

STRATFORD PUBLIC SCHOOLS

Stratford, Connecticut



“Tantum eruditi sunt liberi”

Only The Educated Are Free

Life Science

Grade 7 &

Grade 7 Honors Curriculum

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LIFE SCIENCE

GRADE 7

Course Description:

Grade 7 Regular Life Science: This course includes topics that focus on the Connecticut Science Standards for the middle school life sciences, which can be found on the state education department website at: <http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=320890> . All grade seven students should gain an understanding of the major topics in life sciences, such as human body systems and their interactions to promote internal stable conditions, the continuation and evolution of organisms by passing inherited traits on to offspring, and the balance of abiotic and biotic factors in our planet's ecosystems and how they ensure the survival of life. Throughout the course, students will practice using science inquiry skills in developing investigations to solve scientific questions, along with continued development of scientific literacy and numeracy skills. By participating in Common Formative Assessments, the skills and content found on the science CMT will be reinforced.

Grade 7 Honors Life Science: The 7th grade honors science curriculum consists of the entire regular 7th grade science curriculum, including all assessments and CFA's. In addition, the honors science curriculum includes more advanced content on all topics, more rigorous performance assessments and inquiry lab experiences, and the addition of the standards from the 9th grade Studies In Science curriculum. Students in the honors science program are required to complete more challenging assignments, along with more advanced hands-on laboratory experiences and projects. The honors curriculum includes all the regular curriculum CFA's, including the 9th grade Studies In Science CFA's that correspond to the standards.

Connecticut State Science Standards:

This course meets the following state science standards, which represent the essential content and skills students should acquire in order to be successful in this course, in high school science courses, and in their lifelong learning.

Inquiry Standards for Grade 7 Life Science:

- **C INQ.1** *Identify* questions that can be answered through scientific investigation.
- **C INQ.2** *Read, interpret and examine* the credibility of scientific claims in different sources of information.
- **C INQ.3** *Design and conduct* appropriate types of scientific investigations to answer different questions.
- **C INQ.4** *Identify* independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- **C INQ.5** Use appropriate tools and techniques to *make observations* and gather data.
- **C INQ.6** Use mathematical operations to *analyze and interpret* data.
- **C INQ.7** *Identify and present* relationships between variables in appropriate graphs.
- **C INQ.8** *Draw* conclusions and identify sources of error.
- **C INQ.9** Provide explanations to investigated problems or questions.
- **C INQ.10** *Communicate* about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

Science Common Formative Assessments:

The middle school science curriculum includes six CFA's throughout the year. All CFA's focus on the same ten key scientific inquiry skills necessary for success when performing scientific investigations. Students and teachers

- Question #1: Reading for Content (based on background information)
- Question #2: Identification of IV and/or DV
- Question #3: Identification of the Problem
- Question #4: Identification of the Controlled Variables (Constants)
- Question #5: Identification of the Control Group
- Question #6: Measuring Tools/Metric Measurements
- Question #7: Data Collection/Analyzing Data
- Question #8: Graphing
- Question #9: Drawing Conclusions Based on Data
- Question #10: Validity
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Content Standard (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.

Performance Standards:

- (C.4) *Describe* how abiotic factors, such as temperature, water, and sunlight, affect the ability of plants to create their own food through photosynthesis.
- (C.5) *Explain* how populations are affected by predator-prey relationships.
- (C.6) *Describe* common food webs in different Connecticut ecosystems.

Content Standard (7.2) Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Performance Standards:

- (C.15) *Describe* the basic structure of an animal cell, including the nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.
- (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.
- (C.17) *Explain* how the human skeletal and muscular systems support the body and allow movement.
- **State Embedded Task: Feel the Beat**

Content Standard (7.4) Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.

Performance Standard:

- (C.21) *Describe* how freezing, dehydration, pickling, irradiation, and pasteurization prevent food spoilage caused by microbes.

Content Standard (8.2) Reproduction is a characteristic of living systems and it is essential for the continuation of every species.

Performance Standard:

- (C.25) *Explain* the similarities and differences in cell division in somatic and germ cells.
- (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.

Enhanced Curriculum for Grade 7 Honors Life Science includes all of the above inquiry standards and content standards, with the addition of the following grade 9 Studies in Science standards:

Enhanced Inquiry Standards for Grade 7 Honors Life Science:

- **D INQ.3** *Formulate* a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- **D INQ.7** *Assess* the reliability of the data that was generated in the investigation.
- **D INQ.8** Use mathematical operations to *analyze* and *interpret* data, and present relationships between variables in appropriate forms.
- **D INQ.9** *Articulate* conclusions and explanations based on research data, and *assess* results based on the design of the investigation.

Enhanced Content Standards For Grade 7 Honors Life Science:

Content Standard (9.6) Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.

Performance Standards:

- **(D.18):** Compare and contrast the short and long term impacts of landfills and incineration of waste materials on the quality of the environment.

Content Standard (9.7) Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles.

Performance Standards:

- **(D.19):** Assess how chemical and physical processes cause carbon to cycle through the major earth reservoirs.
- **(D.20):** Interpret how solar energy causes water to cycle through the major earth reservoirs.
- **(D.21):** Evaluate how internal energy of the Earth causes matter to cycle through the magma and the solid earth.

Content Standard (9.8) The use of resources by human populations may affect the quality of the environment.

Performance Standards:

- **(D.22):** Assess how the release of sulfur dioxide into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.
- **(D.23):** Predict how the accumulation of carbon dioxide in the atmosphere increases Earth's "greenhouse" effect and may cause climate changes.
- **(D.24):** Evaluate how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.

Content Standard (9.9) Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.

Performance Standards:

- **(D.25):** Predict how land development, transportation options and consumption of resources may affect the environment.
- **(D.26):** Evaluate human efforts to reduce the consumption of raw materials and improve air and water quality.

CAPT Embedded Performance Tasks:

- Acid Rain
- CT Brownfields

Topics Taught and Pacing Guides:

Grade 7 Regular Life Science

UNIT	# OF DAYS
Methods, Measurement, Safety	22 days
Living Things & Cells	32 days
Skeletal & Muscular Systems	21 days
Digestive System	19 days
Circulatory & Respiratory Systems	20 days
Food-Borne Illness & Food Preservation	10 days
Reproduction System & Heredity	29 days
Environmental Science	24 days

Grade 7 Honors Life Science

UNIT	# OF DAYS
Methods, Measurement, Safety	20 days
Living Things & Cells	19 days
Human Body Systems: a) Bones, Muscles, and Skin b) Food and Digestion c) Circulation (includes state embedded task) d) Respiration and Excretion e) Nervous System f) Endocrine System g) Fighting Disease	67 days
Code Orange Novel	10 days
Food-Borne Illness & Food Preservation	10 days
Reproduction System & Heredity	19 days
Environmental Science and The Changing Earth	34 days

Stratford Public Schools Mission Statement:

To develop a community of learners in which ALL students acquire the knowledge, skills, and confidence to meet the challenges of a changing and increasingly diverse society.

