Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2012 Volume III: Anatomy, Health, and Disease: From the Skeletal System to Cardiovascular Fitness

Healthy Kids Become Healthy Adults

Curriculum Unit 12.03.01
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Overview

Diabetes, heart disease and the many afflictions and maladies that are caused by stress are becoming a serious threat to our society. The essential questions this unit seeks to answer are: What are the most prevalent health problems in our communities and how are these diseases prevented through educating our young students? And, how to present anatomy and some physiology in a manner that is clear and simple yet covers the many different, rising health problems that we see among our youth and children today?

Gallup.com lists the seven most prevalent diseases, in order of occurrence, as high blood pressure, high cholesterol, depression, asthma, diabetes, cancer, and heart attack.(Mendes July 23, 2012).

Many of these health problems can be prevented through lifestyle choices such as diet, exercise and stress relief. The Journal of the American Medical Association states that, "Outside of proven clinical interventions, there is reason to think that certain changes in lifestyle might increase host resistance to infectious diseases. These include broadening one's social involvements (e.g., joining social or spiritual groups, having a confidant, spending time with supportive friends) and being more careful to maintain healthful practices such as proper diet, exercise, and sleep, especially under stressful conditions." (Glaser et al. June 30, 1999)

This goal of this unit is to teach children the basics about their anatomy and how it works including the organ systems, lymphatic system and metabolism so that they would be encouraged to create life habits that promote bodily health, thus preventing disease in adulthood. Interactive science notebooks will be used each day during this unit for students to record their predictions and observations, to keep data entry charts, record classroom notes and create drawings related to specific anatomy and health lessons.(See Appendix B for interactive notebook links).

Another goal of this unit is to present lessons in both the literacy and the science classes to fifth grade students by integrating anatomy vocabulary, personal narratives about experiences with nutrition and exercise into the writing curriculum.

Anatomy lessons will work from the inside out. Beginning with skeletal system, then muscles, circulatory/respiratory system, digestion finishing with lymphatic and nervous systems the lessons will be taught as a simplified overview to present the "whole picture" view rather than details so that lessons on healthy lifestyle choices can be the emphasis of the unit.

Bones

The skeletal system is our inner support system. It is made up of 206 different bones which are connected to each other and to other tissues by: ligaments, cartilage, tendons, and muscles. Bones, and the way they are shaped and fit together, make us able to sit up straight, stand up straight, walk, run, play sports, and dance. Bones also serve to protect many of our soft tissues and body organs.(Glencoe McGraw-Hill 2011)

Bones are made up of both living tissues called cells and minerals like calcium. Bones have three major layers that have different functions. The ***periosteum*** is the thin, hard, outer coating that contains the nerves and blood vessels that bring nutrients to the bones. Just inside the periosteum is the thick, hard, smooth part called ***cortical bone*** or ***compact bone*** . And, on the inside there are many layers of a spongy looking, but strong, material called ***trabecular*** or ***cancellous bone*** . Many bones also have an innermost cavity called bone marrow where blood cells are made. The bone marrow is like a thick liquid and it is protected by the cancellous bone around it.(Dowshen August 2009).

