

**Southington Public Schools
Curriculum Map**

Subject: Science

Grade: 7

UNIT TITLE	#1 Food Production & Preservation	#2 Populations in Ecosystems	#3 Heredity	#4 Cells	#5 Human Body Systems
CONTENT	Food Preservation: <ul style="list-style-type: none"> • Food spoilage – bacteria • Food borne illnesses • Methods of Preserving 	Populations: <ul style="list-style-type: none"> • Affected by ecosystem Biotic and abiotic factors • Predator/Prey relationships • Food webs / food chains 	Heredity: <ul style="list-style-type: none"> • Reproduction • Cell division • Genetic Codes • Environmental influences 	Cells: <ul style="list-style-type: none"> • Animal and Plant: • Structure • Functions 	Human Body Systems: <ul style="list-style-type: none"> • Structures & Functions • Digestive • Respiratory • Circulatory • Muscular / Skeletal
STATE STANDARDS	<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"> ➤ Various microbes compete with humans for the same sources of food. <p>C21. Describing how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes. 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.</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"> ➤ Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply. ➤ Populations in ecosystems can be categorized as producers, consumers and decomposers of organic matter <p>C4. 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.</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"> ➤ Heredity is the passage of genetic information from one generation to another. ➤ Some of the characteristics of an organism are inherited and some result from interactions with the environment. <p>C 25. Explain the similarities and differences in cell division in somatic and germ cells. C27. Describe how genetic information is organized in genes on chromosomes, and explain sex determinations in humans.</p>	<p>7.2 Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.</p> <p>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 INQ.1 Identify questions that can be answered through scientific investigation C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions C INQ.5 Use appropriate tools and techniques to make observations and gather data</p>	<p>7.2 Many organisms, including humans, have specialized organ systems that interact with each other to maintain internal balance.</p> <ul style="list-style-type: none"> ➤ Multi cellular organisms need specialized structures and systems to perform basic life functions. <p>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 muscular/skeletal system supports the body and allows movement C INQ.1 Identify questions that can be answered through scientific investigation</p>

<p>STATE STANDARDS</p>	<p>C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions C INQ.4 Identify independent and dependent variables that are kept constant, when designing an experiment 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 investigate problems or questions. C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>	<p>C 6. Describe common food webs in different Connecticut ecosystem 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 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 investigate problems or questions. C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>	<p>C INQ.1 Identify questions that can be answered through scientific investigation C INQ.3 Design and conduct appropriate types of scientific investigations to answer different questions C INQ.4 Identify independent and dependent 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.8 Draw conclusions and identify sources of error. C INQ.9 Provide explanations to investigate problems or questions. C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>	<p>C INQ.9 Provide explanations to investigate problems or questions. C INQ.10 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p>	<p>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 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>
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ASSESSMENT	PERFORMANCE TASK	PERFORMANCE TASK	PERFORMANCE TASK	PERFORMANCE TASK	PERFORMANCE TASK
	<p>You are a chemistry research scientist and your fellow chemists are waiting to review your experimental design and results to inhibit the growth of micro-organisms. You must design a controlled experiment to prevent microbial growth by adding a chemical. Yeast will model the growth of micro-organisms that make people sick.</p> <p>When designing your experiment, include your purpose, variables, controls, hypothesis, procedure, data, data analysis and conclusion.</p> <p>Present your results in table and graph representations with the entire experimental design for others to review.</p>	<p>Task #1: You are a biologist and a local community is investigating the possibility of turning a natural area of land into a recreation area.</p> <p>This natural area has populations of deer and mountain lions. You must determine what biotic and abiotic factors are involved in this particular ecosystem with these two populations. You will need to consider the limiting factors for both animals.</p> <p>The local community is also thinking about removing the mountain lions so they would not be a danger to visitors. You must describe to them the benefits and problems that might be caused by removing them. Include in your final report how these populations are affected by predator-prey relationships.</p> <p>Task #2: You are a biologist who has been investigating an ecosystem in Connecticut. You will prepare a report and diagram explaining a food web in an ecosystem there. Identify the ecosystem and include all the organisms (including an energy source) that are</p>	<p>You are a designer for a toy company that makes toy alien bugs and you will demonstrate your understanding of how traits are passed from parents to offspring with a new product.</p> <p>President of Bug Builders, Inc. and other members of the research and development team.</p> <p>You have studied how traits are passed from one generation to another. Your job is to come up with the new bug designs using parts that are available in the warehouse.</p> <p>You must determine the possible offspring by coming up with new combinations of traits, and assembling bug parts in new ways.</p>	<p>Final Cell Project The following project will be completed in class and will demonstrate your knowledge of the cell and its functions that allow it to remain alive.</p> <p><u>The City</u> Steven Spielberg has come to Southington in order to film a movie. He is making this movie with the help of the National Science Teachers Association and your help. The basic idea of the movie revolves around a city that is trying to survive against enemy attack. The characters of the movie have not yet been identified and the movie scenery has not yet been created. Your role as a scientist is to help create a city and characters that relate to the cell and cell processes. You will also help create a basic script for the movie. The following cell part names, their functions or processes must be addressed in your work: Cell cell membrane/cell wall nucleus Nuclear membrane cytoplasm organelles Mitochondria endoplasmic reticulum ribosome Golgi bodies</p>	<p>“Feel the Beat” CSDE Embedded Performance Task.</p> <p>Students will explore what conditions cause your heart to beat faster or slower. They will also explore how different movements (exercise) affect pulse rate. For both explorations, each student will design and conduct experiments with different variables to answer the questions. They will describe the experimental design, collect and represent data in tables and graphs and complete the analysis and interpretation of the data.</p> <p>DI Projects: Students will select an end product to explain the process of digestion or the functions of the circulatory or respiratory systems.</p>

