overall exposure to the outdoors. The effectiveness of industrialized machines have optimized agriculture to a point where it is no longer necessary for the average person to consider a career in farming. In today’s society less, than 2% of the US population are farmers.<sup>4</sup>

**Discussion:**

For the first 20,000+ years of their existence, humans spent the majority of their day outdoors, exposed to the elements and nature. They learned how to adapt to their surroundings, take shelter from the elements, and react to changes in climate and environment. We now live in a fast paced world where people rarely take time for themselves. There is always something going on or somewhere to be. Life presents stresses for adults and children alike. The world has become complicated and busy. We live in an age of high technology where everyone has computers, smart-phones and accessibility to Wi-Fi is omnipresent. The vast majority of people spend their days inside, and only on the weekends do they venture out to run errands or cook outside. Most people live this unbalanced routine for the entirety of their lives.

Spending time outside is beneficial to all aspects of wellness. Scientifically, clean air and Vitamin D allow for increased bodily health and mental wellness. This in turn can enhance mood and boost learning in both adults and children. If the advantages of exposure to the outdoors were better understood by the public, the lives of many could be enhanced.

**Supporting Content:***Air Quality*

Air quality is a very important environmental issue, even though people might not realize how much of an effect it has on their day-to-day health. There are two types of air quality, indoor and outdoor. In 2012, the EPA rated poor indoor air quality as the “fourth largest environmental threat” to our population.<sup>5</sup>

The amount of pollutants entering our homes increases daily. It is a common misconception that outdoor air is more polluted than indoor air. In most buildings, outdoor air is pumped inside to mitigate the itinerant pollutant levels.

Combustion of hydrocarbons are a major contributor to air pollution.

“Airborne particles (also referred to as particulate matter or PM) are tiny solid substances and liquid droplets that are light enough to remain suspended in air for days and weeks at a time. PM is generated from a wide variety of sources each of which has a unique signature of chemical composition and size.”<sup>5</sup>

Particulate matter is incredibly small, on the scale of nanometers or micrometers. This allows for the particle matter to move around the atmosphere in much the same way as the other molecules that make up the air we breathe.<sup>5</sup> As a result, microscopic pollutants are eventually homogeneously mixed throughout the atmosphere.

As scientists continue to intensely monitor air quality and its effects on health, they are becoming more aware of the amount of pollutants that originate inside the home. There are a wide variety of sources for indoor air pollution. Biological and combustion pollutants along with radon, mold, mildew and formaldehydes are the common contributors to decreased air quality in homes and businesses.<sup>6</sup> Biological pollutants are often key contributors to histamine responses in children and adults. Combustion pollution in indoor air is primarily a result of heating systems and hot water heaters. The combustion of fuel sources results in harmful gaseous byproducts such as CO and NO<sub>2</sub>.<sup>6</sup> Carbon monoxide can become lethal if not properly ventilated from a closed environment such as a

home. Nitric oxide is less dangerous, but can combine with water in the nasal passages to form dilute nitric acid, causing irritation and discomfort.

Radon and asbestos are considered to be more passive indoor pollutants. They exist in items that we put in our home, but are not directly produced as a result of living inside the way that combustion pollutants are. Radon is a naturally occurring radioactive gas. "Indoor radon exposure is estimated to be the second leading cause of lung cancer in the U.S."<sup>6</sup> Asbestos is a commonly known air pollutant. Asbestos abatement has occurred over the last 30 years as a way to mitigate the long-term health problems associated with exposure such as Mesothelioma.

In addition to radon and asbestos, other pollutants are found within the house and household items. Formaldehydes are found in many building products including flooring, carpets, particleboard and plywood paneling. Common household items such as cleaning products and aerosols can emit potentially dangerous particles into the air within the home. The majority of pollutants originating inside of homes and structures are not deadly. Indoor pollutants cause lasting health concerns, compounded substantially by the fact that the average American spends an average of 19 hours a day indoors.<sup>5</sup> This means that the average American spends almost 80% of his/her life in closed environments where indoor pollutants decrease air quality.

The key to improving air quality is proper ventilation. If homes are not properly ventilated, the air quality inside can become so poor that there can potentially be lasting health effects on the individual. The amount of outside air

that enters the home per hour is known as the ventilation rate.<sup>5</sup> Standard heating/cooling units replace anywhere from 10 - 50% of the indoor air volume per hour, assuming that the windows remain closed to conserve the heat or air conditioning. If natural ventilation is utilized by opening windows, it can take as little as 15 minutes to replace the majority of the indoor air volume with air from the outside. The replacement rate is dependent on factors such as weather and window size. Natural convection is far more efficient than the ventilation of heating and cooling systems.