Stratford Information Literacy and Technology Standards:

Standard 1: Information Strategies – Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use – Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application – Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation – Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management – Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Middle School Science **Science 21st Century Skills and Expectations**

Critical Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks
2. Work independently and collaboratively to solve problems and accomplish goals
3. Communicate information clearly and effectively using a variety of tools / media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility and adaptability in thinking patterns, work habits, and working/learning conditions
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior

Integration of 21st Century Skills per Subject	Critical Skill Addressed
7th Grade Regular and Honors Life Science	
Yeast Lab – November/December	2, 3, 4, 5
Feel the Beat (Embedded Task) – March	2, 3, 4, 5
Outbreak! – February/March	1, 2, 3, 4, 5, 6
Environmental Issues - May	1, 2, 3, 4, 5, 6
8th Grade Regular and Honors Physical Science	
“Fun”derstanding Coasters – February/March	1, 2, 4, 5
Vehicle Safety Research – April/May	1, 2, 3, 4, 5
Shipping and Sliding – January/February	1, 2, 3, 4, 5,
Bridges Web Quest – May/June	1, 2, 3, 5

Safety In The Science Laboratory

Students and teachers must be aware of the potential for safety problems in the science classrooms and laboratories. Schools should review available safety resources and develop safety training for their teachers and students as well as safety rules for the classroom.

Teachers must choose safe labs that cover important concepts. Thought must be given to the chemicals purchased by schools. Which chemicals are the safest for the proposed labs, how much is needed, where will the chemicals be stored and in what arrangement? Are the storage areas locked and well ventilated?

General Lab Safety Recommendations

1. Always perform an experiment or demonstration prior to allowing students to replicate the activity. Look for possible hazards. Alert students to potential dangers.
2. Safety instructions should be given orally and be posted each time an experiment is begun.
3. Constant surveillance and supervision of student activities are essential.
4. Never eat or drink in the laboratory or from laboratory equipment. Keep personal items off the lab tables.
5. Never use mouth suction in filling pipettes with chemical reagents. Use a suction bulb.

General Science Safety Checklist

The following is a suggested checklist of safety concerns in K-12 science laboratories.

1. Appropriate protective equipment for the science laboratory
2. Enforcement of safety procedures
3. All students and teachers know the location of all protective equipment
4. All students read and sign a lab safety contract.
5. Sufficient, accessible lab stations per number of students in each laboratory
6. All students must wear proper safety goggles whenever chemicals, glassware, or heat are used

No food products should be consumed by staff or students as part of a lesson, unit or related course work.

Stratford Public Schools – Grade 7 – Life Science

<p>Unit Name: <u>Methods of Science, Measurement and Safety</u></p> <p>➤ Synopsis: This unit reviews the scientific method of experimentation through inquiry, literacy and numeracy. Skills such as stating a scientific problem, experimental design, taking measurements, making observations, and forming conclusions will be taught at the start of the year, and then continued throughout the curriculum. On each CFA given throughout the year, key inquiry skills will be tested for continued mastery of the science skills.</p>	<p align="right">Est. # of Weeks: <u>8 weeks</u></p>
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STUDENT LEARNING GOALS

Content-Specific Powered Standards:

- **C INQ.1** Identify questions that can be answered through scientific investigation.
- **C INQ.2** Read, interpret and examine the credibility of scientific claims in different sources of information.
- **C INQ.3** Design and conduct appropriate types of scientific investigations to answer different questions.
- **C INQ.4** Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- **C INQ.5** Use appropriate tools and techniques to make observations and gather data.
- **C INQ.6** Use mathematical operations to analyze and interpret data.
- **C INQ.7** Identify and present relationships between variables in appropriate graphs.
- **C INQ.8** Draw conclusions and identify sources of error.
- **C INQ.9** Provide explanations to investigated problems or questions.
- **C INQ.10** Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies
Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use
Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application
Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation
Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management
Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

21st Century Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Key Vocabulary:

- Inquiry, hypothesis, observations, conclusions, independent (manipulated) variables, dependent (responding) variables, constants, controls, validity, metric system, qualitative and quantitative observations, inferences.
- Scientific tools: metric ruler, graduated cylinder, thermometer, beaker, dropper, microscope, triple beam balance
- Need to know how to measure: length (cm, mm), volume (mL), mass (grams), temperature (degrees Celsius)

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ Students must adhere to the Stratford Public Schools safety rules when performing scientific investigations. ➤ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. ➤ Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. ➤ Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists. ➤ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. ➤ Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media. ➤ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ➤ What are the key safety rules in a science classroom or lab? ➤ How is inquiry used to solve problems or gather data to better understand a situation? ➤ How do scientists gather observations and measurements to find answers to questions? ➤ How do scientists communicate their findings in science? ➤ What are the characteristics of a controlled experiment?
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<p>State Grade Level Expectations</p> <p><u>Students will:</u></p> <ul style="list-style-type: none"> ➤ Explain the key rules that must be followed in a science classroom or during a lab investigation. ➤ Identify questions that can be answered through scientific investigation. ➤ Read, interpret and examine the credibility of scientific claims in different sources of information. ➤ Design and conduct appropriate types of scientific investigations to answer different questions. ➤ Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment. ➤ Use appropriate tools and techniques to make observations and gather data. ➤ Use mathematical operations to analyze and interpret the data. ➤ Identify and present relationships between variables in appropriate graphs. ➤ Draw conclusions and identify sources of error. ➤ Provide explanations to investigated problems or questions. ➤ Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic. ➤ Identify and implement the safety measures to be taken in laboratory and field investigations. ➤ Collect and record data, using a variety of metric measures. ➤ Analyze direct and indirect evidence in order to propose reasonable explanations. ➤ Write lab reports about his or her laboratory and field investigations, using a standard format: Problem, Hypothesis, Materials, Procedure, Results, Conclusion, and Validity. 	
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ASSESSMENT PLAN	
<p>Summative Assessment(s):</p> <ul style="list-style-type: none"> ➤ Required Assessment: <i>State Embedded Task: Feel the Beat</i> (to be completed by the end of the circulatory/respiratory unit) ➤ Suggested Assessments and Activities: Quizzes, tests, performance tasks, lab investigations, homework. Various Investigations that Build Inquiry Skills and Measurement Skills – These should be incorporated throughout the year to practice/build on these skills (see curriculum binder for hard copy of activity): <ul style="list-style-type: none"> ▪ Sugar Lab, Packing Peanuts, Magic Sand, Feet Lab, Penny Lab, Gobstoppers, Qualitative vs. Quantitative, Observations and Inferences, Measurement Labs, Sponge Bob, Safety Poster Project 	<p>Formative and Diagnostic Assessment:</p> <ul style="list-style-type: none"> ➤ Science inquiry and measurement skills (C.INQ’s 1-10) are integrated into all CFA’s throughout the school year ➤ CFA #1: Earth Science (Dig In)