ASSESSMENT

involved in this food web. Show the feeding relationships in the order that they occur. You must include at least 5 components to this web. Also explain the predator – prey relationships among the organisms.

lysosomes
vacuoles
Chloroplasts
tissues
organs
Organ systems
organism
diffusion
Osmosis
semi permeable
active transport
Photosynthesis
respiration
fermentation
Mitosis

It is up to you to determine how the role of the characters in the city or city design must relate to their corresponding role in the cell.

To Do:

1. You will explain how your city structure design and/or characters will compare to actual cell parts, functions & processes.
2. Create a script using the town and characters in which something happens.
3. Draw an illustration of your city that is clearly labeled.

• **OTHER EVIDENCE**

- Lab reports/results
- Homework lab – mold on bread / describe conditions and amount of growth obtained.
- Persuasive letter to parent discussing which method of preservation is the best to prevent food spoilage.
- Chart with advantages and disadvantages to each type of food preservation.
- Analysis of food label ingredients.
- Experimental Designs
- Lists of foods we eat that are examples of each type of food preservation.
- Chart with types of food-borne illnesses, symptoms, and ways to reduce the risk.
- Summarize articles on food borne illnesses and different types of food preservation.
- Worksheets
- Quiz
- Test

• **OTHER EVIDENCE**

- Ecosystems Lab Notebook
- Observations of Lab Procedures
- Response Sheets from Ecosystems Card Sort and Analysis
- Lab Experiment Reports
- Log of mini-ecosystem interactions and changes.
- Drawings of Food Webs
- Drawings of Food Chains
- Explanation of photosynthesis equation.
- Data Tables/Charts
- Analysis of experiments
- Poster Presentation
- Quizzes
- Test

• **OTHER EVIDENCE**

- Punnett Square
- Venn Diagram
- Drawings of cell with nucleus, chromosome, gene, allele
- Student response sheets: constructed responses: Larkey
- Genetic Variation Practice Sheets
- genetics lab reports
- quiz
- test
- homework
- directed reading response

• **OTHER EVIDENCE**

- Model of cell: parts labeled and functions described
- Quizzes
- Test
- Venn Diagrams
- Key Vocabulary Flip Chart
- Pictorial Drawings of Cells
- Homework

• **OTHER EVIDENCE**

- Concept Maps
- Systems Diagrams Labeled
- Picture Booklets of Labeled Organ Systems and Functions
- Lab Reports
- Persuasive Writing: Why you shouldn't smoke – give reasons how it's harmful to the body!
- Quizzes
- Tests
- Notebook
- DI Stations / Projects
- Open Ended Writing:
 - Journey to the Center of the Digestive System
 - You are a drop of blood describe your journey through the body.