Proper ventilation can be achieved by installing air filtration units within the home or office. However, these units cost thousands of dollars. It is much easier to simply open up the windows and allow for the pollutants trapped indoors to be removed via natural ventilation. When informed about the dangers of indoor pollutants, the reaction of most people is to go out and buy filtration systems. People often do not want to change their schedules or lifestyles, even when it will benefit them in the long run. When it comes down to it, there will always be pollutants in the air that people are exposed to. The best thing to do is to mitigate the concentration of pollutants by going outside and enjoying the fresh air.

### *Effects of Sunlight*

A variety of health benefits are associated with exposure to sunlight. Dr. James Spencer has stated that "being out in the sun boosts our mood, improves sleep, and promotes vitamin D production."<sup>7</sup> Sunlight is beneficial because of vitamin D, a vitamin best known for helping to create and maintain healthy bones.

It is also critically important in regulating the immune system and cellular motion inside the body.<sup>8</sup> There are three ways for our bodies to maintain the recommended amount of vitamin D. The first two routes are through ingestion; by eating foods that contain it or by taking a supplement. Excess vitamin D is stored in fat cells until it is needed again. It is incredibly easy to develop a vitamin D deficiency. Milk is often fortified with vitamin D to compensate for the lack of vitamin D that children get from other sources.<sup>8</sup>

The third way that humans get Vitamin D is by enjoying the outdoors. When exposed to sunlight, the skin will naturally start to produce Vitamin D, increasing overall health. Vitamin D creates healthy bodies by encouraging the absorption of calcium into the blood stream, helping bone health and contributing to thyroid, parathyroid, intestine and kidney health.<sup>9</sup> People who maintain a healthy level of vitamin D are also less likely to develop high blood pressure, diabetes, heart disease, multiple sclerosis and obesity.<sup>10</sup> The American Cancer Society has demonstrated through population studies that people who have low levels of Vitamin D are at a higher risk of dying from any of these maladies.<sup>9</sup>

The power of sunlight is often underestimated as a preventative medicine and a cancer-detering agent: In a 4-year study from The International Agency for Research on Cancer in 2007 looked at 1,179 healthy women over age 55 randomly chosen from rural Nebraska. One third the women received 1,400 to 1,500 milligrams of calcium each day, another third received calcium plus 1,100 IU of vitamin D each day, whereas the rest got a placebo. The women who took calcium and vitamin D had significantly less risk for all types of cancer similar to

women who possessed higher vitamin D levels when the study started.<sup>10</sup>

Although not conclusive, this shows that there may be potential to harness the sun to help combat cancer.

Being outdoors is also linked to simple benefits such as better sleep and a generally happier outlook on life.<sup>8</sup> Vitamin D correlates to a healthier sleep cycle by influencing the body's production of melatonin, a hormone produced naturally in the body by the pineal gland. Your 'body clock' regulates the amount of melatonin that the body produces. It is gradually released as the day progresses, and peaks as the body gets ready for sleep. The body regulates its melatonin throughout the night. When the concentration begins to fall the body wakes up, rested and ready to go.

The amount of melatonin that the body makes is directly connected to the amount of Vitamin D absorbed when exposed to sunlight.<sup>7</sup> When not exposed to enough sunlight, the body gets off its natural cycle, producing melatonin earlier or later than normal. This creates large deviations in both hormonal and sleep cycles. Poor sleep is often caused by abrupt changes in melatonin release. This is evident in people who work night shifts and have low Vitamin D levels as a result of isolation from sunlight. If isolated from sunlight for extended periods, people often experience what is known as Seasonal Affective Disorder.<sup>11</sup> This is a type of depression that occurs during the same seasons each year.<sup>12</sup> Most people experiencing SAD begin to feel depressed in the fall when days become shorter, and continue to feel depressed until the days become longer in late spring. Individuals who experience SAD symptoms often have a vitamin D

deficiency. This deficiency disrupts melatonin levels, altering the circadian rhythm. This causes imbalances of serotonin in the brain and results in mood swings. People with SAD often feel grumpy, lethargic, and experience an elevated level of anxiety.

