

Wolcott Public Schools

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Middle School Curriculum Grade 7 Life Science



Children are our Future...

Mission Statement:

The mission of the Wolcott Public Schools is to develop in each student the knowledge, skills, and attitudes necessary to become a productive member of the community and a contributing member to society.

Departmental Philosophy:

The philosophy of science involves the development of *wonder* about the natural world and the ability to observe, describe, and apply basic process skills. It also allows students to develop *descriptions* of basic natural phenomena and the capacity to perform simple experiments and record accurate data. This will then lead to the development of basic *explanations* for natural phenomena and the ability to ask good questions and apply experimental procedures to collect and analyze data. The final goal is for students to develop an *interest* in global issues and have the ability to collect, analyze, and use data to explore and explain related science concepts.

Course Description:

Students will spend their seventh grade year studying life science. It is one of several branches of science that involves the study of living things and how all life on Earth is connected and dependent on each other. It deals with living organisms and their organization, life processes, and relationships to each other and their environment. It encompasses many branches of science such as cellular biology, genetics, human anatomy and physiology, and ecology.

<u>Content Standard:</u> Scientific Inquiry, Scientific Literacy, and Scientific Numeracy <u>Unit 1: Process Skills</u>

Sample Activities	Assessment Strategies	Resources
• Case of the Sleeping Frog	✓ Exam✓ Group work	 Case of the Sleeping Frog ditto Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 178-179)
• Articles from <i>Current Science</i> , <i>Junior Scholastic</i> , and other sources	✓ Questions (written)✓ Pair share	 Junior Scholastic Magazine Current Science Magazine
• Using the Microscope Lab	✓ Lab report✓ Exam	 Using the Microscope dittos Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 178-179)
• Under What Conditions Does a Plant Grow Best? Activity	✓ Questions (verbal)✓ Exam	Text- <u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 178-179)
 Gummy Worm Lab Gum Lab Observation vs. Inference dittos 	 ✓ Lab reports ✓ Questions (written) ✓ Exam ✓ Lab practical 	 Observation worksheets Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 174-177)
	 Sample Activities Case of the Sleeping Frog Articles from Current Science, Junior Scholastic, and other sources Using the Microscope Lab Under What Conditions Does a Plant Grow Best? Activity Gummy Worm Lab Gum Lab Observation vs. Inference dittos 	Sample ActivitiesAssessment Strategies• Case of the Sleeping Frog• Exam • Group work• Articles from Current Science, Junior Scholastic, and other sources• Questions (written) • Pair share• Using the Microscope Lab• Lab report • Exam• Under What Conditions Does a Plant Grow Best? Activity• Questions (verbal) • Exam• Gummy Worm Lab • Observation vs. Inference dittos• Lab reports • Lab practical

Performance Standards	Sample Activities	Assessment Strategies	Resources
<u>Unit 1: Process Skills</u> (Continued)			
C INQ.6: Use mathematical operations to analyze and interpret data.	Gum LabSkittles Lab	 ✓ Lab reports ✓ Exam ✓ Group work 	 Volume/Density dittos Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 185-189)
C INQ.7: Identify and present relationships between variables in appropriate graphs.	Graphing LabGraphing problems	 ✓ Graphs ✓ Lab reports ✓ Quiz ✓ Exam 	 Graphing Worksheets Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 182-184)
C INQ.8: Draw conclusions and identify sources of error.	Gum LabGraphing Lab	 ✓ Lab report ✓ Exam ✓ Pair share 	 Graphing/Gum lab dittos Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg.178-179)
C INQ.9: Provide explanations to investigated problems or questions.	• Gum Lab	✓ Lab report✓ Exam	Gum lab dittos
C INQ.10: Communicate about science in different formats, using relevant science vocabulary, supporting evidence, and clear logic.	• How to Write a Conclusion Activity	 ✓ Questions (both verbal and written) ✓ Lab reports ✓ Exam 	 How to write a conclusion ditto Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 190-193)

<u>Content Standard:</u> Structure and Function—How are organisms structured to ensure efficiency and survival? Heredity and Evolution—What processes are responsible for life's unity and diversity?