LEARNING PLAN COMPONENTS

- **Suggested Teacher Resources:** *Science Process Skills*, Kendall/Hunt, 2003, *Doing Good Science in Middle School*, NSTA Press, 2004
- **FLINN** Safety DVD (Life Science Version)
- *United Streaming* videos
- *MythBusters*, Discovery Channel and United Streaming

HONORS PROGRAM

Content-Specific Powered Standards:

- **D INQ.3** *Formulate* a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- **D INQ.7** *Assess* the reliability of the data that was generated in the investigation.
- **D INQ.8** Use mathematical operations to *analyze* and *interpret* data, and present relationships between variables in appropriate forms.
- **D INQ.9** *Articulate* conclusions and explanations based on research data, and *assess* results based on the design of the investigation.

Enhanced Program:

- More student-designed labs throughout curriculum, with required use of formal written lab reports.

Unit Name: Living Things and Cells

Est. # of Weeks: 6 weeks (32 days) **Honors:** 4 weeks (19 days)

- **Synopsis:** This unit begins by introducing the characteristics and needs of all living things, and then builds on the main focus that all living things are composed of one or more cells. The main focus of this unit includes the basic structures of cells (animal, plant, and bacterial), the importance of the cell membrane in diffusion and osmosis, cell processes (photosynthesis and cellular respiration), and cellular division in somatic (body) cells.

STUDENT LEARNING GOALS

Content-Specific Powered Standards:

- (7.2) Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.
 - (7.2.a) All organisms are composed of one or more cells; each cell carries on life-sustaining functions.

CMT Correlations:

- (C.15) Describe the basic structure of an animal cell, including the 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 (gamete) cells.

Ongoing Integration of Inquiry Skills:

- C INQ.1 Identify questions that can be answered through scientific investigation.
- C INQ.2 Read, interpret and examine the credibility of scientific claims in different sources of information.
- C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions.
- C INQ.4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- C INQ.5 Use appropriate tools and techniques to make observations and gather data.
- C INQ.6 Use mathematical operations to analyze and interpret data.
- C INQ.7 Identify and present relationships between variables in appropriate graphs.
- C INQ.8 Draw conclusions and identify sources of error.
- C INQ.9 Provide explanations to investigated problems or questions.
- C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

21st Century Skills: Yeast Lab

Date: November/December

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
- ➔ 2. Work independently and collaboratively to solve problems and accomplish goals.
- ➔ 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- ➔ 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies

Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use

Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application

Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation

Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management

Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary:

- cell, reproduce (asexually and sexually), unicellular, multicellular, autotroph, heterotroph, homeostasis, stimulus, response, organelle, cell wall, cell membrane, nucleus, cytoplasm, mitochondria, endoplasmic reticulum, ribosomes, Golgi bodies, vacuoles, lysosomes, chloroplasts, eukaryote, prokaryote, selectively permeable, diffusion, osmosis, photosynthesis, chlorophyll, cellular respiration, mitosis, interphase, prophase, metaphase, anaphase, telophase, cytokinesis, daughter cells,

<p>➔ 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.</p> <p>6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.</p>	<p>chromosomes</p>
<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ All living things have common characteristics – made of cells, reproduce, grow and develop, respond to changes in their environment, obtain and use energy, contain the same chemicals. ➤ In order for survival, all living things need water, food, living space, and internal stable conditions. ➤ Cells contain organelles that carry out specific life-sustaining functions. ➤ Animal, plant, and bacterial cells can be distinguished by their different organelles and structures. ➤ Photosynthesis and cellular respiration form a cycle that keeps the levels of oxygen and carbon dioxide fairly constant in the Earth’s atmosphere. ➤ Mitosis in somatic (body) cells involves the replication of the chromosomes into two identical sets followed by the division of the entire cell into two similar cells, in humans containing 23 pairs of chromosomes (46 individual chromosomes). 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ➤ What makes something “living”? ➤ What are the basic structures of animal and plant cells, and how do they function to support life? ➤ When observing cells, how can animal, plant, and bacterial cells be distinguished? ➤ How do necessary substances enter and exit cells? ➤ How do the processes of photosynthesis and cellular respiration keep levels of oxygen and carbon dioxide constant in the atmosphere? ➤ How do the body’s cells reproduce to make more cells?
<p>Learning Objectives</p> <p><u>Students will:</u></p> <ul style="list-style-type: none"> ➤ List the characteristics all living things share, and identify what all living things need to survive. ➤ Compare and contrast the structures of animal, plant, and bacterial cells. ➤ Use appropriate tools to observe cells. ➤ Distinguish eukaryotic and prokaryotic cells. ➤ Describe how most small molecules and water molecules cross the cell membrane. ➤ Explain why osmosis is important to cells. ➤ Explain the raw materials and products of photosynthesis and cellular respiration. ➤ List and describe the stages of mitosis. <p><u>State Science GLE’s:</u></p> <ol style="list-style-type: none"> 1. Compare and contrast single-celled organisms with multicellular organisms. 2. Illustrate and describe in writing the structure and functions of the following: cell membrane, cytoplasm, mitochondria, and nucleus of an animal cell. 3. Illustrate and describe the structural differences between bacterial and animal cells. 	
<p>ASSESSMENT PLAN</p>	
<p>Summative Assessment(s):</p> <ul style="list-style-type: none"> ➤ Required Assessment: Martian Cell Performance Task ➤ Suggested Assessments and Activities: Quizzes, tests, performance tasks, inquiry investigations, homework. Labs: Gummy Bear Osmosis Lab, Mitosis Flip-Book, Lab Demos on Diffusion/Osmosis 	<p>Formative and Diagnostic Assessment:</p> <ul style="list-style-type: none"> ➤ CFA #2: Yeast (October)
<p>LEARNING PLAN COMPONENTS</p>	

- Textbook: *Cells and Heredity* (Prentice Hall, 2005)
- *United Streaming* videos
- *A Journey Through the Cell* video, Cambridge Educational Video
- *World of Discovery: The Secret Life of 118 Green Street* video, ABC Video

HONORS PROGRAM

Enhanced Program:

- Inclusion of more cell organelles (structure and function)
- More use of microscopes and observing different cells (parts of microscope identified)

Unit Name: Human Body Systems

Est. # of Weeks: 12 weeks (60 days)

Honors: 13-14 weeks (67 days)

- **Synopsis:** This unit encompasses all of the major systems of the human body, including the skeletal and muscular systems, the digestive system, and the respiratory and circulatory systems. Teachers have the option to teach food-borne illness/food preservation after the unit on digestion or at the end of the human body unit.