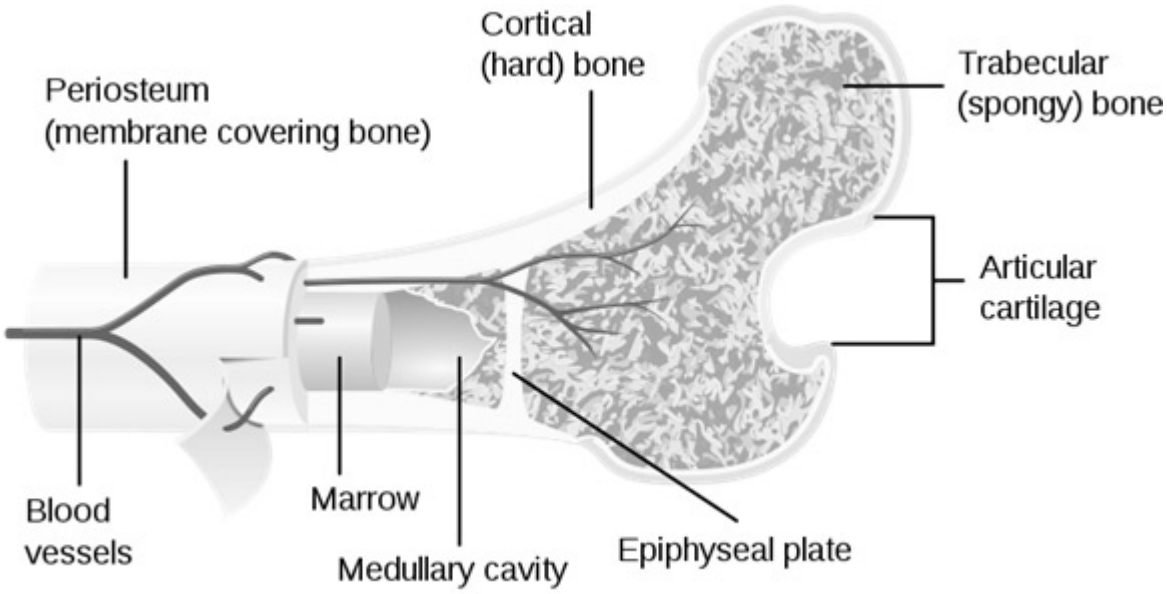


Image #1(Pbroks13 November 12, 2008)

Image #1(Pbroks13 November 12, 2008)

Bones come in different sizes and have different functions. The spinal column is at the center of the skeletal system. It holds the body upright and allows the whole body to bend and twist in many directions. Also, the spinal column protects the spinal cord while the brain is protected by the skull bones. The ribs protect the heart, lungs, and digestive organs. The largest and longest bones are in the arms and legs, and along with the bones in the hands, feet, and hips, they support and move those extremities. Ear bones, the smallest bones in

the body, help transmit sound from the outer ear to the inner ear. ("Learn Bones Anatomy" May 19, 2012).

Muscles

There are three different kinds of muscles and over six hundred total muscles in the human body. Although the three different kinds of muscle are made from the same kind of elastic body tissue, they are shaped and controlled differently.

Skeletal muscles are the muscles that move the bones of the skeletal system. They are called "striated" because they consist of their "striped" appearance when observed under the microscope. These muscles are moved voluntarily when a person decides to lift, move, talk, or just show off by flexing a muscle. Not all muscles work this way. Some muscles work automatically or involuntarily such as the muscles in the digestive system and the heart. There are two kinds of these involuntary muscles: heart, or **cardiac muscle** and **smooth muscle** which are found in the stomach and other internal organs.(Dowshen August 2009).

Muscles are made principally of amino acid fibers called proteins. These fibers break down as muscles are used. Eating enough protein allows muscles to be rebuilt.(Vonda August 31,2011)

Circulatory System

The circulatory system goes around and round, like a circle. The heart is the center of this system. The muscles of the heart work by relaxing to let blood in and contracting, to send blood through the **arteries** . Nutrients that have been ingested by the body and processed through the digestive system make their way to the blood. When the heart beats, the nutrients in the blood are sent to all parts of the body. Blood travels through arteries to capillaries and finally to veins before returning to the heart. The circulatory system works like a system of highways and roads leading to all the body cells. Used blood that has already deposited nutrients to cells goes back to the heart through the veins to be sent to the lungs to be replenished with oxygen. When the circulatory system is working well, it takes less than a minute for blood to be pumped to all of the cells in the body. The harder a body works, the more rapidly and forcefully the heart contracts. Feeling the heart beat or feeling a pulse can help a person know how hard the heart is working. There are many places near the surface of the body where a pulse can be felt. A pulse is created by the rhythm of the heart beating and the pressure of the blood moving through the blood vessels.(Dowshen August 2009).

