

DRAFT 7th Grade Pacing Guide FOR 07-08 8/19/07

UNIT 1: PROPERTIES OF MATTER

C0. Describe matter and its properties.

C1. Describe the properties of common elements such as oxygen, hydrogen, carbon, iron, and aluminum.

CINQ1. Identify questions that can be answered through scientific investigation.

CINQ5. Use appropriate tools and techniques to make observations and gather data.

CINQ6. Use mathematical operations to analyze and interpret data.

DISTRICT EMBEDDED TASK: STAYING AFLOAT

UNIT 2: CHEMICAL PROPERTIES

C 2. Describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they are made.

C 3. Explain how mixtures can be separated by using the properties of the substances from which they are made, such as particle size, density, solubility and boiling point.

Q1 Assessment

UNIT 3: CELLS

C 15. Describe the basic structures of an animal cell, including nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.

C 25. Explain the similarities and differences in cell division in somatic and germ cells.

UNIT 4: GENETICS/REPRODUCTION

C 26. Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production.

C 27. Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans

Q2 Assessment

UNIT 5: LIFE SYSTEMS: MUSCULO-SKELETAL

C 17. Explain how the human musculo-skeletal system supports the body and allows movement.

Q3 Assessment

UNIT 6: LIFE SYSTEMS: BIOCHEMICAL

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.

ET: CMT Task Heartbeat

UNIT 7 MICROBES/FOOD PRESERVATION

C 21. Describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes

ET: Food Preservation Project

. Q4 Assessment

CINQ1 Identify questions that can be answered through scientific investigation.

CINQ2 Read, interpret and examine the credibility of scientific claims in different sources of information.

CINQ3 Design and conduct appropriate types of scientific investigations to answer different questions.

CINQ4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.

CINQ5 Use appropriate tools and techniques to make observations and gather data.

CINQ6 Use mathematical operations to analyze and interpret data.

CINQ7 Identify and present relationships between variables in appropriate graphs.

CINQ8 Draw conclusions and identify sources of error.

CINQ9 Provide explanations to investigated problems or questions.

CINQ10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

7th Grade Science

a. Matter and Properties

I

b. Quarter: One

II. Unit 1: Properties of Matter Unit Length 4 weeks

a. Unit #1 Introduction:

During this unit, students will realize that matter is anything that has mass and takes up space. That element's are the basic building blocks of matter and can be identified by their physical and chemical properties. Furthermore, students will use the periodic table to gather information about the properties of oxygen, hydrogen, carbon, iron, and aluminum. Students will then be introduced to measurement skills needed to make observations and gather information and use mathematical operations to analyze and interpret data. In addition, students will identify questions to be answered through scientific investigation.

b. Standards for Unit #1:

- **C0.** Describe matter and its properties.
- **C1.** Describe the properties of common elements such as oxygen, hydrogen, carbon, iron, and aluminum.
- **CINQ1.** Identify questions that can be answered through scientific investigation.
- **CINQ5.** Use appropriate tools and techniques to make observations and gather data.
- **CINQ6.** Use mathematical operations to analyze and interpret data.

c. Essential Questions:

1. How can matter have mass and volume?
2. What is the difference between physical and chemical properties?
3. What are the basic elements?
4. How can elements have different properties?
5. How small is an atom?

d. Essential Content/Concepts:

1. Matter is anything that has mass and takes up space.
2. All matter has both physical and chemical properties.
3. The basic building blocks of matter are called elements.
4. Elements are represented by a symbol.
5. The smallest particle of element that has the properties of the element is called an atom.
6. Elements are only made up of one type of atom.
7. The atoms of different elements, such as hydrogen, oxygen, iron, and aluminum, have different properties.

e. Essential Skills:

1. Use appropriate scientific tools to measure mass and volume in metric units.
2. Use mathematical operations to calculate volume and density.
3. Use the periodic table to gather information about the properties of common elements.
4. Identify questions that can be answered through scientific investigation.

f. Vocabulary

- | | |
|------------------------|------------------------------------|
| 1. Matter | 10. Periodic Table of the Elements |
| 2. Mass | 11. Triple Beam Balance |
| 3. Volume | 12. Graduated Cylinder |
| 4. Density | 13. Meter Stick |
| 5. Length | |
| 6. Atoms | |
| 7. Elements | |
| 8. Physical properties | |
| 9. Chemical properties | |

g. Science Misconceptions

1. A gas does not have mass or take up space.
2. Large objects fall faster than smaller objects.
3. A “problem” is something that is done wrong in an experiment.