STUDENT LEARNING GOALS

Content-Specific Powered Standards:

- **(7.2)** Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.
- **(7.2.a)** All organisms are composed of one or more cells; each cell carries on life-sustaining functions.
 - **(7.2.b)** Multicellular organisms need specialized structures and systems to perform basic life function.

CMT Correlations:

- **(C.15)** Describe the basic structure of an animal cell, including the nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.
- **(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.
- **(C.17)** Explain how the human skeletal and muscular systems support the body and allow movement.

Ongoing Integration of Inquiry Skills:

- **C INQ.1** Identify questions that can be answered through scientific investigation.
- **C INQ.2** Read, interpret and examine the credibility of scientific claims in different sources of information.
- **C INQ.3** Design and conduct appropriate types of scientific investigations to answer different questions.

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies

Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use

Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application

Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation

Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management

Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

<ul style="list-style-type: none"> ➤ C INQ.4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment. ➤ C INQ.5 Use appropriate tools and techniques to make observations and gather data. ➤ C INQ.6 Use mathematical operations to analyze and interpret data. ➤ C INQ.7 Identify and present relationships between variables in appropriate graphs. ➤ C INQ.8 Draw conclusions and identify sources of error. ➤ C INQ.9 Provide explanations to investigated problems or questions. ➤ C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic. <p>21st Century Skills: Feel the Beat (Embedded Task) <u>Date: March</u></p> <ol style="list-style-type: none"> 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks. ➔ 2. Work independently and collaboratively to solve problems and accomplish goals. ➔ 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. ➔ 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. ➔ 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior. 	<p>Key Vocabulary:</p> <ul style="list-style-type: none"> ➤ Cells, tissues, organ, organ system, homeostasis ➤ Vertebrae, joint, ligament, cartilage, compact bone, spongy bone, marrow, involuntary muscles, voluntary muscles, types of muscle tissue (cardiac, smooth, skeletal) ➤ Digestion, absorption, mechanical and chemical digestion, epiglottis, esophagus, peristalsis, stomach, pepsin, small intestine, villi, liver, bile, gallbladder, pancreas, large intestine ➤ Atrium, ventricle, valve, aorta, vena cava, septum, arteries, veins, capillaries, pulse, diffusion, blood pressure, stethoscope, blood, plasma, red blood cells, hemoglobin, white blood cells, platelets ➤ Respiration, oxygen, carbon dioxide, pharynx, trachea, lungs, bronchi, alveoli, diaphragm
<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ In the human body, cells become more specialized as tissues, which then group together performing a specific job as organs, ultimately working as systems to perform life functions. ➤ All systems of the body work together to maintain homeostasis, the body's tendency to keep an internal balance. ➤ The skeletal system provides shape and support, protects organs, produces blood cells, enables you to move by working with the muscular system, and stores minerals for the body. ➤ Skeletal muscles work in pairs, with one muscle in the pair contracting while the other relaxes to its original length. ➤ The digestive system is responsible for breaking down food into smaller substances the body can use, absorbing nutrients into the bloodstream, and eliminating wastes. ➤ The circulatory system is responsible for carrying needed substances 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ➤ What are the levels of organization in the human body? ➤ What are the functions of the skeletal system? ➤ What role do joints play in the body? ➤ How do the skeletal and muscular systems, working together to support and protect the body, allow for movement? ➤ How does the digestive system break down food, absorb nutrients, and help to eliminate wastes from the body?

<p>(nutrients, water, dissolved gases) to cells and removing waste products from cells, along with carrying white blood cells throughout the body to fight disease-causing pathogens.</p> <ul style="list-style-type: none"> ➤ Blood leaves the heart through arteries, exchanges materials with the body's cells at capillaries, and then travels back to the heart by veins. ➤ The respiratory system is responsible for moving oxygen from the outside environment into the body, and then removing wastes, such as carbon dioxide and water, from the body. 	<ul style="list-style-type: none"> ➤ What path does blood take throughout the circulatory system? ➤ How does the digestive, respiratory, and circulatory systems function together to bring oxygen and nutrients to the cells and expel waste materials?
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Learning Objectives

Students will:

- Identify the levels of organization in the body.
- Define homeostasis.
- Describe the major functions of the skeletal, muscular, digestive, circulatory, and respiratory systems, and name and describe the functions of the major organs of these systems.
- Describe the movement of hinge, pivot, gliding, and ball-and-socket joints.
- Model how the biceps and triceps work in a pair to move the arm.
- Dissect an owl pellet and reconstruct the skeleton of the rodent, labeling the bones.
- Distinguish mechanical and chemical digestion in both the mouth and stomach.
- Explain peristalsis and its importance in digestion.
- Describe how the structure of villi aid in absorption.
- Label the parts of the human heart.
- Describe the path of a red blood cell, including how oxygen is delivered to the body's cells and carbon dioxide is removed.
- Distinguish the functions of arteries, veins, and capillaries.
- List and describe the four components of blood.

State Science GLE's:

1. Explain how the structure and function of multicellular organisms (animals) depends on the interaction of cells, tissues, organs, and organ systems.
2. Investigate and explain in writing the basic structure and function of the human skeletal system.
3. Differentiate between the structures and range of motion associated with ball, socket, and hinge joints and relate human joint to simple machines.
4. Demonstrate how the muscles, tendons, ligaments, and bones interact to support the human body and allow movement.

State Science GLE's continued:

5. Label the major parts of the human respiratory system and explain in writing the function of each part (nasal cavity, trachea, bronchi, lungs, and diaphragm).
6. Label the major parts of the human circulatory system and explain in writing the function of each part (heart, veins, arteries, and capillaries).
7. Design and conduct controlled variable experiments to analyze the interaction between the circulatory and respiratory systems as the demand for oxygen changes. (State Embedded Task)
8. Label the major parts of the human digestive system and explain in writing the function of each part in the chemical and physical breakdown of food (mouth, esophagus, stomach, small intestine, large intestine, rectum).