Lungs

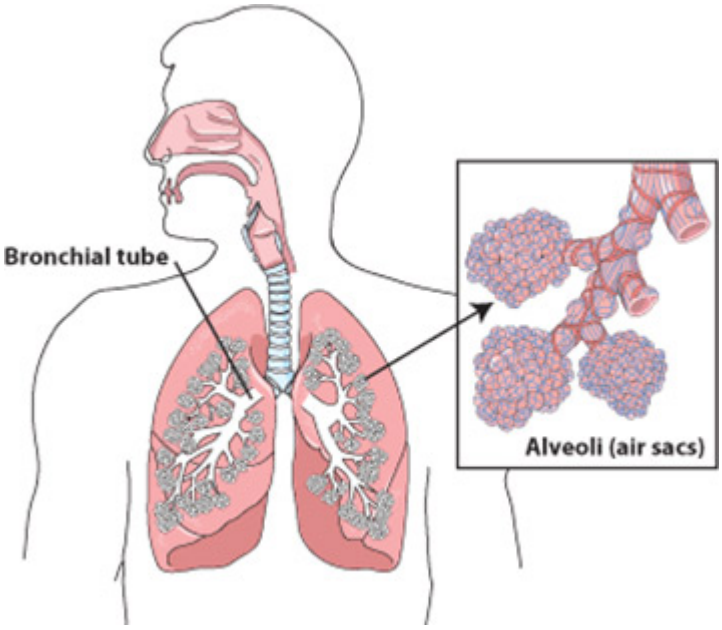
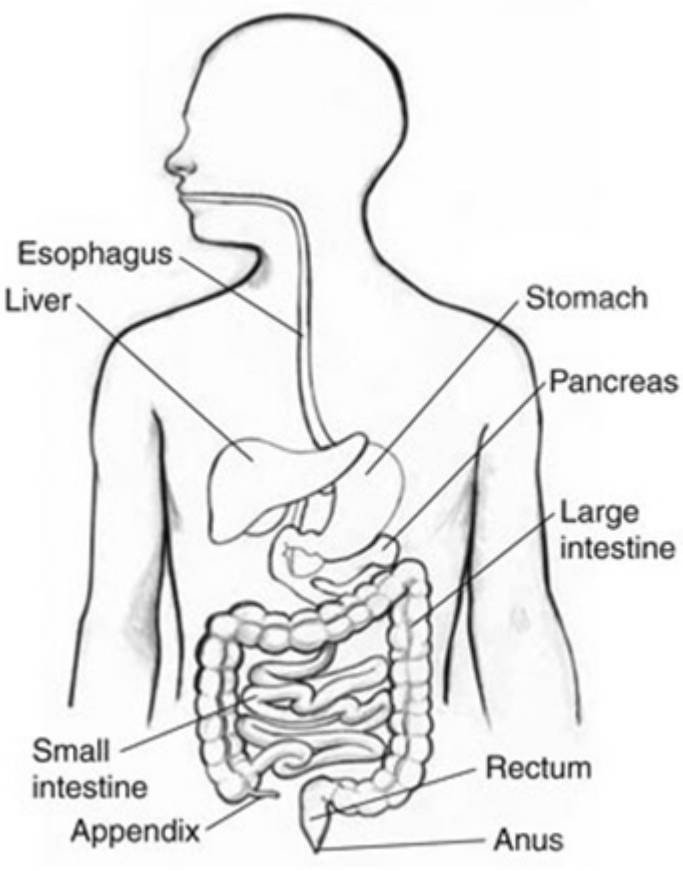


Image #2 (Castellon November 29, 2010)

Every cell of the body needs oxygen at every moment. Oxygen is in the air we breathe and the lungs bring this oxygen into the body. Air is carried to the lungs by the nose, mouth and ***trachea*** . Lungs look a little bit like an upside down tree split into two big branches. The trachea is the trunk of the tree and those two large branches are called ***bronchi*** . Smaller branches coming off the bronchi are called ***bronchioles*** . At the end of the bronchioles are *alveoli* , small sacs that fill with air when the body breathes. Capillaries cover the outside of each alveoli sac. It is through these capillaries, the smallest blood vessels, that oxygen from the air enters the circulatory system. Healthy lungs are the color pink because of all the oxygen in the blood in the capillaries around the alveoli.(Castellon November 29, 2010).

Digestive System



Image#3 (Becker March 20, 2012)

The digestive system is a long tube inside the body that runs from the mouth to the anus. It contains several twisting and turning organs, each doing a certain job to turn ingested food into smaller substances that can be carried by the bloodstream to the body's cells. In addition to the mouth and anus the main parts of the digestive tract are the esophagus, stomach, small intestine, large intestine and the rectum.(Becker March 20, 2012).

Digestion begins in the mouth. The jaw, teeth, saliva, and tongue work together to break food into small pieces and send it down the throat. Saliva has numerous functions. It contains a special chemical called **ptyalin** (**tahy** - *uh* -lin) ***enzyme*** that changes starches into sugars before the chewed food enters the esophagus.(Becker March 20, 2012).