Activities:

1. Labs:

- a. Measuring Length
- b. Determining Mass and Volume
- c. Making Sense of Density (Science Explorer, *Chemical Building Blocks*, teaching resources)
- d. Metric Olympics

2. Reading for information

- a. Measuring, Estimating Measurements, and Metric System (Unlocking Science Process Skills) pp. 40-51
- b. Gold’s Glittery Rewards
- c. Navy Relic

3. Web or Library research:

- a. Element Project/Flip book (To identify properties of hydrogen, oxygen, iron, and aluminum.)
- b. Metric Poster

Multimedia Presentations:

Elements, The (United Streaming Videos)

IV. Significant Tasks (ST) #/Title:

Significant Task 1: Post-it Lab (Lab packet)

a. Significant Task Introduction:

- The *Post-it Significant Task* will introduce students to the experimental process. Using the Erickson/Therrien Lab Packet students will identify and define variables for a scientific investigation. Write an appropriate procedure to solve the identified problem and conduct an investigation. Using suitable scientific tools the student will measure and use mathematical operations to collect data.
- Assessment: Lab Packet Rubric

b. Length/Timing: End of Unit One

c. Essential Questions:

1. How are variables identified?
2. Why should procedures be detailed?
3. What information belongs in a data table?

d. Assessment Tools (AT):

1. Lab

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Example Assessment Questions:

I. 7th Grade Science

a. Compounds and Mixtures

b. Quarter: 1

II. Unit #2: Compounds and Mixtures Unit Length: 6 weeks

a. Unit Introduction: During this unit, students will discover that the basic elements can be chemically combined to form simple compounds and these substances have different properties than those of the elements from which they are made. That many different combinations of elements are possible, making a variety of substances. Additionally, students will discover that substances can be physically combined forming a mixture. Those mixtures of simple substances can be separated using the properties from which they are made.

b. Standards for Unit #:

- **C2.** Describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they are made.
- **C3.** Explain how mixtures can be separated by using the properties of the substances from which they are made, such as particle size, density, solubility and boiling point.
- **CINQ1** Identify questions that can be answered through scientific investigation.
- **CINQ3** Design and conduct appropriate types of scientific investigations to answer different questions.
- **CINQ4** Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment

c. Essential Questions:

1. How do compounds chemically combine?
2. What is the difference between a physical and a chemical change?
3. How can compounds have different properties than the elements that make them up?
4. How can a mixture be separated by using physical properties?

d. Essential Content/Concepts:

1. A compound is a substance made of two or more elements that are chemically combined.
2. A compound is represented by a chemical formula.
3. The smallest part of a compound is a molecule.
3. A substance that undergoes a physical change is still the same substance after the change.
4. A chemical change produces new substances with properties different than those of the original substances.
5. When elements are chemically combined, they form compounds, such as water and table salt that have properties that are different from the elements of which they are made.
6. A mixture is made of two or more substances that are not chemically combined.
7. Mixtures can be separated by physical properties such as particle size, density, solubility, and boiling point.

e. Essential Skills:

1. Separate substances in a mixture.
2. Compare and contrast the properties of water with those of hydrogen and oxygen.
3. Design and conduct appropriate types of scientific investigations to answer different questions.
4. Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment

f. Vocabulary –

Compound, mixture, chemical change, physical change, solubility, boiling point, substance, molecule, chemical formula, solid, liquid, gas, rate of reaction,

g. Science Misconceptions

1. A physical change produces new substances.
2. A chemical change does not produce a new substance.

Activities

1. Labs:

- a. Rate of Dissolving
- b. Separating Sand, Salt, and Iron
- c. NeoSci Elements, Mixtures and Compounds Lab

2. Reading for Information

- a. A \$3 Water Purifier That Could Save Lives
- b. Phosphate Mines

3. Web or Library Research

a. “Compounds and Mixtures that Innovate” research compounds that have changed or advanced society. Examples are ceramics, plastics, Teflon, concrete, bronze, and steel

4. Multimedia Presentations

- a. Discovering the Elements Part II (57:12) United Streaming Videos

IV. Significant Tasks (ST)

Significant Task 2: Separation of a Mixture (Lab packet)