ASSESSMENT PLAN

Summative Assessment(s):

- **Required Assessment:** State Embedded Task: Feel the Beat, and Owl Pellet Dissection
- **Suggested Assessments and Activities:**
 - Quizzes, tests, performance tasks, lab investigations, homework

Formative and Diagnostic Assessment:

- CFA #3: Cellular Respiration
- CFA #4: Protein Digestion
- CFA#5: Feel the Beat

- Design and Build a Hand Prosthesis (p.5)
- Travels of a Red Blood Cell (p.77)
- Inquiry Lab: As the Stomach Churns (p.66)
- Inquiry Lab: Clues About Health (p.132)
- Measuring the Length of the Digestive System Parts
- Medical Rounds

For copies of the student/teacher guide and scoring rubric for the State Embedded Task, “Feel the Beat”, go to:
<http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=320890>

LEARNING PLAN COMPONENTS

- Textbook: *Human Biology and Health* (Prentice Hall, 2005)
- *United Streaming* videos
- *Human Body: Pushing the Limits*, Discovery Channel & United Streaming
- *The Ultimate Guide: The Human Body*, Discovery Channel
- *Osmosis Jones*, Warner Brothers
- *Rock & Learn Human Body* (special education & lower level video)
- *Body Atlas*, TLC and Ambrose Video

HONORS PROGRAM

Enhanced Program:

- Addition of the immune and nervous systems, and more concentration on medical conditions associated with each system
- Additional Key Vocabulary: inflammatory response, phagocyte, immune response, lymphocyte, T-cell, antigen, B-cell, antibody, AIDS, HIV, active immunity, passive immunity, vaccination, antibiotic, stimulus, response, neuron, nerve impulse, dendrite, axon, interneuron, sensory neuron, nerve, motor neuron, synapse, central nervous system, peripheral nervous system, brain, spinal cord, cerebrum, cerebellum, brain stem, somatic nervous system, autonomic nervous system,
- Enhanced Performance Assessments: enhanced inquiry lab experiments and projects on each body system (TBD by honors teacher) and frog dissection at the end of the unit

Stratford Public Schools – Grade 7 – Life Science

Unit Name: <u>Food-Borne Illnesses and Food Preservation Techniques</u>	Est. # of Weeks: <u>2 weeks (10 days)</u>
<p>➤ Synopsis: This unit can be taught after the digestive system, or after the human body systems unit. Teachers will briefly introduce pathogens and how infectious diseases are spread, continuing with the focus on common food-borne illnesses, especially those caused by <i>E. coli</i> and <i>Salmonella</i>. Using resources from the <i>Fight Bac</i> curriculum (www.fightbac.org), this unit will teach students the importance of safe handling of food and ways we preserve our food from contamination and spoilage.</p>	

STUDENT LEARNING GOALS

<p>Content-Specific Powered Standards:</p> <p>➤ (7.4) Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.</p> <ul style="list-style-type: none"> ▪ (7.4.a) Various microbes compete with humans for the same sources of food. <p>CMT Correlations:</p> <p>➤ (C.21) Describe how freezing, dehydration, pickling, irradiation, and pasteurization prevent food spoilage caused by microbes.</p> <p>Ongoing Integration of Inquiry Skills:</p> <p>➤ C INQ.1 Identify questions that can be answered through scientific investigation.</p> <p>➤ C INQ.2 Read, interpret and examine the credibility of scientific claims in different sources of information.</p> <p>➤ C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p>➤ C INQ.4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.</p> <p>➤ C INQ.5 Use appropriate tools and techniques to make observations and gather data.</p> <p>➤ C INQ.6 Use mathematical operations to analyze and interpret data.</p> <p>➤ C INQ.7 Identify and present relationships between variables in appropriate graphs.</p> <p>➤ C INQ.8 Draw conclusions and identify sources of error.</p> <p>➤ C INQ.9 Provide explanations to investigated problems or questions.</p> <p>➤ C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p> <p>21st Century Skills: Outbreak! Date: February/March</p> <p>➔ 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.</p> <p>➔ 2. Work independently and collaboratively to solve problems and</p>	<p>Interdisciplinary Standards (Technology Integration)</p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr style="border-top: 1px dashed black;"/> <p>Key Vocabulary:</p> <p>➤ Pathogens, infectious disease, bacteria, viruses, fungi, protists, immunity, food-borne illness, food poisoning, spoilage, contamination, cross-contamination, food preservation, refrigeration and freezing, canning, irradiation, dehydration, freeze-drying, salting, pickling, pasteurization, chemical preservation</p>
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<p>accomplish goals.</p> <ul style="list-style-type: none"> ➔ 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. ➔ 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. ➔ 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. ➔ 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior. 	
<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ Pathogens are responsible for causing infectious diseases. ➤ Food-borne illnesses are caused by consuming food that has been contaminated with a pathogen. ➤ Food can be preserved using different techniques that either eliminate (kill) all pathogens on the food, or slow down the activity of the pathogens on the food. ➤ Common techniques used in preservation food are refrigeration and freezing, canning, irradiation, dehydration, freeze-drying, salting, pickling, pasteurization, and using chemical preservation. ➤ Once the consumer brings food home, it is their responsibility to ensure that the food being consumed is safe. Techniques used by the consumer to ensure this are washing hands and surfaces often, avoiding cross-contamination, cooking certain foods to a proper temperature, and refrigerating food promptly. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ➤ How does the body get infected with pathogens? ➤ How can bacteria and other pathogens affect our food supply? ➤ How can food preservation improve the quality of our lives? ➤ What are the common types of food preservation? ➤ How can you ensure that you and your family will be safe from contracting a food-borne illness in your home?
<p>Learning Objectives</p> <p><u>Students will:</u></p> <ul style="list-style-type: none"> ➤ List the types of pathogens and explain how infectious diseases can be spread. ➤ Define food-borne illness and name the most common pathogens that cause it. ➤ Explain how cross-contamination occurs and give a common example that occurs in everyday households. ➤ List and describe types of food preservation. ➤ Explain the four techniques people can use to ensure that the food being consumed at home is safe. ➤ Read and interpret various articles on recent outbreaks of food poisoning in the media. ➤ Create a poster, pamphlet, or infomercial educating others about food-borne illnesses and the importance of food preservation and food handling techniques. <p><u>State Science GLE's:</u></p> <ol style="list-style-type: none"> 1. Investigate and describe in writing different types of microbes and the environmental conditions necessary for their survival. 2. Describe the optimum conditions for rapid bacterial growth. 3. Illustrate and describe the structural differences between bacterial and animal cells. 4. Discover and discuss how humans use bacteria to produce food and identify examples. 5. Compare and contrast the role of bacteria in food production and food spoilage. 6. Evaluate and report how each method of food preservation including dehydration, pickling, irradiation, and refrigeration works to stop or inhibit bacterial growth and give examples of each. 	