Muscles in the throat help push the food into the esophagus. There, the smooth muscles of the esophagus automatically push the food down to the stomach in a wave-like action is called ***peristalsis*** . This action is strong enough to push the food to the stomach even if the person is upside down.(Carone 2011).

Peristalsis continues during digestion in the stomach. There is a combination of several chemicals including gastric acid and enzymes that are secreted from the stomach lining to further work on breaking down the food.(Becker March 20, 2012).

By the time the food gets to the small intestines it is ready to be absorbed into the bloodstream. In the small intestines peristalsis works in a back and forth movement allowing food to be absorbed as it moves at a slower rate. After the nutrients are absorbed from the digested food it moves to the large intestines where

water is absorbed and waste is sent to the rectum to be removed from the body.(Carone 2011).

Endocrine System

Many of cells of the body depend on chemicals, called ***hormones*** to stimulate or inhibit their activity. These hormones are made by small organs in the body called endocrine glands. The glands release these hormones into the blood that brings them to the cells. Glands are responsible for keeping the body alert, telling the body to grow, and controlling reproduction, bringing energy from sugar to cells, and fighting off illnesses. When the body is stressed from poor eating habits, inadequate sleep, or psychological problems these glands may become overworked and start producing too much or too little of the hormones. This can lead to problems in the immune system, causing a variety of physical ailments and diseases.(Dowshen August 2009).

Immune System

Living on the earth, human bodies are constantly exposed to things that can cause sickness, injuries and disease. Luckily, the body is equipped with a system to protect and heal itself. This is called the immune system. Many different parts of the body contribute to this system. In the digestive system there are many strong chemicals and helpful bacteria that fight off harmful microorganisms. Many structures in the body such as small hairs in the nose and lungs filter out harmful substances that can cause illness. In the blood, white blood cells, called leukocytes, capture and destroy invading microorganisms. When the immune system is in good working order and a person has healthy habits, the body will usually function quite well.(Dowshen August 2009).

Modern Health Concerns

Diabetes

Diabetes occurs when sugar levels in the blood are too high. When sugar and starches are eaten they are changed, through digestion, to a simple sugar called ***glucose*** . Body cells get their energy from glucose. For glucose to get to the cells, ***insulin*** is required. Insulin is a ***hormone*** produced in an organ called the ***pancreas*** . People who have a disease called Type I Diabetes have bodies that are unable to make insulin. If a person has Type II Diabetes, the body has difficulty making and using insulin. Without enough insulin, glucose stays in the blood which, over time, can cause many other parts of the body to work poorly. It can cause blindness, kidney failure and poor circulation.(Lindburg July 2, 2012).

Although some people are more likely than others, because of their genetics, to get Type II Diabetes, this disease can be prevented, in many cases, through healthy habits. Choosing nutritiously balanced foods that are low in sugar and without highly processed food additives such as high fructose corn syrup and transfats is a good start. Regular exercise and getting enough sleep is helpful too. Scientists and doctors have found that keeping the body at a normal weight is the most important factor in preventing this disease.(Colquhoun et al. 2011), (Lindburg July 2, 2012).

Heart Disease

A health problem involving the heart is called a ***cardiovascular disease*** . Two common cardiovascular

diseases are usually caused by constriction in the blood vessels by a process called atherosclerosis. When these blockages occur the heart has to work harder to send blood around the body and sometimes blot clots get stuck in these narrow passages causing problems like ***heart attack*** and ***stroke*** .

A heart attack happens when a clot blocks blood flow in an artery in the heart which causes part of the heart muscle to stop working. A person needs immediate medical assistance during a heart attack to restore blood flow to the damaged region.

A stroke happens when a blood clot blocks circulation to the brain. The brain cells that are blocked from receiving blood can die. This may cause impairments in thinking, sensation or movement.

The heart can also have problems with the valves that regulate blood flow in and out of it. These problems may be due to congenital malformations, childhood disease or infections of the blood. Any problem with the heart can lead to a problem with the body getting nutrients from the blood which can cause more problems. Keeping the heart healthy is important.("Getting Healthy" 2012).

Many people live after experiencing a heart attack or stroke, but they are still in danger of having another if they don't make changes in their eating and exercising habits.

Stress and Disease

Stress is a series of chemical reactions that take place in the glands of the endocrine system, along the nervous system and in the brain. When the body is handling stress well it is useful in helping people to be alert, strong and focused in difficult situations. However, scientists have discovered that too much stress can cause many problems with emotional and bodily functioning.