Unit 2: Cellular Biology and Genetics

Performance Standards	Sample Activities	Assessment Strategies	Resources
 7.2—Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance. All organisms are composed of one or more cells; each cell carries on life-sustaining functions. C 15. Describe the basic structure of an animal cell, including nucleus, cytoplasm, mitochondria, and cell membrane, and how they function to support life. 	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Cheek Cell Lab Cell Project (make a 3D model of a cell) Plant vs. Animal Cell Lab Video of cells and their organelles Osmosis/Diffusion Activity 	 Daily Questions (POD's) Review dittos Homework questions Lab Reports Cell Structure Quiz Organelle Function Quiz Cell Project Exam 	 Guided reading dittos Labeling the cell parts dittos Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 4-54) Microscopes

<u>Content Standard:</u> Structure and Function—How are organisms structured to ensure efficiency and survival? Heredity and Evolution—What processes are responsible for life's unity and diversity?

Unit 2: Cellular Biology and Genetics

Performance Standards	Sample Activities	Assessment Strategies	Resources
 8.2—Reproduction is a characteristic of living systems and it is essential for the continuation of every species. Heredity is the passage of genetic information from one generation to another. Some of the characteristics of an organism are inherited and some result from interactions with the environment. 	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Cell Cycle Activity Onion Root Lab Mitosis Video 	 ✓ Daily Questions (POD's) ✓ Review dittos ✓ Homework questions ✓ Lab Reports ✓ Cell Division (Mitosis) Quiz ✓ Exam 	 Cell Cycle worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 55-67and pg. 92-96) Microscopes
C 25. Explain the similarities and differences in cell division in somatic and germ cells.	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Individual Difference Lab Take A Class Survey Activity Punnett Square Problems Make the Right Call Lab DNA Model Activity Cracking the Code Video Stem Cell Research Debate Paper Pet Project 	 Daily Questions (POD's) Review dittos Homework questions Lab Reports Punnett Square Quiz Vocabulary Quiz Project Exam Response Essays 	 Genes/Chromosome dittos Punnett Square worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 74-135) Microscopes Stem Cell Article Harry Potter and Genetics Article

Performance Standards	Sample Activities	Assessment Strategies	Resources
Performance Standards <u>Unit 2: Cellular Biology</u> <u>and Genetics</u> (Continued) C 27. Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Nature at Work Lab Telltale Molecule Activity Charles Darwin Video 	 ✓ Daily Questions (POD's) ✓ Review dittos ✓ Homework questions ✓ Lab Reports ✓ Evolution Quiz 	 Resources Evolution dittos Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Cells and Heredity</u> (pg. 136-167)

<u>Content Standard:</u> Structure and Function—How are organisms structured to ensure efficiency and survival? Heredity and Evolution—What processes are responsible for life's unity and diversity?

Unit 3: Human Biology

Performance Standards	Sample Activities	Assessment Strategies	Resources
 7.2—Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance. All organisms are composed of one or more cells; each cell carries on life-sustaining functions. Multicellular organisms need specialized structures and systems to perform basic life functions. 	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Skelton Video Types of Muscle Lab Skeletal Muscle Lab 	 Daily Questions (POD's) Review dittos Homework questions Lab Reports Skeleton Quiz Exam 	 Skeleton worksheets Muscular system worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Human Biology and</u> <u>Health (pg. 4-41)</u> Microscopes X-rays
C 17. Explain how the human musculo-skeletal system supports the body and allows movement. C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Food Label Activity Digestive System Video As the Stomach Churns Lab Blood Typing Lab CMT "Feel the Beat" Lab Path of Blood Video Affects of Smoking Activity Frog Dissection Lab 	 Daily Questions (POD's) Review dittos Homework questions Lab Reports Digestive System Quiz Heart Quiz Respiratory System Quiz Exam 	 Digestive system worksheets Circulatory system worksheets Respiratory system worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Human Biology and</u> <u>Health (pg. 42-137)</u> Microscopes

<u>Content Standard:</u> Structure and Function—How are organisms structured to ensure efficiency and survival? Heredity and Evolution—What processes are responsible for life's unity and diversity?