SKILLS	<ul style="list-style-type: none"> • Describe the causes and effects of food-borne illness • Use a microscope and prepared slides of bacteria and mold • Investigate the role of microorganisms in food spoilage • Observe and describe effects of microbes involved in food spoilage • Use safety techniques related to microbe investigations • Investigate and describe methods to reduce food spoilage • Evaluate methods to reduce food spoilage • Describe how food preservation methods prevent spoilage • Investigate the growth of bacteria and how we reduce the rate of bacterial growth • Evaluate techniques used to increase food safety • Design an experiment to investigate the ability of chemicals to inhibit the growth of yeast 	<ul style="list-style-type: none"> • observe organisms as individuals and populations to monitor and describe changes • analyze and sort images to determine individuals, populations, communities, ecosystems • explain the defining characteristics of an individual, population, community and ecosystem • construct and maintain an ecosystem • identify biotic and abiotic factors in an ecosystem • describe how biotic and abiotic factors affect an ecosystem • create and maintain an aquatic and terrestrial mini-ecosystem with biotic and abiotic elements • predict and describe interactions between organisms in an abiotic environment • observe the effects of a decomposer in a mini-ecosystem • research functional roles of organisms in an ecosystem to construct a food web • diagram food webs in various ecosystems • describe the feeding relationships in food chains and food webs 	<ul style="list-style-type: none"> • Compare phenotypes to genotypes. • Compare dominant and recessive traits. • Describe the relationship between genes and traits. • Distinguish between genes and traits. • Make predictions of possible offspring from Punnett Squares. • Draw and explain the purpose of Punnett Squares. • Analyze Mendel’s experiment. • Compare and contrast mitosis and meiosis. • Determine the probability of (genetic outcome) offspring dependent upon parent traits. • Create models/drawings to represent phenotypes and genotypes. • Explain the relationship between traits and heredity. • Describe experiments of Mendel. • Explain the difference between dominant and recessive traits. • Describe how a population can change over time due to environmental factors. 	<ul style="list-style-type: none"> • Label & ID all cell parts • Describe the function of each cell part • Observe and describe simulations of cell processes • Build a model of a 3-D cell with appropriate organelles identified • Describe the process of diffusion and osmosis • Describe passive and active transport • Compare and contrast: Plant cell vs. animal cell • Infer why plant and animal cells are different 	<ul style="list-style-type: none"> • Identify and label major components of the following systems: digestive, respiratory, circulatory, skeletal, and muscular. • Explain how the organs interact in each system • Explain function of each system • Explain how oxygen moves throughout systems and how waste is removed • Explain how internal balance of body is kept by the systems • Explore and investigate structure and function with relationship of bones and muscles • Demonstrate enzyme reaction to digest foods • Describe the process of digestion • Compare the mechanical and chemical breakdown of food • Compare and contrast three types of muscles • Explain how muscles, bones and tendons work together to provide movement. • Interpret Graphs: Amount of nutrients and products in 3 different areas of digestion system.

SKILLS

- Examine labels of processed foods and determine the identity and purpose of the chemical additives
- Describe how processed food prevents food spoilage
- Explain the advantages and disadvantages of each method of food preservation: freezing, pickling, freeze-drying and irradiation
- Investigate a method of food preservation

- explore how the burning of food demonstrates that it contains energy
- explain how organisms get the energy they need to live
- explain the feeding relationships among producers, consumers, and decomposers
- describe how photosynthesis makes energy available to organisms
- explain the process / formula of photosynthesis
- describe how every activity done by a living organism involves expenditure of energy
- analyze experimental data to confirm that plants require H₂O, CO₂, and light to increase in biomass (food)
- calculate the theoretical growth of a population assuming no limiting factors
- use computer simulations to discover how reproductive strategies and limiting factors affect population growth
- analyze lab experiments and/or field experiments to determine the effects of abiotic factors on population size

- Observe variation in human traits and apply knowledge to Larkey traits
- Use a simulation to determine the transfer of genetic information.
- Explain how organisms inherit features and traits from their parents.
- Describe how dominant and recessive alleles interact to produce traits in an ecosystem.

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SKILLS

- describe the population fluctuations in an ecosystem in terms of limiting factors, environmental factors and feeding relationships