Many different kinds of events can bring on stress. These are called **stressors** . Being in a physically dangerous or frightening situation can be a stressor. Feeling overworked, angry, worried or sad for a long period of time can also be a stressor. The ***adrenal glands*** are stimulated by the ***hypothalamus*** and pituitary to make ***adrenaline*** and ***cortisol*** and send them into the bloodstream. Adrenaline increases the activity of the heart and lungs and speed up blood pressure and metabolism. This allows more blood to get to the muscles so that they are ready to work hard and fast if necessary. Other parts of the body respond as well. Eyes dilate which helps improve vision and sweating for cooling the body increases. Cortisol releases glucose from the liver to give cells more energy. The body changes in this way to be prepared for what is often called "fight or flight" or the stress response.(Dowshen August 2009).

When working properly, the stress response is helpful in s situations. Unfortunately, stress can cause health problems if the body does not turn off the response and return to normal quickly enough or if the body perceives ordinary events as stressors and over reacts. This can happen during times of long term stress or repeated stress.(Dowshen August 2009).

A common problem caused by long term stress is the weakening of the immune system, which then sets the body up to being vulnerable to many illnesses. Stress overload can be caused by certain life circumstances such as divorce, death of a loved one, being placed into an unknown situation. Stress overload can also occur during ordinary life circumstances such as when a person starts feeling overly worried about school work, or relationships, or when there seems to be too many demands and expectations to live up to.("How Repeated Stress Impairs Memory" March 7, 2012).

When stress is very extreme in situations such as war, famine, disasters, or severe abuse, it can cause a problem called ***Post Traumatic Stress Disorder*** (PTSD). People suffering from condition are in a constant state of fight or flight. They may behave strongly in ordinary circumstances by overreacting to loud noises or when they are accidently startled. Professional medical and psychological help is needed to help heal this problem.

In most cases stress is a part of everyday, ordinary life. The best way to keep it from getting out of control is to make choices that help the body deal with stress and keep a healthy balance between the stress response and relaxation response. The relaxation response counteracts the stress response. Being able to balance the two is known as stress management skills.

Relaxation Response Exercise: Deep Breathing

Once you have practiced this exercise several times, it can be done almost anywhere or anytime except in circumstances when the stress response is necessary to take care of a serious situation. In other words, don't close your eyes and focus on deep breathing when you are running away from a wild animal.

Step One: Choose a time and place that is quiet and where you will not be disturbed for at least 30 minutes. Step Two: Sit upright, but not too stiffly, in a chair that is comfortable yet supportive for your back. Once you are seated, you should be able to not be distracted by any noises, smells, or other things in the room. Rest your hands on your lap. You do not have to hold your hands in any kind of fancy position; just let them relax in your lap in a position that is comfortable for you.

Step Three: Close your eyes and notice how you are breathing. Does your breath go deep into your belly or does it go in and out through your chest only? Put your hand on your belly and feel your belly push out as you inhale and sink in as you exhale. Do this a few times until it feels comfortable and then return your hand to your lap.

Step Four: As you breathe into your belly, or diaphragm, count to four (not too fast). Then count to four as you breathe out. When this feels comfortable try counting to four on the in-breath and then counting to eight on the out-breath. Do you notice that when you breathe out you use your stomach muscles to push the air completely out of your body which makes room for you to breathe in more air on the in-breath?

Step Five A: (Optional) if you feel very comfortable with Step Four and want to try one more thing – here it is. As you complete count eight on the out-breath, notice the space between breathing out and breathing in and count to two. Then, breathe in on the four count and out on the eight count repeating the two count between out-breath and in-breath. Once that is comfortable, try doing the same thing between breathing in and breathing out. Find the place between the in-breath and out-breath and hold it counting to two.

OR

Step Five B: (Optional) Remember a time and a place where you were very happy. Use all of your senses to be back in that scene. What did it look like? What did it sound like? Did you smell anything? Did you taste anything? Focus on that time as you breathe in and imagine white light coming into your body from just above your head. As you breathe out imagine that white light settling into your heart. If another happy time comes

to mind you can switch over to that and continue to imagine the light coming in through your head and into your heart.

Step Six: After a few more breaths open your eyes and notice how you feel. Do you feel more relaxed? Did anything distract you from the exercise? Many people like to write down their experiences during breathing exercises like this. You can create a journal just for this and look it over in a few weeks or months and see if you have noticed any changes in your life as a result.