Unit 3: Human Biology

Performance Standards	Sample Activities	Assessment Strategies	Resources
 8.2—Reproduction is a characteristic of living systems and it is essential for the continuation of every species. Heredity is the passage of genetic information from one generation to another. Some of the characteristics of an organism are inherited and some result from interactions with the environment. C 26. Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production. 	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Sperm/Egg Lab How Many Offspring Lab Human Development Video 	 ✓ Daily Questions (POD's) ✓ Review dittos ✓ Homework questions ✓ Lab Reports ✓ Exam 	 Male reproductive system ditto Female reproductive system dittos Videos United Streaming Text-<u>Prentice Hall Science Explorer: Human Biology and Health (pg. 214-245)</u> Microscopes
 7.4—Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations. ☆ Various microbes compete with humans for the same sources of food. C 21. Describe how freezing, dehydrating, pickling and irradiation prevent food spoilage caused by microbes. 	 Class Discussion/Notes Vocabulary Word Wall Bacteria Video Compare and Contrast Activity: Techniques that Prevent Food Spoilage 	 ✓ Daily Questions (POD's) ✓ Review dittos ✓ Homework questions ✓ Bacteria quiz 	 Bacteria worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: From Bacteria to</u> <u>Plants (pg. 48-57and</u> <u>pg. 165-167)</u> Internet

<u>Content Standard:</u> Matter and Energy in Ecosystems—How do matter and energy flow through ecosystems? <u>Unit 4: Ecology</u>

Performance Standards	Sample Activities	Assessment Strategies	Resources
 6.2—An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact. Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply. Populations in ecosystems can be categorized as producers, consumers, and decomposers of organic matter. C 4. Describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis. 	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Teacher-Directed Discussion on the Role of Plants in an Ecosystem Photosynthesis Video A World in a Bottle Activity Biome Discussion Biome Video 	 ✓ Daily Questions (POD's) ✓ Review dittos ✓ Homework questions ✓ Lab Reports ✓ Exam 	 Biotic/Abiotic factors ditto Photosynthesis worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Environmental</u> <u>Science (pg. 4-12, pg. 48-53, and pg. 58-73)</u>
C 5. Explain how populations are affected by predator-prey relationships.	 Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Counting Turtles Activity Predator/Prey Video Understanding Food Chains and Food Webs 	 ✓ Daily Questions (POD's) ✓ Review dittos ✓ Homework questions ✓ Lab Reports ✓ Exam 	 Population graphs worksheet Predator/Prey worksheets Videos United Streaming Text-<u>Prentice Hall Science</u> <u>Explorer: Environmental</u> <u>Science (pg. 13-35 and</u> <u>pg. 42-47)</u>

Performance Standards	Sample Activities	Assessment Strategies	Resources
Performance Standards <u>Unit 4: Ecology</u> (Continued) C 6. Describe common food webs in different Connecticut ecosystems.	 Sample Activities Class Discussion/Notes Vocabulary Word Wall Guided Reading dittos Connecticut Wildlife Discussion Forest Food Chain/Food Web Activity 	 Assessment Strategies Daily Questions (POD's) Review dittos Homework questions Exam 	 Poittos Videos United Streaming Text-Prentice Hall Science Explorer: Environmental Science (pg. 42-47) Internet

Pacing Guide

<u>September:</u> Begin with <u>Unit 1: Process Skills</u> \rightarrow Thinking like a scientist (estimating, predicting, observation vs. inference, classifying), making measurements in SI (length, mass, liquid volume, temperature, and time), converting SI units, the scientific method (including identifying and controlling variables, interpreting data, and drawing conclusions), and start to work on creating data tables and bar, line, and pie graphs.

October: Finish up the process unit by the middle of the month. Begin <u>Unit 2: Cellular Biology and Heredity</u> by working with the <u>Cells and Heredity</u> book. Start with Chapter 1: Cell Structure and Function (discovering cells, looking inside cells).

November: Finish up Chapter 1 (chemical compounds in cells and the cell in its environment) by about mid November and then move on to Chapter 2: Cell Processes and Energy (photosynthesis, respiration, cell division).