Seasonal Affective Disorder affects everyone to some extent throughout the year. Most people will experience more anxiety and depression in the dead of winter than they would on the beach during the summer. WebMD reports that “about 5 percent of the population experiences the most severe symptoms of SAD -- depression and hopelessness - while another 15 percent have the so-called ‘winter blues’ or ‘winter doldrums’.”<sup>13</sup> Moderate to intense SAD is often treated with a sunlamp that replicates light waves emitted by the sun. This treatment allows the body to naturally boost its production of vitamin D, creating better health and a better mood in patients.<sup>14</sup>

### *Children and The Outdoors*

The benefit of the outdoors is just as important to the health of children as it is to adults. Children are in a stage of life where they are impressionable. A new term, “Vitamin G,” has been coined to refer to the amount of time that children spend outside. Child physiologists and pediatricians are intensely studying the effects of “Vitamin G,” due to a growing concern that child development is becoming impeded.<sup>15</sup> Today, it is easier for parents to sit their child in front of a TV than to go outside and play with them. In a world that moves faster and faster everyday, it is important to take time out for ourselves, but also



to teach children how to enjoy the outdoors and become in tune with nature.

Families need to be better educated on what simple lifestyle changes can do for general health.

*Prevention Magazine* published an article in November 2011 to promote the exposure of children to fresh air and the outdoors, entitled “The Fresh Air-Fix: The Simple Way to Boost Brainpower, Improve Health and Feel Great.”<sup>15</sup> This article encouraged parents to enforce a “green hour” for children to get outside and get active. The magazine urged parents to expose their children to ‘green spaces’ as a way to naturally combat stress and ADHD, and to increase success in school.<sup>7</sup> A mix of fresh air and exercise were encouraged along with activities such as gardening and bird watching. Encouraging a child to love nature can help shape a healthy lifestyle and prevent a variety of potentially harmful health effects.

“Teaching and Learning in Nature: Let’s Go Outside!”<sup>16</sup> is a pamphlet distributed by the National Fish & Wildlife Service. It details how the amount of time that children are spending outside is at an all time low, estimating that each child spends approximately 6.5 hours per day in front of televisions, computer and video games. Children are six times more likely to play a video game than to go outside and ride a bike. As a consequence, children are missing out on the mental and physical benefits that come from learning and developing in the outdoors. “Nature is important to children’s development - intellectually, emotionally, socially, spiritually, and physically” states the authors of the pamphlet.<sup>16</sup> Studies have shown that schools which utilize at least some sort of

outdoor learning activities in conjunction with classroom learning develop students with better math, science, social studies and language arts skills. One 2005 study by the California Department of Education found that students in outdoor science programs improved their test scoring by 27 percent.<sup>16</sup> Additionally, students that spend more time outdoors are said to have better self-esteem and increased motivation to learn new material. Being outside triggers children's imaginations and sparks their inquisitive minds.

There have been exciting findings associated with the mental development of children. "Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs, mud-turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water-lilies, woodchucks, bats, bees, butterflies, animals to pet, hay fields, pine cones, rocks to roll, sand, snakes, huckleberries and hornets: and any child who has been deprived of these has been deprived of the best of his/her education."<sup>16</sup> This quote from Luther Burbank shows that TVs, computers and video games weren't always common forms of entertainment for children. The only option for entertainment was to go outside and play with other kids. Children learned to problem solve by building forts, and learned how things worked by investigation. They used their imagination to build castles in their backyards and went on great expeditions around the neighborhood. Today's world is a scarier place where parents are hesitant to let their kids out of sight for fear of their safety. However, children should be given the opportunity to experience the outdoors for themselves, the same way their parents did.

Schools and parents have the opportunity to work together in order to make changes in education that allow students to learn while in harmony with nature. Schools can implement hiking for physical education or even adventures into local ecosystems for biology classes. By changing the way that we educate our children, we can help shape the lifestyle choices that they will make in the future. At the same time this physically engages them in the learning process, allowing for better results inside and outside the classroom. This creates active problem solvers with tactile connections to the material being taught, thereby maximizing their education. These students will grow up and encourage their children to learn in the same way, creating generations of healthy well-rounded children and adults with appreciation for the outdoors.