Try doing this exercise for three to five minutes at first, then each time you try it over several days, try increasing the time until you are able to do it for about twenty minutes during each session.

This activity can be introduced to students as an opening to the Health and Anatomy Unit and practiced briefly before other lessons as the unit progresses. Students should be familiar with this exercise and have practiced a few days in a row before introducing Heart Rate Lesson below.

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Heart Rate Lesson

This activity is best begun after children have been sitting quietly and working for at least 30 minutes. Results will be adversely affected if the lesson begins after physical education, recess or a noisy transition when their pulses are elevated. It teaches children how to find a pulse, use the pulse to track heart rate, record heart rate data for three different situations, and compare results. During this lesson children will also practice two healthy activities: aerobic exercise and a simple meditation.

After children have practiced *Relaxation Response Exercise: Deep Breathing* for a few days in a row, they are ready to measure their heart rates and compare results that occur in their own bodies during a similar relaxation activity with an aerobic activity.

Step One: Open lesson with whole group direct instruction by asking students some general questions about heart rate, heart beats, pulse, and other related questions to start them thinking about heart rate and to get a general idea of their background knowledge. Keep track of their answers on chart paper or, a computer-based interactive white board.

Some Example Questions:

Has a doctor ever used a stethoscope to listen to your chest?

What was the doctor listening for?

Have you ever heard your own heart beat?

Have you ever listened to or felt someone else's heart beat?

How often does your heart beat?

How many times in a minute does your heart beat?

How does someone take a pulse?

Has anyone ever taken your pulse?

Have you ever taken your own pulse?

What is a heart rate?

What is a healthy heart rate?

How do different activities affect your heart rate?

While reviewing the questions and answers distribute the **Pulse Rate Data Collection Chart** (see Appendix A) to each student and have a whiteboard or chart paper version ready for sample results.

Step Two: Show children how to check their own pulse by placing a thumb on their chin and feeling for the ***carotid artery*** in the neck with their forefingers and middle fingers together (see www.health.com for an image). Rotate around to students to make sure that they are finding the pulse correctly. Have them try both right hand and left hand to determine preference for finding the pulse.

Step Three: When they all have located the pulse, have them count their own beats for six seconds, and record this number on the chart. Multiply the recorded number by ten. Repeat three times. Teacher can record his or her own pulse on the sample chart or choose a student as an example.

Step Four: Have students stand up and move to an area of the room where they have space for movement, or rearrange desks to make adequate space. Lead students in some aerobic calisthenics or dancing for about five to seven minutes. Then, while standing or walking slowly repeat Step Three and record results.

Step Five: Cool down by returning to normal seating arrangements. When they are settled into their seats lead students in the Relaxation Response Exercise for about five to seven minutes. Immediately afterward repeat Step Three and record results.

Step Six: Return to whole group instruction and compare results on sample data chart. Students may wish to share their individual data as well. Model for students how to formulate questions for further study based on the data recorded. Encourage them to ask questions and record for use in future lessons.

Some Modeled questions may include:

Why does your heart rate increase when you exercise?

Was your heart rate different at rest than it was five minutes after exercising? Why do think that happened?

What might happen to you if your heart rate was always as high as it was right after exercise?

What might happen to you if your heart rate was the same all the time?

Is your heart rate always the same when you are sitting? Why or Why not?

Have students attach recorded data into an interactive science notebook for use during future lessons.

Creating a 3-D Bone Model Activity

Students will create a cross section of a femur using cardboard, sponge, paper towel roll, and paper maché. Use Image #1 (page 3) as a reference and template to prepare materials. Depending on background knowledge of the students, and grade level, you may choose to leave out some of the labels from the image such as: articular cartilage, medullary cavity, and ephephyseal plate. The labels essential to this lesson are: periosteum, compact bone, spongy bone, marrow, and blood vessels

Materials:

Image#1 (page 3) drawn or projected onto a white board, or drawn on chart paper.

