

HILLSBOROUGH TOWNSHIP SCHOOL DISTRICT

SCIENCE CURRICULUM

MEDICAL LABORATORY

AUGUST 2021

**Hillsborough Township Public Schools  
Medical Laboratory Curriculum**

<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Medical Ethics	10 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Students will be shown an article about nurse Charles Cullen who had ended the lives of 40 patients, several of those at Somerset Medical Center (RWJ/St. Barnabas University Hospital) in Somerville, NJ.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● Why are ethical standards important in the various fields of medical technology?</li> <li>● Why is the understanding and commitment to the Hippocratic Oath a fundamental component of pursuing a career in the medical field?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Medical ethics is a system of moral principles that apply values and judgments to the practice of medicine.</li> <li>● The goal of health care workers is to provide quality patient care in an environment that is safe for workers and patients. Besides being a humanitarian issue, safety is also a legal issue.</li> <li>● The overall commitment to the implementation of conscientious medical procedures when interacting with patients and peers.</li> <li>● Specific qualifications are necessary along with job functions, and ethical responsibilities in the medical field.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b> <b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<p style="text-align: center;"><b>Science and Engineering Practices</b></p> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>● Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)</li> </ul>	<p style="text-align: center;"><b>Disciplinary Core Ideas (DCI)</b></p> <p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>● Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.</li> </ul>	<p style="text-align: center;"><b>Crosscutting Concepts</b></p> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information</li> </ul>

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<p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3)</li> </ul>	<ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system’s internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

<p><b>Math</b></p> <ul style="list-style-type: none"> <li>MP.2 Reason abstractly and quantitatively.</li> <li>MP.4 Model with mathematics.</li> </ul> <p><b>ELA</b></p> <ul style="list-style-type: none"> <li>SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)</li> <li>WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)</li> <li>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)</li> </ul> <p><b>Computer Science and Design Thinking</b></p> <ul style="list-style-type: none"> <li>8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.</li> <li>8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.</li> <li>8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a</li> </ul>
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phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

- 9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).
- 9.4.12.CI.2 Identify career pathways that highlight personal talents, skills, and abilities (e.g. 1.4.12 prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CI.3 Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.2 Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.
- 9.4.12.IML.7 Develop an argument to support a claim regarding a current workplace or societal/ethical issue

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Students will be shown a powerpoint focusing on "The Immortal Life of Henrietta Lacks". They will ask questions and identify the ethical problems associated with this medical ethics example.</p> <p>Students will be shown the video, "The Family Who Walks On All Fours". Students will be randomly placed in groups to take notes on the ethical representation of this family to analyze and interpret data to determine the cause of the condition which makes the afflicted family members walk on all fours. The causes that are discussed in the movie</p>	<p><b>Inquiry Activity:</b> In groups of 4-5 students, each group will be given envelopes containing various types of questions to plan and carry out investigations if the questions are from an ethical, scientific, personal preference, or legal perspective.</p> <p><b>DVD video:</b> "The Family Who Walks On All Fours"</p>	<p><b>Formative:</b> Question Inquiry - Students will determine through argument their group decisions of the various types of questions with the entire class. Medical ethics questions will be discussed pertaining to the treatment of Henrietta Lacks by the medical personnel at Johns Hopkins in the 1950's and the current treatment of her family members. The responsibility of the medical community along with financial implications will be argued.</p>