#### *Wellness: College Students and Professional Life*

Principles of outdoors learning are not only applicable to young children, but also to young adults and college students. College is a unique time of change and special circumstances. The stress of relationships, classes, jobs, tests, and papers makes college a difficult time for many people. Studies conducted by teacher's unions have shown that development occurs at the undergraduate level when students engage in both academic and non-academic activities both inside and outside of the classroom.<sup>17</sup> The objectives of a well rounded postsecondary education include critical thinking, intellectual flexibility, knowledge acquisition and application, as well as interpersonal and practical competence.<sup>17</sup> Professors can attain positive learning outcomes by incorporating in-classroom learning with

outdoor activities. This stimulates students through immersion in projects and activities. Students then have the opportunity to see real applications of ideas learned from textbooks. Creating interactive and exciting environments is one of the ways that we can help engage students, especially those who may not learn well in a traditional classroom environment. This mix of traditional and non-traditional methods helps foster a better understanding of the high-level material that is taught in college.

Leadership principles are being taught more often in colleges and universities. Educators have realized that well-rounded educations must include some type of leadership training to prepare students who are entering the workforce. Administrators are hoping to teach college students the tools for effective communication and project management. Most leadership training focuses on meetings, business dinners and resumes; however, there is a growing trend in leadership training known as outdoor leadership. These leadership training sessions are geared toward non-traditional learning environments where students experience challenges first hand and learn how to effectively resolve the issue.

These skills are helpful on excursions, but can also be tailored to the professional and personal world. There are now entire companies dedicated to teaching leadership skills to individuals through non-traditional methods. One of largest institutions is NOLS, the National Outdoor Leadership School. Their mission statement reads: "The NOLS community-its staff, students, trustees, and alumni-shares a commitment to wilderness, education, leadership, safety,

community, and excellence. These values define and direct who we are, what we do, and how we do it.”<sup>18</sup> NOLS believes that education should not only be informative but that it should also be fun, exciting and challenging to students. They design their courses and trips to foster skill building and personal development, while expressing the importance of safety and respect for the environment. Educators and guides are “committed to inspiring students to explore and develop their understanding of wilderness ethics, leadership, teamwork, natural history and technical skills.”<sup>18</sup> This creates a well-rounded educational and leadership experience. The NOLS initiative has become incredibly successful in locations throughout the United States and around the world.

NOLS and similar organizations are pushing the envelope on traditional learning environments and helping students to succeed in unexpected yet enriching ways. Participation, however, is incredibly expensive and not available to the average child. As a result, the idea hasn’t become common. NOLS concepts would likely do well if expanded and implemented in conventional school districts. Teachers don’t need to plan extensive trips to Patagonia for students to reap the benefits of learning and thriving outdoors. It can be achieved by taking students outside to look at the plant life during biology class. Math teachers can bring their chalkboards outside to teach counting and addition. This type of hands on learning will enrich educational experiences and develop inspired children and adults who are eager to learn and try new things. Change may not happen instantaneously, but if families continue to push the importance

of wellness in wilderness to those around them, it will slowly change the way people think about going outdoors.

In the professional world, there has been a change in how offices are structured. Companies started to move away from the one room, cubicle style workplace in favor of more pleasing designs. Employers are taking cues from companies like Google that allow employees to have fun and relax while at work. Google popularized the idea that happy employees produce a better quality of work.<sup>19</sup> Although not all companies can achieve what Google has done to the same scale, it is possible to help employees to be happier and healthier at work by incorporating green spaces into office buildings. This can be as simple as picnic tables on the lawn, or the roof as a place for employees to relax and eat lunch. These spaces are environments for employees to utilize while still getting their work done. When employees get sun and fresh air, they improve their health, which means less sick days, which makes everyone happy.

### **Thesis Project:**

#### *Purpose:*

Spending time outside has always been close to my heart. As a child, I grew up spending a lot of my time outdoors. I planted gardens with my mom, made tree forts with my dad, and played in mud puddles in my driveway. I started playing soccer when I was 3, and continued playing until I was a senior in High School. Getting outside, exercising, and having fun with my friends was a huge part of my lifestyle. Coming to college, I did not play a sport but still wanted to

spend time outside. I realized that I could change my lifestyle so I could get my course work done, hang out with friends but still spend time outside.