An actual mammal bone cut in cross section (often available from a supermarket butcher)

Corrugated cardboard - "Recycled" science fair display boards work well

Large sponges (usually used for washing cars) - cut in half at midline

Empty paper towel rolls

Thick red yarn or cord

Newsprint or newspaper cut into strips

Paper maché paste – old fashioned wheat paste works well

Soft, flexible wire mesh to support paper maché (optional)

White or "bone" colored paint

Regular school glue

Scissors

Teacher prep: Cut corrugated cardboard into bone shapes, one per student (refer to Image#1 for shape). Prepare paper maché paste. Cut wire mesh - sized to fit over bone shapes. Have newsprint and other thin papers cut into small strips and set aside in a bin. Make a "prototype" bone to be used as a model for the class lesson

Step One: Introduce lesson by asking students if they know what their bones look like inside. If students are feeling confident about their knowledge and artistic ability, ask for volunteers to draw a diagram on white board or chart paper. Students should write their own predictions and drawings in their own interactive science notebooks.

Step Two: Show students your prototype model of the bone cross section, and the actual bone, if available, or if they are likely to be overwhelmed by too much information at one time, just show the portion of Image#1 that displays the periosteum and compact bone. Then hand out the pre-cut cardboard pieces and wire mesh that form the frame of the bone model. Use the image, the "prototype" and the cardboard bone frames to describe the periosteum layer and the compact bone beneath it. Briefly point out the other bone parts, letting the students know that you will return to them later.

Step Three: Now students are ready to use the paper maché, cardboard frames and wire mesh to create the periosteum. Extra pieces of cardboard can be glued directly under the periosteum layer to serve as compact bone, to be covered with paper maché, (then painted differently later in the project) to show the difference between periosteum layer and compact bone layer. Make another model with the students as to demonstrate each step along the way. Tape the wire mesh onto the cardboard to give it a 3D bone shape. Demonstrate how to apply the strips of paper dipped in paste to the frame. When a thin layer of paper maché has been applied, set models aside to dry. Students should have their names attached to the models. Wrap up this portion of the lesson by having students note vocabulary, make drawings and describe their experiences of the project so far in their interactive notebooks. (The final layers of paper maché will be applied after the interior of the model is complete).

Step Four: This step begins at least one day following Step Three when the first layer of paper is dry. Have Image#1 and prototype bone model displayed. Have cut sponges ready to use in classroom. Begin lesson by pointing out the spongy bone section in the model and the image. Ask some opening questions to start the children thinking about bones and bone structure. "What do you think the spongy bone feels like?" Why isn't it solid like the periosteum or the compact bone? Do you think it is strong or weak? Do you think it is heavy or light? Take a few moments to discuss answers and have students record the newly learned facts into their interactive notebooks. Having an actual mammal bone is helpful at this point because students can see and feel the hardness of the spongy bone. Distribute the cut sponge pieces and direct them to glue the pieces into the bone models to match the image. After gluing have them record any final observations, facts, vocabulary or drawings pertinent to the lesson in their notebooks.

Step Five: This step can be done immediately after the spongy bone activity or it can be presented as a separate lesson on the following day. Begin again with Image#1, the prototype model, and the model in progress. Have paper towel rolls, red yarn, and glue ready for use. Start the discussion with a mini lesson on bone marrow structure and its function. Distribute paper towel rolls and have students glue them into the center of the bone model. Then distribute the red yarn so students can attach blood vessels using Image#1 and the prototype model as a guide.

Step Six: This is the final step in completing the models. It will need to be spread out over a few days to allow for drying of paste and paint. It is also an excellent time to review the bone parts and their functions as children are working. Have paint, paper and maché paste ready to use and more red yarn to add blood vessels in different layers as needed. Over the course of two to four sessions students will add layers of paper maché to the periosteum and compact bone. When all layers of paste are dry, students can paint and label the models to complete the project.(Image #1)

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Appendix A

Pulse Rate Data Collection Chart for Heart Rate Lesson (pages 11-12)

Column A Activity/Trial #	Column B 6 Second Pulse Count	Column C X 10 = Pulse Count per Minute	Column D Notes
Sitting Trial#1			
Sitting Trial#2			
Sitting Trial#3			
Average sitting heart rate	Add amounts from column C_____ Divide the number by 3_____ This is your average sitting heart rate		
Aerobic exercise Trial#1			
Aerobic exercise Trial#2			
Aerobic exercise Trial#3			
Average aerobic heart rate	Add amounts from column C_____ Divide the number by 3_____ This is your average aerobic heart rate		
Relaxation Trial#1			
Relaxation Trial#2			
Relaxation Trial#3			
Average relaxation heart rate	Add amounts from column C_____ Divide the number by 3_____ This is your average relaxation heart rate		