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<p>from which the students will be taking notes will include the perspective of either the doctors treating the family, the Turkish government, the film crew, other members of the family, the living environment, etc. Students will obtain, evaluate, and communicate information for this medical ethics activity.</p>	<p><b>Reference to the book:</b> <u>The Immortal Life of Henrietta Lacks</u> by Rebecca Skloot</p> <p>Medical Ethics Questions Activity</p> <p><b>Module:</b> “Genetic Modification: The Ethical and Societal Implications of Crispr Technology”</p> <p><b>Textbook:</b> <u>Basic Clinical Laboratory Techniques</u> Barbara H. Estridge (2012)</p>	<p><b>Summative:</b> Terminology and case studies.</p>
		<p><b>Video Analysis</b> - At the completion of the movie, students will first discuss their individual responses within their group. Students will then engage in argument from the evidence from their assigned perspective with the other groups to determine the cause of the disorder. Posters depicting the group's evidence will be prepared and used in the discussion to support the group's views. An overall assessment of all group presentations will culminate in the overall argument to determine the cause of the condition and the treatment of the afflicted family members.</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>● Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>● Medical Ethics Case Study analysis</li> </ul>	<ul style="list-style-type: none"> <li>● All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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Unit Title	Time Frame/Pacing	
Introduction to Medical Technology	15 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Students will be shown the documentary clip, "After the Rainbow", which emphasizes the importance of laboratory safety.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● Why is the accurate functioning of a medical or clinical laboratory important in various types of hospital procedures?</li> <li>● How do medical clinical laboratories serve a vital role in modern healthcare?</li> <li>● How are various types of careers in the medical field related to the different medical laboratory departments?</li> <li>● Why should the general safety guidelines be complied with when utilizing laboratory equipment such as the centrifuge, autoclave, or laboratory balances?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● The specific skills and qualifications necessary for their individual choice of a medical career.</li> <li>● Understand the organization and functions of the medical laboratory and will also be able to identify the types of testing performed in the medical laboratory.</li> <li>● Learn medical terminology by examining the fundamental parts of various medical terms. Focus will be placed on acronyms used in the medical profession.</li> <li>● Learn how to keep a regulation lab book according to the GLP regulations for lab book experiments.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b>		
<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas (DCI)</b>	<b>Crosscutting Concepts</b>

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<p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)</li> </ul> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HSLS1-3)</li> </ul>	<p><b>LS1.A: Structure and Function:</b></p> <ul style="list-style-type: none"> <li>Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.</li> <li>Feedback mechanisms maintain a living system’s internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</li> </ul> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

<p><b>Math</b></p> <ul style="list-style-type: none"> <li>MP.2 Reason abstractly and quantitatively.</li> </ul> <p><b>ELA</b></p> <ul style="list-style-type: none"> <li>SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)</li> <li>WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)</li> <li>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)</li> </ul>
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**Computer Science and Design Thinking**

- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.
- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).
- 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g. 1.4.12 prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.DC.7: Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
Ask questions about the importance of Quality Assurance in clinical laboratories by using Standard Deviation principles used in Quality Assurance inspections.	Ask questions about the importance of Quality Assurance in clinical laboratories by using Standard Deviation principles used in Quality Assurance inspections.	Career Research Project - research and discussions on various careers in the medical field.  Analyze various laboratory test report forms and



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<p>Plan and carry out investigations to identify laboratory glassware and the correct procedures to operate major pieces of equipment used in laboratory research, such as, the centrifuge, balance, and microwave etc. equipment commonly used in various types of lab procedures.</p> <p>Develop and use the microscope model to perform the oil immersion technique in viewing tissue sample slides.</p> <p>Use mathematics and computational thinking in learning about the various ways in which the health care professional will use the metric system in normal laboratory testing procedures. They will measure metric volumes, lengths, and weights and convert metric units such as the procedure for temperature conversions from Fahrenheit to Celsius.</p> <p>Develop and use the model of a regulation lab book to perform labs necessary for the upcoming study units. Students will be following the GLP regulations for lab book experiments.</p>	<p>Plan and carry out investigations to identify laboratory glassware and the correct procedures to operate major pieces of equipment used in laboratory research, such as, the centrifuge, balance, and microwave etc. equipment commonly used in various types of lab procedures.</p> <p>Develop and use the microscope model to perform the oil immersion technique in viewing tissue sample slides.</p> <p>Microscope - human tissue sample slides</p> <p><b>Textbook:</b> <u>Basic Clinical Laboratory Techniques</u> Barbara H. Estridge (2012)</p>	<p>note the types of tests performed in each department.</p> <p>Define medical terms and practice in groups pronouncing medical terms.</p> <p>Lab practical (safety check) on laboratory safety in the classroom.</p> <p>Calculations of conversions, standard deviations, and the construction of quality control charts.</p> <p>Lab investigations including: microscope use in examining tissue samples; making measurements by using SI Units in a student-designed graphing procedure in human variations (e.g. height, hand width etc).</p> <p>Preparation of a student lab book.</p> <p><b>Summative:</b> Terminology and techniques.</p>
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**Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate**

- Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.

<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>
<ul style="list-style-type: none"> <li>Microscope Immersion Oil Procedural Practicum CA</li> </ul>	<ul style="list-style-type: none"> <li>All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification</li> </ul>

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	of questions, reading questions aloud, word banks, and alternate testing sites.
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<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Hazards: Physical, Chemical, and Biological	15 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Procedural protocol - Nurse as a victim of a needle-stick accident causing a HIV infection.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● Why are biological hazards particularly critical to recognize and safeguard against for the safety of lab and hospital workers?</li> <li>● Why are the GHS regulations necessary for the global implementation of laboratory practices?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Differentiate between a physical, chemical, and biological hazard.</li> <li>● Understand the importance of the GHS hazard regulations and their impact on unification of laboratory procedures world-wide.</li> <li>● Understand the importance of the GLP and GCP government regulations represented in the compliance issues faced in both the clinical and nonclinical laboratory.</li> <li>● Apply the hazards regulations to authentic areas of laboratory activity as in the high school/college labs and hospital/research labs.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b>		
<b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<p style="text-align: center;"><b>Science and Engineering Practices</b></p> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>● Develop and use a model based on evidence to illustrate the relationships between</li> </ul>	<p style="text-align: center;"><b>Disciplinary Core Ideas (DCI)</b></p> <p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>● Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is</li> </ul>	<p style="text-align: center;"><b>Crosscutting Concepts</b></p> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including</li> </ul>

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<p>systems or between components of a system. (HS-LS1-2)</p> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HSLS1-3)</li> </ul>	<p>itself a component of the next level.</p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

**Math**

- MP.2 Reason abstractly and quantitatively.

**ELA**

- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)
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**Computer Science and Design Thinking**

- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

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**Career Readiness, Life Literacies, and Key Skills**

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- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Plan and carry out the design to implement the GHS regulations in the poster project.</p> <p>Evaluate various types of situations to identify potential hazards and then plan and carry out a design to correct those hazardous conditions.</p> <p>Develop and use a model to represent a Public Health Fact sheet (usually found in Medical offices)</p>	<p>Differentiate between a physical, chemical, and biological hazard.</p> <p>Understand the importance of the GHS hazard regulations and their impact on unification of laboratory procedures world-wide.</p> <p>Understand the importance of the GLP and GCP government regulations represented in the</p>	<p><b>Formative:</b> Posters depicting a type of hazard utilizing the GHS regulations.</p> <p>Public Health Fact Sheet.</p> <p><b>Summative:</b> Vocabulary on Physical, Chemical, and Biological hazards Kahoot.</p>