ASSESSMENT PLAN

Summative Assessment(s):

- **Required Assessment:** The Cafeteria Catastrophe Performance Task
- **Suggested Assessments and Activities:** Quizzes, tests, performance tasks, inquiry investigations, homework, Fight Bac website resources/labs.
 - *Current Science* article, “Food Fright”
 - *Time for Kids* article, “The Flu”
 - *How Things Work: Food Preservation* (reading assignment or webquest)
 - Food Preservation Home Scavenger Hunt
 - *Poison Pump* Activity (*Project Wet*)
 - *Fight Bac* Video and Activity/Lab

Formative and Diagnostic Assessment: NA

LEARNING PLAN COMPONENTS

- **Textbook:** *Human Biology and Health* (Prentice Hall, 2005)
- *Current Science* article, “Food Fright” (March 2, 2007 – Vol.92, Issue 12)
- *Fight Bac* curriculum, information, and video can be obtained at: www.fightbac.org
- **United Streaming Videos**
- Interactive Web Activity on Pickling: Students are able to pickle cucumbers in this interactive site and see how their pickling ability was by ‘tasting’ their pickles: <http://www.exploratorium.edu/cooking/index.html>
- **Informational Websites:**
 - <http://www.fda.gov/Food/ResourcesForYou/Consumers/KidsTeens/default.htm> (food safety for kids)
 - <http://vm.cfsan.fda.gov/~mow/foodborn.html> (FDA - food borne illness information)
 - <http://www.fooddetectives.org/> (play food detective games online)
 - <http://www.extension.iastate.edu/foodsafety/Lesson/lessons.html> (online information)
 - <http://www.agr.state.nc.us/cyber/kidswrld/foodsafes/index.htm>
 - <http://www.foodsafety.gov/~fsg/fsgkids.html> (links to best food safety sites)
 - <http://lancaster.unl.edu/food/mypyramid-foodsafety.shtml>
 - <http://www.mayoclinic.com/health/first-aid-food-borne-illness/FA00043> (basic info on food-borne illnesses)

Stratford Public Schools – Grade 7 – Life Science

Unit Name: <u>Human Reproduction and Heredity</u>	Est. # of Weeks: <u>6 weeks (29 days)</u> <u>Honors: 4 weeks (19 days)</u>
<p>➤ Synopsis: This unit begins with the basic structures and function of the reproduction system, focusing on the production of sex cells, which contain the chromosomes essential for the continuation of the human species. The heredity section of this unit focuses on common human traits and how they are passed on to offspring. Using Punnett squares, students will practice predicting the probability of offspring inheriting certain traits from their parents. Comparing and contrasting the reproduction of somatic cells and gametes are included.</p>	

STUDENT LEARNING GOALS

<p>Content-Specific Powered Standards:</p> <p>➤ (8.2) Reproduction is a characteristic of living systems and it is essential for the continuation of every species.</p> <ul style="list-style-type: none"> ▪ (8.2.a) Heredity is the passage of genetic information from one generation to another. ▪ (8.2.b) Some of the characteristics of an organism are inherited and some result from interactions with the environment. <p>CMT Correlations:</p> <p>➤ (C.25) Explain the similarities and differences in cell division in somatic and germ cells (gametes).</p> <p>➤ (C.26) Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production.</p> <p>➤ (C.27) Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.</p> <p>Ongoing Integration of Inquiry Skills:</p> <p>➤ C INQ.1 Identify questions that can be answered through scientific investigation.</p> <p>➤ C INQ.2 Read, interpret and examine the credibility of scientific claims in different sources of information.</p> <p>➤ C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p>➤ C INQ.4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.</p> <p>➤ C INQ.5 Use appropriate tools and techniques to make observations and gather data.</p> <p>➤ C INQ.6 Use mathematical operations to analyze and interpret data.</p> <p>➤ C INQ.7 Identify and present relationships between variables in appropriate graphs.</p> <p>➤ C INQ.8 Draw conclusions and identify sources of error.</p> <p>➤ C INQ.9 Provide explanations to investigated problems or questions.</p> <p>➤ C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p> <p>21st Century Skills</p> <p>1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.</p>	<p>Interdisciplinary Standards (Technology Integration)</p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr style="border-top: 1px dashed black;"/> <p>Key Vocabulary:</p> <p>➤ Sexual reproduction, egg, sperm, germ cells, gametes, fertilization, zygote, testes, testosterone, ovaries, estrogen.</p> <p>➤ Chromosomes, genes, alleles,</p>
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<ol style="list-style-type: none"> 2. Work independently and collaboratively to solve problems and accomplish goals. 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions. 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving. 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior. 	<p>meiosis, mitosis, parent cell, daughter cell, heredity, dominant, recessive, purebred, hybrid, homozygous, heterozygous, Punnett square, phenotype, genotype, codominance, sex chromosomes, sex-linked genes, karyotype</p>
<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ Hormones produced by the testes and ovaries regulate both male and female reproductive organs. ➤ Male sex cells (sperm) are produced in the testes, while female sex cells (eggs) are produced in the ovaries. ➤ Cell division of sex cells (meiosis) occurs twice, resulting in sperm and egg having half of each of the 23 pairs of chromosomes. ➤ Genetic information is organized on chromosomes into smaller segments known as genes, and each gene controls a trait. Chromosomes are organized into pairs, half of every pair coming from each parent (half from the sperm, half from the egg) during fertilization. ➤ Alleles are the different forms of a gene, and are either dominant or recessive and are represented with symbols. ➤ An organism's phenotype is its physical appearance, or visible trait, and its genotype is the genetic makeup, or allele combination, or that trait. ➤ A Punnett square is used to calculate the probability that offspring with a certain combination of alleles will result. ➤ While many characteristics of organisms are inherited, some characteristics may be the result of environmental conditions. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ➤ Which human reproductive organs are responsible for the production of sex cells? ➤ What are the similarities and differences in how somatic (body) cells and germ (sex) cells divide? ➤ How are the traits of an individual determined by the chromosomes they receive from their parents? ➤ How do chromosomes play a part in the determination of an offspring's sex?
<p>Learning Objectives / Grade Level Expectations</p> <p><u>Students will:</u></p> <ul style="list-style-type: none"> ➤ Identify the organs that produce sperm and egg. ➤ Describe the role chromosomes play in inheritance, including how they determine an individual's gender. ➤ Compare and contrast the events that take place in mitosis and meiosis. ➤ Explain the relationship between chromosomes, genes, and alleles. ➤ Use Punnett squares to determine the probability offspring will receive certain combinations of alleles. ➤ Identify allele combinations as heterozygous, homozygous dominant, or homozygous recessive. ➤ Describe an organism's phenotype and genotype. <p><u>State Science GLE's:</u></p> <ol style="list-style-type: none"> 1. Relate the continued existence of any species to its successful reproduction and explain in writing the factors that contribute to successful reproduction. 2. Describe the structure, location and function of chromosomes, genes and DNA, and how they relate to each other in the living cell. 3. Illustrate the major structures in human male and female reproductive systems and explain where meiosis and gamete formation take place.* 4. Identify and report on the role of hormone production as it initiates and regulates the creation of male and female 	

germ cells (gametes) from birth through adolescence and into adulthood.*

5. Compare and contrast the events and processes that occur when a human egg is fertilized or not fertilized.*
6. Demonstrate the relationship of corresponding genes on pairs of chromosomes to traits inherited by offspring.
7. Describe in writing the role of the germ cells (gametes) in the formation of the human zygote and its resulting 23 pairs of chromosomes, the 23rd of which determines gender and the other 22 of which determine the characteristics of that offspring.