1. Significant Task Introduction: The *Separation of a Mixture Task* will reinforce the experimental process. Using the “Lab Packet” students will identify and define variables for a scientific investigation. Write an appropriate procedure to solve the identified problem and conduct an investigation. Using suitable scientific tools the student will

measure and use mathematical operations to calculate volume and density in metric units and record data, drawing conclusions and assessing their validity. Assessment: Lab Packet Rubric

b. Length/Timing: End of Unit 2

c. Essential Questions:

1. How are variables identified?
2. Why should procedures be detailed?
3. What information belongs in a data table?

d. Assessment Tools (AT): Lab Packet

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Example Assessment Questions:

I. Grade/Course Title: 7th Grade Science

b. Quarter: Two

II. Unit #3: Cells Unit Length 6 weeks

a. Unit Introduction: During this unit students will discover that cells are the basic building blocks of life and each cell carries out life processes utilizing some common structures. These structures perform specific functions within the cell and function together to support life. Furthermore, cells come in many shapes and sizes and that cells have many different functions. Different types of cells have different organelles depending on the complexity of the cell. That all cells contain chromosomes that carry information needed to control the activities of the cell, to make new cells and new organisms. In addition, these cells reproduce through either mitosis or meiosis. These two different types of cell division have some similarities and differences depending on the type of cell that is dividing.

b. Standards for Unit #3

- **C15.** Describe the basic structures of an animal cell, including nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.
- **C25.** Explain the similarities and differences in cell division in somatic and germ cells.
- **CINQ6.** Use appropriate tools and techniques to make observations and gather data.
- **CINQ7.** Identify and present relationships between variables in appropriate graphs.

c. Essential Questions:

1. How do cells carry out life processes?
2. What is cell division?
3. Are there different types of cell division?
4. What are chromosomes?
5. What cell structures are vital for a cell to have?
6. What is mitosis and meiosis?
7. What is the difference between somatic and germ cells?

d. Essential Content/Concepts:

1. Cells are the basic building blocks all living things.
2. Cells have organelles that carry out life processes
3. Cells have a cell membrane; some cells have a cell wall.
4. Different types of cells have different organelles.
5. All cells have chromosomes that control the activities of the cell.
6. Cell division takes place in all cells.
7. Cell division varies with different cells.

e. Essential Skills:

1. To be able to use a microscope.
2. Compare and contrast cell structures
3. Compare and contrast the cell division in somatic and germ cells.

f. Vocabulary –

Organelle, cell membrane, nucleus, cytoplasm, mitochondria, microscope, cell division, somatic cell, germ cell, chromosomes, cell theory, diffusion, osmosis, mitosis, meiosis, asexual reproduction, sexual reproduction, unicellular, multi-cellular

g. Science Misconceptions

1. That all cells do not have the same basic structures.
2. That cells are not three dimensional.
3. That cell size is the same for all cells.
4. That more complex organisms have more chromosomes.

Activities:

Labs

Microscope Lab with Elodea leaf and cheek cells

- a. compare and contrast cells
- b. diffusion with Elodea

(<http://biology.arizona.edu/sciconn/lessons/mccandless/elodea.html>)

Diffusion with an Egg

Observation of Protozoa

Frey “Exploring Cell Processes, Cell Biology Lab Kit”

Projects

Cell Mobile

Build a Three Dimensional Cell

Edible Cells

Poster project comparing different types of cells

<http://www.kathimitchell.com/cells.html>

Research

Bacteria found on or in the body.

Smallest living organism

Write a Biography of a cell

Reading for Information

Stem Cells to any Cell

A Fix for Injured Knees

IV. Significant Tasks (ST) Cell Flash Cards

a. Significant Task Introduction: This task gives students the opportunity to determine the value of using flash cards, self-examination and peer examination in learning vocabulary and factual information. It also incorporates hands-on materials with the visual appeal and support second many language learners need to become actively engaged in acquiring language. The language component builds on students’ knowledge

of English syntax to reconstruct scrambled sentences containing key information and vocabulary for science. This lesson should work for the benefit of both native and non-native speakers of English.

b. Length/Timing: 4-5 class periods

c. Essential Questions: What are the parts of the cell?

d. Assessment Tools (AT): Notebooks, projects, assessments, and labs

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Suggested Science Fair Topics