December: Finish up Chapter 2 (cancer) by the end of the 1st week of December and begin Chapter 3: Genetics: The Science of Heredity (Mendel's work, probability and heredity, the cell and inheritance). Be sure to explain the "Paper Pet" project before students go on Christmas break.

January: Finish up Chapter 3 (the DNA connection) by the end of the 1^{st} week in January. Start and finish Chapter 4: Modern Genetics (human inheritance, human genetic disorders, advances in genetics) by the end of the 3^{rd} week of January. Start Chapter 5: Changes Over Time (Darwin's theory, evidence of evolution).

February: Finish Chapter 5 (the fossil record) by the end of the 1st week of February. Begin <u>Unit 3: Human</u> <u>Biology</u> by switching to the <u>Human Biology and Health</u> book. Start with Chapter 1: Bones, Muscles, and Skin (Body organization and homeostasis, the skeletal system, diagnosing bone and joint injuries, the muscular system, the skin). Finish Chapter 1 by the end of the month.

<u>March:</u> Begin and finish Chapter 2: Food and Digestion (food and energy, healthy eating, the digestive process begins, and final digestion and absorption) by the end of the 3^{rd} week of March. Start Chapter 3: Circulation (the body's transport system, a closer look at blood vessels).

<u>April</u>: Finish Chapter 3 (blood and lymph and cardiovascular health) by the middle of April. Start and finish Chapter 4: Respiration and Excretion (the respiratory system, smoking and your health, the excretory system) by the end of the month.

<u>May:</u> Start and finish Chapter 7: The Endocrine System and Reproduction (the endocrine system, the male and female reproductive systems, the human life cycle) by the middle of May. Begin <u>Unit 4: Ecology</u> by switching to the <u>Environmental Science</u> book and start with Chapter 1: Populations and Communities (living things and the environment, studying populations, interactions among living things, changes in communities). This chapter should be complete by the end of the month.

June: Begin and finish Chapter 2: Ecosystems and Biomes (energy flow in ecosystems, cycles of matter, biogeography, biomes, aquatic ecosystems).

Essential Questions

- 1. Describe how to use the scientific method to solve everyday problems.
- 2. Explain how to collect, organize, interpret, and analyze data to solve problems and share your results.
- 3. How can you determine the relevance and credibility of scientific information found in publications such as newspapers and magazines?
- 4. Explain how microscopes aid in scientific observation.
- 5. Describe how cells, as the basic unit of life, are organized in order to perform the basic life processes.
- 6. Illustrate how genes determine trademark characteristics of a species and account for individual differences.
- 7. What is natural selection and how does it lead to evolution?
- 8. Why are cells organized into tissues, organs, and organ systems?
- 9. Explain how our organ systems interact with one another to maintain optimal balance (homeostasis).
- 10. Describe why reproduction is necessary for the continuation of every species.
- 11. Explain how all the components of an ecosystem interact with and affect one another.
- 12. Analyze how energy moves through an ecosystem.

Skills Objectives

- 1. Students will be able to estimate and measure length, mass, volume, temperature, and time.
- 2. Students will be able to make both qualitative and quantitative observations and make inferences (educated guesses) about observations.
- 3. Students will be able to organize data in a table, identify independent and dependent variables, and present the data as a visual representation (graph).
- 4. Students will be able to conduct a scientific investigation using the scientific method and then detail their findings in a lab report.
- 5. Students will be able to identify the structure and function of the components of a cell and be able to explain how a cell divides.
- 6. Students will be able to understand how genes and the traits that are expressed by them work by studying fellow classmates and their own family history.
- 7. Students will be able to identify the major bones and muscles of the body and describe how the two work together to help the body move.
- 8. Students will be able to explain how foods are mechanically and chemically digested by the body and the effect enzymes have on the rate of digestion.
- 9. Students will be able to explain how the circulatory and respiratory systems of the human body work together by analyzing pulse and breathing rate at rest and during exercise.
- 10. Students will be able to describe the structure and function of the male and female reproductive systems, including the process of egg and sperm production.
- 11. Students will be able to identify the various abiotic and biotic factors that make up an ecosystem.
- 12. Students will be able to explain how populations are affected by predator-prey relationships.
- 13. Students will be able to demonstrate how energy moves through an ecosystem by constructing food chains and food webs.