*GLE's # 3, 4, 5 are taught in the middle school health classes.

ASSESSMENT PLAN

Summative Assessment(s):

- **Required Assessment:** *Crazy Traits Heredity Kits and/or Inherited Traits Project*
- **Suggested Assessments and Activities:** Quizzes, tests, performance tasks, inquiry investigations, homework. **Labs:** *Family Traits, Easter Egg Genetics, Karyotyping Project, Punnet Practice*

Formative and Diagnostic Assessment: NA

LEARNING PLAN COMPONENTS

- Textbook: ***Human Biology and Health*** (Prentice Hall, 2005)
- Textbook: ***Cells and Heredity*** (Prentice Hall, 2005)
- ***United Streaming*** videos

HONORS PROGRAM

- Enhanced topics: Active and passive transport, structure and replication of DNA, transcription and translation, mutations in DNA, human genetic disorders, using pedigrees, advances in genetics (selective breeding, cloning, genetic engineering, DNA fingerprinting)
- Enhanced lab and project experiences: (TBD by honors teacher)

Stratford Public Schools – Grade 7 HONORS Life Science

Unit Name: “Code Orange” **Est. # of Weeks: 2 weeks (10 days)**

***This is utilized in the Honors program only.**

- **Synopsis:** After learning about the immune system, students will have an understanding on pathogens and how infectious diseases are spread. This short novel focuses on a young adolescent who is struggling to complete a science project on an infectious disease. One night, he discovers what he believes to be are old scabs from victims of smallpox, so he starts inquiring online about whether he could contract the disease. As the story develops, readers learn about various infectious diseases, the history of the vaccine, and how pathogens can be used as bio-weapons. The story touches on the realism of bio-terrorism when the main character gets kidnapped because he is suspected of carrying the smallpox virus, but later saves New York City from a possible travesty.
- In the *Teacher’s Notes*, teachers can find handouts with chapter questions, key vocabulary terms, images that relate to topics discussed in the story, and *United Streaming* video suggestions. It is recommended that teachers read the story themselves ahead of their students so that class discussion can take place.
- In the story, the main character is completing a science project on an infectious disease, so to go along with this, it is suggested that the “Pathogen Wanted Poster” project be assigned during the reading of *Code Orange* as an independent take-home project. There is also a disease project by Prentice Hall included in the curriculum binder similar to the pathogen poster that teachers may want to consider.

STUDENT LEARNING GOALS

Content-Specific Powered Standards:

- **(7.2)** Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.
- *Continuation of standards found in the cells and human body units.*

Ongoing Integration of Science Literacy Skills:

- Speaking, listening, presenting, interpreting, reading and writing about science.
- Having the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media.

Ongoing Integration of Inquiry Skills:

- **C INQ.1** Identify questions that can be answered through scientific investigation.
- **C INQ.2** Read, interpret and examine the credibility of scientific claims in different sources of information.
- **C INQ.10** Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

21st Century Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies

Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use

Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application

Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation

Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management

Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary:

- (Chapter 1) Bioterrorism, Manhattan, skirted, immunization, pinnacle, dilute, venue, deciphering, epidemic, all-nighter
- (Chapter 2) Doorman, concierge,

<p>patterns, work habits, and working/learning conditions.</p> <p>5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.</p> <p>6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.</p>	<p>suburbanite, repellent, kiosk, saunter, rigor, confluent</p> <p>➤ (Chapter 3) Eradication, inoculation, scourge</p>
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<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ➤ Pathogens are organisms that cause disease, and can be spread through contact in either an infected person; soil, food or water; a contaminated object; or an infected animal. ➤ Smallpox, long considered to be the most deadly and persistent human pathogenic disease, was eradicated by the WHO by 1977 through a massive vaccination program. ➤ Vaccines consist of pathogens that have been weakened or killed but can still trigger the immune system to go into action. 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ➤ How is smallpox contracted? ➤ What are the symptoms of the disease? ➤ How can contracting the disease be prevented? ➤ How was the smallpox vaccination discovered and how is it administered? ➤ Which character are you most like – Olivia, Mitty, or Derek – and why? ➤ How would you have handled the situation Mitty gets himself into?
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<p>Learning Objectives</p> <p><u>Students will:</u></p> <ul style="list-style-type: none"> ➤ Define key vocabulary words. ➤ Compare their own work ethics to that of Mitty, the main character. ➤ Describe how smallpox is contracted and its symptoms. ➤ Describe how Edward Jenner realized how to make a vaccination for smallpox. ➤ Observe images of victims of smallpox and compare the symptoms to other ‘pox’ diseases. ➤ Watch United Streaming videos on smallpox, the CDC, and Edward Jenner. ➤ Explain how this story relates to real life events.

ASSESSMENT PLAN

<p>Summative Assessment(s):</p> <p>Suggested Assessments:</p> <ul style="list-style-type: none"> ➤ Chapter questions ➤ Pathogen Wanted Poster Project ➤ “Be a Disease Detective” (in binder) ➤ Use <i>Glo Germ</i> to simulate spread of pathogens 	<p>Formative and Diagnostic Assessment: NA</p>
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LEARNING PLAN COMPONENTS

<ul style="list-style-type: none"> ➤ Code Orange, by Caroline B. Cooney, Laurel Leaf Publishing ➤ <u>Textbook:</u> Human Biology and Health (Prentice Hall, 2005)

Stratford Public Schools – Grade 7 – Life Science

Unit Name: <u>Environmental Science</u>	Est. # of Weeks: <u>5 weeks (24 days)</u> <u>Honors: 7 weeks (34 days)</u>
<p>➤ Synopsis: This unit is a continuation of the unit on characteristics of living things, with a focus on both the living and non-living factors that interact in ecosystems. One of the major topics discussed in this unit is how changes in abiotic and biotic factors affect an ecosystem. When teaching this unit, teachers should try to focus on ecosystems found in Connecticut.</p>	