I started finding quiet places on campus where I could relax, people watch, and even study. I have spent hundreds of hours in the library while at college but I always find the time to take a break from that, even for a few minutes to go outside and get fresh air. Through joining the Outdoor Club, I have gone on so many amazing trips and outings, and have had so many wonderful experiences in nature. I have seen how people are touched by their outdoor experiences, regardless of whether they have been in the woods a thousand times before or not at all. We are so lucky to have such a beautiful campus with so many green spaces for students, staff and community members to enjoy. However, I think that students (especially those in more traditional majors) often forget how wonderful it is to be outside.

We have beautiful benches placed all around campus for students to enjoy. However, reading books or writing essays is nearly impossible to do while sitting on a bench, and finding a position on the ground is often difficult as well. Even the best-intentioned students eventually revert to the library for a better chair. Therefore, I came up with the idea of putting Adirondack Style Chairs on campus. Adirondack Chairs are inexpensive, comfortable and beautiful. I wanted students, staff and community members to have a more comfortable place on campus to sit, do work or read. My goal was that individuals would be able to rest in these chairs and accomplish any tasks they needed to get done, while also experiencing the beauty of our campus and the outdoors.

Additionally, I hope that these chairs (as a permanent part of campus) will be enjoyed so much that people build or donate more. Hopefully when I return to campus 20 years from now, there will be Adirondack Chairs everywhere as places for relaxation, learning and enjoyment. I want to share with others the wonderful experiences that I have had in nature; especially while attending Alfred University. I hope that other students can find peace, health and happiness between the craziness of tests, papers and life.

*Process:*

The idea was simple, but the execution was slightly more involved. The first step was presenting the idea to Dr. Gordon Atlas (Head of the University Honor's Program). His approval was needed in order to move forward with the project as a recognized Honors Thesis, and in order to obtain the funding for the chairs. The next step was writing a proposal to Alfred University's Physical Plant. I needed approval from Physical Plant because they are the department that maintains the grounds and any additions to campus. The proposal included the style of chair, the decoration/color on the chair, the upkeep plan for the chairs, and the location in which the chairs would be placed. I gave their office the choice of placement and stain color, as a way to ensure that it would fit with the aesthetics of campus.

Once the proposal was approved through Physical Plant, I was able to order the chairs. The chairs came as a kit of precut pieces that needed assembled. I chose this method because it allowed me to know how the chairs



would look, and allowed me to stain them as I pleased. Once I had received the chairs, I decided on a stain color. Physical Plant allowed me to choose the stain color that I wanted. After much trepidation, a medium cedar stain was selected. I chose a deck stain that came in a variety of colors and rated for 20 years wear. Staining the individual pieces took a very long time. After the stain dried, I was able to assemble the chairs by following the directions provided by the company. I placed two protective coatings of polyurethane over the stain as a protective barrier to the elements, and to help the chairs stand up to wear and tear.

The biggest considerations that I made was the location of the chairs. I wanted them to be placed in an area with a good view, centrally located but not in the way. I decided on the South side of Powell Campus Center. After talking to community members and students, I decided they should be installed near the carillon. This allows people to sit and enjoy the bells when they are playing. The final step was to give the chairs to Physical Plant. Physical Plant will install the chairs in their permanent location once students leave campus for the summer.

*Process Documentation:*



Staining the pre-cut pieces of the Adirondack Chairs before assembly.



Assembling the chairs inside of the Sugar Shack on Alfred University campus.



One chair completed, while the pieces of the second chair wait to be assembled.



Assembled Adirondack Chairs with a fresh coat of protective polyurethane dry in the Alfred sun.





Adirondack Chairs in front of the Carillon, where they will be permanently installed.





Closer look at the chairs where they will be installed.



The beautiful view of campus and Alfred University from the Adirondack Chairs

### **Conclusions & Closing Thoughts:**

For thousands of years, our ancestors spent the majority of their time outside. They survived and thrived in harmony with nature. Today, society has become extremely fast paced and disparate. Individuals need to find a way to balance the responsibilities of a modern lifestyle and the need for health and wellness. Getting outdoors should not be thought of purely as leisure, but instead taken more seriously as an aspect of health and wellness. By making wilderness immersion a priority, we can create generations of happy, healthy adults and children.