Example Assessment Questions

I. Grade/Course Title: 7th Grade Science

a. Course Overview/Description:

b. Quarter: Two

II. Unit #4: Genetics and Reproduction Unit Length: 5 weeks

a. Unit Introduction: In this unit students will describe the structure and function of the human reproductive system including the production of two special reproductive cells. These cells are formed by a type of cell division called meiosis. That these cells contain only half the number of chromosomes found in other body cells and when these cells join through the process of fertilization they form one cell with a complete set of chromosomes. Furthermore, these chromosomes carry the genetic information necessary for the cells to function properly and the same genetic information also gives the individual, characteristics or traits. These traits are a combination of the parents resulting in variations from one generation to the next.

b. Standards for Unit #4

- **C26.** Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production.
- **C27.** Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.
- **CINQ6.** Use mathematical operations to analyze and interpret data.
- **CINQ7.** Identify and present relationships between variables in appropriate graphs.
- **CINQ10.** Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

c. Essential Questions:

1. How do humans reproduce?
2. Why are the reproductive structures different in males and females?
3. What are the reproductive cells called?
4. What are chromosomes and how do they carry genetic information?
5. How are reproductive cells formed?
6. What are characteristics or traits?
7. How are offspring different than their parents?
8. How are sex and variations determined?

d. Essential Content/Concepts:

1. The male reproductive system produces the sperm cell
2. The female reproductive system produces the egg cell.
3. Chromosomes carry the genetic information to produce new organisms.
4. The two reproductive cells carry half the chromosomes necessary for human development.
5. Fertilization is the process that joins the two special reproductive cells.
6. The offspring is not identical to either parent, but has traits of both.
7. Sexual reproduction leads to variation in the next generation.

e. Essential Skills:

1. Explain the differences between mitosis and meiosis.
2. Describe the male and female reproductive system.
3. Explain the difference between dominant and recessive genes.
4. Describe how variations can be determined through genetics.
5. Describe how chromosomes determine sex.
6. Use the information in a Punnett Square.

f. Vocabulary –

sex cells, sperm, egg, uterus, testes, ovaries, fallopian tube, sperm duct, genetics, traits, dominant, recessive, chromosomes, genes, Punnett square, heredity, Mendel, meiosis, mitosis, genetic disorder, genetic diseases, genotype, phenotype

g. Science Misconceptions

1. Traits are inherited from one parent.
2. Development of the offspring takes place in the stomach.
3. Environmentally caused characteristics can be passed to offspring.
4. Meiosis does not differ from mitosis.
5. The role of chance and probability in heredity.

Activities:

Labs:

Flower Fertilization and Flower Dissection

Mendelian Crosses

Bug Builders/Model Making

Punnett Squares

Probability Exercises

Tracing Traits

http://www.teachersdomain.org/resources/tdc02/sci/life/repro/lp_reproduce/

Projects:

Genetic Disorder Research Project

Reading for Information:

Clone Wars

IV.. Significant Tasks (ST)

a. Significant Task Introduction:

b. Length/Timing: *_Ex. On-going throughout the year etc. _*

c. Essential Questions: *_Ex. How do we know molecules are moving?*

d. Assessment Tools (AT): *_Ex. Notebook of at-home experiments, . _*

e. Procedure: *(Numbered steps)*

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Suggested Science Fair Topics

Example Assessment Questions

I. Grade/Course Title: 7th Grade Science

Quarter: 3

II. Unit #5: LIFE SYSTEMS: MUSCULO-SKELETAL Unit Length: 10 weeks

a. Unit Introduction: The human body is a complex organism that is made up of a number of different body systems. Each system carries out a specific life process contributing to the body as a whole. The muscular and skeletal systems work with one another to support and move the body. The skeletal system consists of bones, cartilage, and connective tissue and supports the body and protects internal organs. The muscular system consists of muscles that help the body move and aids in circulation, digestion, and respiration.

b. Standards for Unit #5

- **C17.** Explain how the human muscular-skeletal system supports the body and allows movement.
- **CINQ2** Read, interpret and examine the credibility of scientific claims in different sources of information.
- **CINQ10** Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

c. Essential Questions:

1. How does the body move?
2. What type of tissue make up bones?
3. How are bones joined together?
4. How do muscles move the skeletal system?
5. How many different types of muscles are there?

d. Essential Content/Concepts:

1. The skeletal system supports and protects the body.
2. Bones store minerals, allow movement and make blood cells.
3. Where one bone meets another bone, a joint is formed.
4. Bones are moved by muscles.
5. Bones consist of specialized cells.
6. Bones are held together by tissues called ligaments.
7. Muscles are attached to bones by tendons.
8. Muscles are masses of tissue that contract to move bones or organs.
9. Voluntary muscles are controlled by our will.
10. Involuntary muscles are not under our conscious control.
11. There are two types of involuntary muscles, cardiac and smooth.