Assessments

- 1. <u>Process Unit Assessment:</u> will test students on their basic process skills like observing, inferring, predicting, classifying, measuring, estimating, graphing, and the scientific method.
- 2. <u>Cells and Heredity Assessment:</u> will test students on their knowledge of the cell, its parts, how somatic and germ cells divide, genes vs. chromosomes, how traits are passed on to their offspring, and evolution.
- 3. <u>Human Biology and Health Assessment:</u> will test students on their knowledge of the muscular, skeletal, digestive, circulatory, respiratory, excretory, and reproductive systems as well as how those organ systems work together to maintain homeostasis in the body.
- 4. <u>Ecology Assessment:</u> will test students on their knowledge of the parts that make up an ecosystem, biomes, how populations are affected by predator-prey relationships, and food chains/food webs.

Appendix

Possible Websites:

Cell:

http://www.cellsalive.com/ http://www.biology.arizona.edu/cell_bio/tutorials/cell_cycle/cells3.html

Heredity:

http://www.biology.arizona.edu/cell_bio/tutorials/meiosis/page3.html http://genetics.gsk.com/chromosomes.htm

Human Body:

http://medivisuals.com/samples.php http://www.innerbody.com/htm/body.html http://vilenski.org/science/humanbody/index.html http://www.getbodysmart.com/index.htm

Food Preservation:

http://www.fsis.usda.gov/Fact_Sheets/Focus_On_Freezing/index.asp http://sleekfreak.ath.cx:81/3wdev/CD3WD/FOODPROC/M0010E/INDEX.HTM http://www.uga.edu/nchfp/ http://www.fsis.usda.gov/help/FAQs_Food_Spoilage/index.asp

Ecology:

http://www.ucmp.berkeley.edu/exhibits/biomes/index.php http://www.vtaide.com/png/foodchains.htm

Connecticut Wildlife and their Food Chains:

http://www.ct.gov/dep/cwp/view.asp?a=2723&q=325712&depNav_GID=1655 http://www.cwrawildlife.org/ http://curriculum.calstatela.edu/courses/builders/lessons/less/biomes/deciduous/decweb.html

CMT Curriculum Embedded Performance Task:

"Feel the Beat" (see attached pages)

Curriculum Embedded Performance Task Middle School Science

Content Standard 7.2



Feel The Beat

Student Materials

Connecticut State Department of Education Bureau of Curriculum and Instruction

Feel The Beat

A Guided Exploration of the Factors That Affect Pulse Rate

You have probably noticed that when you walk or run up the stairs at school to get to a class upstairs, you get "out of breath" and your heart beats faster. Why does this happen? Are there other conditions that cause your heart to beat faster or slower?

Your Task

In this activity you and your partners will design and conduct experiments to explore how hearts beat under different conditions.

Get Ready

Gather the following materials:

Materials	
1 stethoscope per lab group	Alcohol wipes
1 stopwatch per lab group	Graph paper, poster paper, markers

Explore

- 1. Explore the sound of a heart beating using the stethoscope. See if you can detect heartbeats by holding the stethoscope to the neck, back, wrist and ankle. Do the heartbeats sound the same at different places?
- 2. In your science notebook, describe things you noticed about the beating heart.
- 3. Think about your observations. Work with your partners to list questions about factors that may affect heart rates. Examine your list, and classify the questions into two groups: (1) those that can be answered through a classroom experiment and (2) those that require other resources like books, the internet or special equipment not available to you.

Experiment #1: Effect of Movement on Pulse Rate

In this investigation, you will explore how different movements (e.g., walking, climbing steps, lifting weights, or hand-clapping) affect pulse rate. Keep a detailed and organized record of your experimental design, data collection and analysis in your science notebook.