STUDENT LEARNING GOALS

<p>Content-Specific Powered Standards:</p> <p>➤ (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.</p> <ul style="list-style-type: none"> ▪ (6.2.a) Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply. ▪ (6.2.b) Populations in ecosystems can be categorized as producers, consumers, and decomposers of organic matter. <p>CMT Correlations:</p> <p>➤ (C.4) Describe how abiotic factors, such as temperature, water, and sunlight, affect the ability of plants to create their own food through photosynthesis.</p> <p>➤ (C.5) Explain how populations are affected by predator-prey relationships.</p> <p>➤ (C.6) Describe common food webs in different Connecticut ecosystems.</p> <p>Ongoing Integration of Inquiry Skills:</p> <p>➤ C INQ.1 Identify questions that can be answered through scientific investigation.</p> <p>➤ C INQ.2 Read, interpret and examine the credibility of scientific claims in different sources of information.</p> <p>➤ C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p>➤ C INQ.4 Identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.</p> <p>➤ C INQ.5 Use appropriate tools and techniques to make observations and gather data.</p> <p>➤ C INQ.6 Use mathematical operations to analyze and interpret data.</p> <p>➤ C INQ.7 Identify and present relationships between variables in appropriate graphs.</p> <p>➤ C INQ.8 Draw conclusions and identify sources of error.</p> <p>➤ C INQ.9 Provide explanations to investigated problems or questions.</p> <p>➤ C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>	<p><u>Interdisciplinary Standards (Technology Integration)</u></p> <p>Standard 1: Information Strategies Students determine their need for information and apply strategies to select, locate, and access information resources.</p> <p>Standard 2: Information Use Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.</p> <p>Standard 3: Information and Technology Application Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.</p> <p>Standard 4: Literacy and Literary Appreciation Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.</p> <p>Standard 5: Personal Management Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.</p> <hr style="border-top: 1px dashed black;"/> <p>Key Vocabulary:</p> <p>➤ Organism, habitat, biotic factors, abiotic factors, species, population, community, ecosystem, limiting factor, carrying capacity, adaptation, competition, predation, predator, prey, producer, consumer, herbivore, carnivore, omnivore, scavenger, decomposer, food chain, food web</p>
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- ➔ 1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
- ➔ 2. Work independently and collaboratively to solve problems and accomplish goals.
- ➔ 3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
- ➔ 4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
- ➔ 5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
- ➔ 6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Enduring Understandings:

- Populations in ecosystems are affected by biotic factors, such as other populations and food supply, and abiotic factors, such as water, sunlight, air, temperature, and soil.
- Limiting factors, such as food and water, living space, and weather conditions, can cause populations in ecosystems to either increase or decrease, often resulting in competition amongst species.
- Depending on how an organism in an ecosystem obtains its energy and how it interacts with other organisms determines that organism's energy role of producer, consumer, or decomposer.
- Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy, which then passes from organism to organism in the ecosystem, can be shown in food chains and food webs.

Essential Questions:

- How are ecosystems affected by changes in biotic and abiotic factors?
- How do different limiting factors affect changes in population?
- How does energy flow through an ecosystem, and how does the addition or removal of organisms affect it?
- How do different abiotic factors affect photosynthesis and the growth of plants?

Learning Objectives

Students will:

- Identify biotic and abiotic factors in ecosystems.
- Describe the levels of organization within an ecosystem.
- Explain the causes of changes in population size and identify factors that limit population growth.
- Explain how predation affects population size.
- List common predators and prey found in Connecticut ecosystems.
- Name and describe energy roles (producer, consumer, decomposer) that organisms play in ecosystems.
- Create food webs using organisms found in Connecticut ecosystems and explain the flow of energy and distinguish the producers and consumers.
- Design an investigation to test the effect of abiotic factors on growing plants.

State Science GLE's:

1. Analyze and interpret how biotic and abiotic factors interact within a given ecosystem.
2. Design and conduct a scientific investigation to explore the porosity and permeability of soils and their ability to support different plant life. (Completed as the 6th grade Embedded Task)
3. Defend the statement, "The sun is the main source of energy on Earth."
4. Express in general terms how plants and other photosynthetic organisms use the sun's energy.
5. Investigate and report on the effects of abiotic factors on a plant's ability to photosynthesize.
6. Compare and contrast how energy and matter flow in a Connecticut ecosystem, emphasizing the interactions among producers, consumers and decomposers.
7. Identify local examples of predator-prey relationships and justify the impact of each type of population on the other.
8. Create and interpret graphs that illustrate the fluctuation of populations over time.
9. Distinguish a food chain from a food web and identify local examples of each.
10. Explain the impact of environmental conditions such as climate, elevation, topography or water quality on food chains.
11. Predict what will happen to a population based on current trends (fires, disease, overhunting, development) and defend the prediction.

ASSESSMENT PLAN

Summative Assessment(s):

- **Required Assessments:** student-designed inquiry lab investigation testing abiotic factors on plant growth
- **Suggested Assessments and Activities:** Quizzes, tests, performance tasks, inquiry investigations, homework

Formative and Diagnostic Assessment:

- CFA #6: Plant Ecology

LEARNING PLAN COMPONENTS

- Textbook: *Earth's Living Resources* (Prentice Hall, 1997)
- Textbook: *Environmental Science* (Prentice Hall, 2005)
- *The Savage Garden*, National Geographic Video
- *An Inconvenient Truth*, Paramount Pictures
- *Human Footprint*, National Geographic
- *Six Degrees Could Change the World*, National Geographic
- *Ferngully (G)*
- *Finding Nemo (G)*
- *Hoot (G)*
- Recommended Teacher Resource Books:
 - *Exploring Ecology*, NSTA, 2005

HONORS PROGRAM

Content Specific Powered Standards with Performance Standards:

- **(9.6)** Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.
 - **(D.18):** Compare and contrast the short and long term impacts of landfills and incineration of waste materials on the quality of the environment.
- **(9.7)** Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles.
 - **(D.19):** Assess how chemical and physical processes cause carbon to cycle through the major earth reservoirs.
 - **(D.20):** Interpret how solar energy causes water to cycle through the major earth reservoirs.
 - **(D.21):** Evaluate how internal energy of the Earth causes matter to cycle through the magma and the solid earth.
- **(9.8)** The use of resources by human populations may affect the quality of the environment.
 - **(D.22):** Assess how the release of sulfur dioxide into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.
 - **(D.23):** Predict how the accumulation of carbon dioxide in the atmosphere increases Earth’s “greenhouse” effect and may cause climate changes.
 - **(D.24):** Evaluate how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.
- **(9.9)** Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.
 - **(D.25):** Predict how land development, transportation options and consumption of resources may affect the environment.
 - **(D.26):** Evaluate human efforts to reduce the consumption of raw materials and improve air and water quality.
- **CAPT Embedded Performance Tasks:**
 - Acid Rain
 - CT Brownfields
- Additional Textbook: *Holt Science Spectrum – Physical Science*