e. Essential Skills:

1. Identify the major organs of the skeletal system.
2. Describe four functions of bones.
3. Describe three joints.
4. List three types of muscle.
5. Describe how skeletal muscles move bones.
6. Interpret scientific claims in different sources of information.

f. Vocabulary

Bones, muscles, cartilage, joints, ligaments, tendons, muscle cell, bone cell, tissue, organ, organ system, voluntary muscle, involuntary muscle, cardiac muscle, smooth muscle, skeletal muscle. Flexor, extensor, gliding joint, ball and socket joint, hinge joint, bone marrow, connective tissue

g. Science Misconceptions

1. Individuals can control involuntary muscles.
2. Bones do not consist of living cells.
3. The heart is not composed of muscle.
4. That the body systems are not interdependent.

Activities:

Labs:

Broken Bones

Bon-e Voyage

<http://www.defyinggravity.net/>

Mr. Bones, Foss Human Body

<http://sv.berkeley.edu/showcase/pages/bones.html>

Pickled Bones

Projects:

Create a poster illustrating three muscle types and three movable joints.

Research:

Create a Pamphlet of Common Sports Injuries and Ways to Prevent Them

Bone and Muscle Diseases

Create a timeline for Surgical Techniques

Reading For Information:

How to Fly Like a Bat

IV. Significant Tasks (ST) #/Title: Chicken wing Dissection Significant Task

a. Significant Task Introduction: Muscles and bones work together as levers for movement of body parts. The muscles of the body are under the conscious control of your sensor somatic nervous system if the system is intact. Motor nerves cause the contraction

of striated muscles of your body. Muscles work in antagonistic to flex and extend the bones. All vertebrates have similar body plans because of common ancestors in evolution. Studying the body of another vertebrate is useful to understanding your own body.

b. Length/Timing: End of Unit

c. Essential Questions: How do bone and muscles work together to move the body?

d. Assessment Tools (AT): Lab Observation

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Suggested Science Fair Topics

Example Assessment Questions

I. Grade/Course Title: 7th Grade Science

a. Course Overview/Description:

b. Quarter: Four

II. Unit #6 LIFE SYSTEMS: BIOCHEMICAL Unit Length 5 weeks

a. Unit Introduction: The human body is a complex organism that is made up of a number of different body systems. Each system carries out a specific life process contributing to the body as a whole. The digestive, respiratory, and circulatory systems work in concert to provide our cells with nutrients and oxygen needed for energy production, growth, and repair. The digestive system breaks down food in the digestive tract into nutrients that can be transported by the circulatory system. The respiratory system provides oxygen from the air to the blood and returns the waste product carbon dioxide from the blood to the air. The circulatory system supplies the vital nutrients to all cells of the body.

b. Standards for Unit #6

- **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.
- **CINQ1.** Identify questions that can be answered through scientific investigation.
- **CINQ4.** Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- **CINQ8.** Draw conclusions and identify sources of error

c. Essential Questions:

1. How does the digestive system break down food?
2. How do different enzymes work on different foods?
3. How do nutrients enter the blood stream?
4. What are the components of the digestive system?
5. How do nutrients and oxygen enter the cell?
6. What are the components of the circulatory system?
7. How does blood move through the arteries and veins?
8. How is oxygen exchanged in the alveoli?

d. Essential Content/Concepts:

1. The digestive system breaks down food that can be absorbed into the blood.
2. The digestive system consists of the digestive tract and the accessory organs.
3. Accessory organs produce digestive enzymes that are released into the digestive tract.
4. The digestive system breaks down food by physical and chemical means.

5. The circulatory system transports needed nutrients to all body cells and carries away cell waste products.
6. The components of the circulatory system are the heart, blood, arteries, veins, and capillaries.
7. The capillaries allow exchange between blood and cells in other tissues.
8. Blood is a liquid tissue that consists of plasma, red blood cells, white blood cells, and platelets.
9. The heart is a muscle that contracts regularly to pump blood throughout the body.
10. The respiratory system provides oxygen to the body.
11. The components of the respiratory are the trachea, bronchi, and air sacs.
12. Respiratory gases are exchanged in the alveoli.

e. Essential Skills:

1. Identify major components of the circulatory, respiratory, and digestive system.
2. Draw conclusions from data collected in an experiment.

f. Vocabulary

Digestive tract, esophagus, stomach, small intestines, large intestines, colon, accessory organs, enzymes, feces, heart, blood, plasma, red blood cells, white blood cells, platelets, arteries, veins, capillaries, lymph, trachea, bronchi, alveoli,

g. Science Misconceptions

1. The difference in size between a cell and a molecule.
2. Blood is blue in color.
3. That the stomach is the only part of the digestive system.
4. That all digestion is mechanical.