Appendix B

Interactive notebook links:

http://interactive-notebooks.wikispaces.com/

http://www.middleschoolscience.com/notebook.htm

http://mysciencespace.com/documents/InteractiveNotebook.pdf

http://www.slideshare.net/eboni.dubose/science-interactive-notebook

http://www.youtube.com/watch?v=NVdRfuWe4YM

YNHTI Science Units using interactive science notebooks:

/nationalcurriculum/units/2010/6/10.06.03.x.html

/curriculum/units/2010/3/10.03.04.x.html

/curriculum/units/2011/4/11.04.02.x.html

/curriculum/units/1999/7/99.07.08.x.html

/curriculum/units/2010/3/10.03.02.x.html

Appendix C

Additional Reading List

Anatomy Books:

Your Inner Fish by Neil Shubin

Primary Anatomy by John V. Basmajian, MD

Gray's Anatomy for Students by Richard L. Drake, Wayne Vogl, Adam W. M. Mitchell

Basic Anatomy & Physiology

H. G. Q. Rowett

Anatomy websites:

learnbones.com

kidshealth.org

enotes.com

www.sharecare.com

Diabetes:

Diabetes: Caring for Your Emotions as Well as Your Health by Jerry Edelwich, and Archie Brodsky.

Type 2 Diabetes in Childhood and Adolescence: A Global Perspective by Arlan L. Rosenbloom, Martin Silink, Kaichi Kida.

Handbook of Pediatric Psychology in School Settings (Chap. 11 "Diabetes and the School-Age Child and Adolescent: Facilitating Good Glycemic Control and Quality of Life") by Ronald T. Brown.

Stress:

Psychological Stress and Disease

By: Sheldon Cohen, PhD

Denise Janicki-Deverts, PhD

Gregory E. Miller, PhD

http://jama.jamanetwork.com/article.aspx?volume=281&issue=24&page=2268

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Stress-Induced ImmunomodulationImplications for Infectious Diseases?

Ronald Glaser, PhD; Bruce Rabin, MD, PhD; Margaret Chesney, PhD; Sheldon Cohen, PhD; Benjamin Natelson, MD

JAMA . 1999;281(24):2268-2270. doi:10-1001/pubs.JAMA-ISSN-0098-7484-281-24-jct80024

http://www.sciencedaily.com

www.stressfreekids.com – books and CDs by Lori Lite

Adrenal Fatigue: The 21 st Century Stress Syndrome by Dr. James L. Wilson

http://www.ncbi.nlm.nih.gov/pubmed/9684259

http://www.sciencemag.org

http://science.howstuffworks.com

From The Institute of HeartMath: http://www.heartmath.org

The Appreciative Heart: The Psychophysiology of Positive Emotions and Optimal Functioning By Rollin McCraty, Ph.D., and Doc

Childre

The Coherent Heart: Heart-Brain Interactions, Psychophysiological Coherence, and the Emergence of System-Wide Order By Rollin McCraty, Ph.D., Mike Atkinson, Dana Tomasino, B.A., and Raymond Trevor Bradley, Ph.D.

Fitness inspiration video: Dance Walking with Ben Aarons http://www.youtube.com/watch?v=Ib3Duz_6a9M

Dance Walking Out-takes: http://www.youtube.com/watch?NR=1&feature=endscreen&v=5sxWonzAIlc

Ben finds the Dance Walk Guru Master: http://www.youtube.com/watch?feature=endscreen&v=HSy7h3TPB-M&NR=1

http://www.youtube.com/watch?NR=1&feature=endscreen&v=z1QVWHTFJKQ

Appendix D

Grades 3-5 Core Scientific Inquiry, Literacy and Numeracy Skills used in this unit.

B INQ.1 Make observations and ask questions about objects, organisms and the environment.

B INQ.2 Seek relevant information in books, magazines and electronic media.

B INQ.3 Design and conduct simple investigations.

B INQ.4 Employ simple equipment and measuring tools to gather data and extend the senses.

B INQ.5 Use data to construct reasonable explanations.

B INQ.6 Analyze, critique and communicate investigations using words, graphs and drawings.

B INQ.7 Read and write a variety of science-related fiction and nonfiction texts.

B INQ.8 Search the Web and locate relevant science information.

B INQ.9 Use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.

B INQ.10 Use mathematics to analyze, interpret and present data.

Source: http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=320890