## **Bibliography:**

- 1) Giotto, "Ancient Mesopotamia/ Fertile Crescent The Neo-Babylonian Empire and the Hebrews" (2013) in Mr. Giotto's Site. Accessed April 2013. Available at <<http://www.penfield.edu/webpages/jgiotto/onlinetextbook.cfm?subpage=1501694>>
- 2) Pearson, "The Industrial Revolution, 1760-1850" (2010) in ablongmen.com. Accessed April 2013. Available at <[http://wps.ablongman.com/long\\_levack\\_wc\\_1/43/11053/2829693.cw/](http://wps.ablongman.com/long_levack_wc_1/43/11053/2829693.cw/)>
- 3) M. Kelly, "Industrial Revolution People, Inventions, and Events" (2013) in about.com. Accessed April 2013. Available at <[http://americanhistory.about.com/od/industrialrev/a/indrevoverview\\_2.htm](http://americanhistory.about.com/od/industrialrev/a/indrevoverview_2.htm)>
- 4) "General Facts about Agriculture; Today's Farmer and Farmer Family" in ncsu.edu. Accessed April 2013. Available at <<http://www.cals.ncsu.edu/CollegeRelations/AGRICU.htm>>
- 5) "The Benefits of Clean Air" (2008) in achrnews.com. Accessed April 2013. Available at <<http://www.achrnews.com/articles/the-benefits-of-clean-air>>
- 6) "Indoor Air Quality" (2013) in lung.org. Accessed April 2013. Available at <<http://www.lung.org/associations/charters/mid-atlantic/air-quality/indoor-air-quality.html>>
- 7) D. Kotz, "Host of Benefits Attributed to Sunlight" (2008) in usnews.com. Accessed April 2013. Available at <<http://health.usnews.com/health-news/family-health/articles/2008/06/24/host-of-health-benefits-attributed-to-sunlight>>
- 8) "Vitamin D" (2011) in umm.edu. Accessed April 2013. Available at <<http://www.umm.edu/altmed/articles/vitamin-d-000340.htm>>
- 9) "Vitamin D" (2013) in Cancer.org. Accessed April 2013. Available at <<http://www.cancer.org/treatment/treatmentsandsideeffects/complementaryandalternativemedicine/herbsvitaminsandminerals/vitamin-d>>
- 10) Autier P., Gandini S. Vitamin D supplementation and total mortality: a meta-analysis of randomized controlled trials. *Arch Intern Med*. 2007 Sep; 167(16):1730-7.
- 11) "Sleep Disorders Health Center; Melatonin Overview" (2013) in webmd.com. Accessed April 2013. Available at <<http://www.webmd.com/sleep-disorders/tc/melatonin-overview>>

- 12) "Seasonal Affective Disorder" (2013) in mayoclinic.com. Accessed April 2013. Available at <<http://www.mayoclinic.com/health/seasonal-affective-disorder/DS00195>>
- 13)) "Sleep Disorders Health Center; Seasonal Affective Disorder" (2010) in webmd.com. Accessed April 2013. Available at <<http://www.webmd.com/depression/tc/seasonal-affective-disorder-sad-topic-overview>>
- 14) S. Donaldson James, "Darker Days: Swedes, Americans Fight Xmas Blues With Light" (2012) in abcnews.com. Accessed April 2013. Available at <<http://abcnews.go.com/Health/light-therapy-helps-winter-blues-sad-swedish-bus/story?id=18036009#.UXjlrr-fsy4>>
- 15) S. Mahony, "The Fresh Air Fix" (2011) in prevention.com. Accessed April 2013. Available at <<http://www.prevention.com/health/healthy-living/fresh-air-can-help-your-brain>>
- 16) "Teaching and Learning in Nature; Let's Go Outside" (2007) in fws.gov. Accessed April 2013. Available at <[www.fws.gov/northeast/cpwn/pdf/educatornature.pdf](http://www.fws.gov/northeast/cpwn/pdf/educatornature.pdf)>
- 17) G. Kuh, ""Student Learning Outside the Classroom: Transcending Artificial Boundaries" (1994) in learn2study.org. Accessed April 2013. Available at <[http://www.learn2study.org/teachers/outside\\_classroom.htm](http://www.learn2study.org/teachers/outside_classroom.htm)>
- 18) "NOLS; Missions and Values" (2013) in nols.esu. Accessed April 2013. Available at <<http://www.nols.edu/about/values.shtml>>
- 19) J. Stewart, "Looking For a Lesson in Google's Perks" (2013) in nytimes.com. Accessed April 2013. Available at <[http://www.nytimes.com/2013/03/16/business/at-google-a-place-to-work-and-play.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2013/03/16/business/at-google-a-place-to-work-and-play.html?pagewanted=all&_r=0)>