Activities:

Labs:

Trading Places

Projects:

Travel Brochure of the Body Systems

Multimedia:

Blood Bits

<http://www.blood.co.uk/pages/bbits.htm>

Reading For Information:

Chew For Health

IV.. Significant Tasks (ST): Feel The Beat

a. Significant Task Introduction: In this investigation, students will explore how different movements (e.g., walking, climbing steps, lifting weights, or hand-clapping) affect pulse rate. Students will also identify independent and dependent

variables, and those variables that are kept constant, when designing an experiment. They will keep a detailed and organized record of your experimental design, data collection and analysis in their science notebook and draw conclusions and identify sources of error in the experimental process.

b. Length/Timing: End of the unit

c. Essential Questions:

Why does the heart beat faster with different movements?

d. Assessment Tools (AT): Lab Report

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Suggested Science Fair Topics

Example Assessment Questions

I. Grade/Course Title: 7th Grade Science

a. Course Overview/Description:

b. Quarter: Four

II. Unit #7 MICROBES/FOOD PRESERVATION Unit Length: 5 weeks

a. Unit Introduction: Certain microorganisms or microbes can be harmful to humans and food production. When a microbe enters an organism and reproduces an infection, contamination and food spoilage can result causing serious problems. These infections can be transmitted from one organism to another. Microbes can be controlled through several approaches, leading to removing them, killing them, or preventing them from growing. These control measures change or alter the abiotic factors needed for growth of the microbe.

b. Standards for Unit #7

- **C 21.** Describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes.
- **CINQ6.** Use mathematical operations to analyze and interpret data.
- **CINQ7.** Identify and present relationships between variables in appropriate graphs.
- **CINQ9.** Provide explanations to investigated problems or questions.

c. Essential Questions:

1. How can heat prevent microbes from growing?
2. Can microbes cause diseases?
3. What factors are necessary for microbial growth?

d. Essential Content/Concepts:

1. Microbes are very small organisms.
2. Certain microbes can cause diseases.
3. Diseases from microbes can be passed from one organism to another.
4. Some microbes are helpful to the environment.
5. Freezing slows the growth of microbes.
6. Irradiation kills microbes.
7. Altering abiotic factors limits reproduction in organisms.

e. Essential Skills:

1. Describe different methods that prevent food spoilage.
2. Identify relationships between variables in graphs.
3. Describe factors needed for microbial growth.

f. Vocabulary

microbe, microscope, infectious disease, freezing, dehydration, pickling, irradiation, food spoilage, abiotic factors, transmitted

g. Science Misconceptions

1. Microbes limit themselves to certain things.
2. Microbes are all harmful.
3. Microbes and viruses are one and the same.
4. Food spoilage is not caused by microbes.

Activities:

Labs:

Microscope Lab with prepared bacteria cells

http://www.hhmi.org/biointeractive/vlabs/bacterial_id/shockframe/shockframe_a1.html

Bacteria Gathering Lab

<http://www.uen.org/Lessonplan/preview.cgi?LPid=1167>

Projects:

Develop a timeline for different types of food preservation techniques

Design a Brochure (Microsoft Publisher), outlining food preservation techniques

Food Safety and Quality Projects

(<http://www.econedlink.org/lessons/index.cfm?lesson=EM522>)

Research:

Introduction to Bacteria

Reading for Information:

Don't Eat That Sandwich

Where Have All The Bees Gone?

IV.. Significant Tasks (ST) #/Title: Food Spoilage Significant Task

a. Significant Task Introduction: A major way that people prevent food spoilage is through spices. For example, the list of ingredients on the jar of pickles includes vinegar, salt, sugar~ and spices. Do these ingredients help preserve the pickles? This task will help the students answer this question can spices be used to control food spoilage.

b. Length/Timing:

c. Essential Questions: Can food spoilage be controlled?

d. Assessment Tools (AT): Lab report

UNIT RESOURCES:

Readings, Texts, Materials, Videos

Suggested Science Fair Topics

Example Assessment Questions