Methods For Measuring Pulse Rate

You may have found it difficult to accurately count the heartbeats you heard with the stethoscope because of interference from other noises in the room. An easier way to count heartbeats is to feel the pulse caused each time the heart pumps blood. There are two methods for measuring pulse. You should sit quietly for several minutes before measuring your "**resting**" pulse rate. You can work with a partner or by yourself to try both ways, and then decide which way works best for you:

Wrist Method: With the palm of your partner's hand facing up, place the tips of your first two fingers

on the fleshy part of your partner's thumb. Slide your fingers about 2 inches toward the wrist, stop, and press firmly to feel the pulse of blood which each heart beat sends through the artery. To measure heart rate, count the number of pulses in 30 seconds. Multiply that number by 2, and you will have the number of beats per minute ("bpm").



Neck Method: Place the tips of your first two fingers on either side of your windpipe, near the lump, called an Adam's apple, in the middle of your neck. Press gently until you can feel a pulse. To measure heart rate, count the number of pulses in 30 seconds. Multiply that number by 2, and you will have the number of beats per minute ("bpm").

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CONDUCT YOUR EXPERIMENT:

- 1. Identify the **question** you will investigate.
- 2. Predict, based on your experiences, which activity will have a greater effect on pulse rate.
- **3.** Design a **procedure** to collect data to answer your research question. Identify the **independent** and **dependent** variables in your experiment.
- 4. Write your procedure in your science notebook. Include enough detail so that you or someone else could repeat your experiment.
- 5. Get your teacher's approval before you begin your experiment.
- 6. Create a data table to record data related to your experiment.
- 7. Do your experiment and **record** your findings in your data table. Remember to take a resting pulse count after sitting quietly for 5 minutes.
- **8.** Think about the data you have collected. Do the data for each trial seem generally consistent? If not, do you need to repeat any trials to correct any **errors**?
- **9.** Analyze the data. You have collected pulse rate data for several types of movement, several people, or several trials. This is called "raw data". Do some calculations that will help you answer your experimental question.
- 10. Create a graph that will help you make sense of your data.
- **11. Interpret** the data. What **conclusions** can you make about the effect of different movements on pulse rate? Did anything surprise you?
- 12. Compare your experimental design and results with others in your class.

EXPLAIN YOUR CONCLUSION:

- **1. Research** the respiratory and circulatory systems. Find out about the structures of these two body systems, and how they function to move oxygen through the body.
- 2. Explain why the heart beats faster during activity.

Experiment #2 – Effects of Other Variables on Pulse Rate

Review the list of testable questions you and your partners generated as a result of your stethoscope exploration. Choose another pulse rate factor that you are interested in investigating.

CONDUCT YOUR EXPERIMENT:

Keep a detailed and organized record of your experimental design, data collection and analysis in your science notebook.

- **1.** Identify the **question** you will investigate.
- 2. Predict the relationship you expect to find.
- **3.** Design a **procedure** to collect data to answer your research question. Talk with your partners about how you could test your ideas concerning physical or environmental factors that might increase or decrease pulse rate.
- **4.** Identify the **independent** and **dependent** variables in your experiment. Think about the parts of your experiment that should be kept **constant** so you can collect consistent data.
- 5. Write your procedure in your science notebook. Include enough detail so that you or someone else could repeat your experiment.
- 6. Get your teacher's approval before you begin your experiment.
- 7. Create a **data table** to record data related to your experiment.
- **8.** Do your experiment and **record** your findings in your data table. Remember to take a resting pulse count after sitting quietly for 5 minutes.
- **9.** Think about the data you have collected. Do the data for each trial seem generally consistent? If not, do you need to repeat any trials to correct any **errors**?
- 10. Analyze the data.
- 11. Create a graph that will help you make sense of your data.
- **12. Interpret** the data. What **conclusions** can you make about the effect of different movements on pulse rate? Did anything surprise you?

COMMUNICATE YOUR FINDINGS:

Scientific research can be communicated in formal and informal ways, including written lab reports, journal articles, poster presentations or round-table discussions. Members of a scientific community review the experiments of others, give comments and ask questions. Select a method to share the findings and conclusions from your experiment.