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<p>focusing on a particular type of hazard which could be a physical, chemical, or biological hazard.</p>	<p>compliance issues faced in both the clinical and nonclinical laboratory.</p> <p>Apply the hazards regulations to authentic areas of laboratory activity as in the high school/college labs and hospital/research labs.</p> <p>Poster materials.</p> <p><b>Textbook:</b> <u>Basic Clinical Laboratory Techniques</u> Barbara H. Estridge (2012)</p>	
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>● Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>● Physical, Chemical, and Biological hazard situations which demonstrate different types of hazard scenarios CA</li> </ul>	<ul style="list-style-type: none"> <li>● All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Autopsy	40 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Students will attend a video conference to observe the autopsy procedures in the preparation of the patient that the students will diagnose to determine the cause of death.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● Why is it important to record all observations, especially minute details in forensic investigations?</li> <li>● How do all of the scientific disciplines interact to give an accurate interpretation of an individuals' death?</li> <li>● How are the skills developed which a forensic investigator needs in order to solve crimes?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Understand the importance of observation, such as, the examination of data from the patient's health history, when diagnosing the patient's cause of death.</li> <li>● Observe and understand the principles involved during a human autopsy.</li> <li>● Learn about various disciplines necessary to conduct investigations in Forensic Science.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b> <b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<p style="text-align: center;"><b>Science and Engineering Practices</b></p> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>● Develop and use a model based on evidence to illustrate the relationships between</li> </ul>	<p style="text-align: center;"><b>Disciplinary Core Ideas (DCI)</b></p> <p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>● Multicellular organisms have a hierarchical structural organization, in which any one</li> </ul>	<p style="text-align: center;"><b>Crosscutting Concepts</b></p> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● Models (e.g., physical, mathematical, computer models) can be used to simulate</li> </ul>

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<p>systems or between components of a system. (HS-LS1-2)</p> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3)</li> </ul>	<p>system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2)</p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

- Math**
- MP.2 Reason abstractly and quantitatively.
- ELA**
- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)
  - WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
  - WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)
- Computer Science and Design Thinking**
- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate



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change.

- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

- 9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).
- 9.4.12.CI.2 Identify career pathways that highlight personal talents, skills, and abilities (e.g. 1.4.12 prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CI.3 Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.2 Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience.

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Plan and carry out a diagnosis to determine a cause of death by examining data from a patient's health history.</p> <p>Obtain, evaluate, and communicate information regarding the diagnosis of the autopsy patient.</p> <p>Analyze and interpret data when testing for the alcohol level, narcotics usage, and nicotine and</p>	<p>Live interactive autopsy video conference hosted by COSI. A Pathologist explains procedures and addresses questions from the students regarding the autopsy.</p> <p>Arrangements made through the Tech Department.</p> <p>Alcohol determination lab.</p> <p>Narcotics identification lab.</p>	<p><b>Formative:</b> Labs which will include: Alcohol consumption; Narcotic use; Effects of caffeine and nicotine on body processes; Histological examination of body tissues.</p> <p><b>Summative:</b> Vocabulary knowledge on Autopsy terms.</p> <p>Identification of gross observations of target</p>

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<p>caffeine ingestion by the autopsy patient which may have accerbated death.</p> <p>When presented with patient data, students will ask questions concerning the underlying health conditions of the patient to determine the investigative methods which can be used to assist the student.</p> <p>Construct explanations which will explain the health condition of the patient along with the contributing health related factors, i.e., alcohol consumption, narcotic use etc.</p> <p>Use mathematical and computational thinking when considering the importance of the above mentioned contributing factors.</p> <p>Ultimately, students will engage in argument from the evidence they had examined to determine the patient's cause of death.</p>	<p>Human tissue slide; microscope.</p> <p><b>Textbook:</b> Basic Clinical Laboratory Techniques Barbara H. Estridge (2012)</p>	<p>organs.</p> <p>Assessments focused on the autopsy labs listed above.</p> <p>Formal final autopsy report to include all labs, investigations, and analyses used to determine a cause of death.</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>Formal final autopsy report to include all labs, investigations, and analyses used to determine a cause of death.</li> </ul>	<ul style="list-style-type: none"> <li>All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Urinalysis	20 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Examination of bladder/kidney stone samples.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● Why would performing a routine urinalysis on a patient be important in the detection of medical abnormalities and how can a systemic disease cause an abnormal urinalysis result?</li> <li>● How does collecting urine specimens for drug screening differ from collecting specimens for routine urinalysis?</li> <li>● Why is it important to be aware of safety precautions when handling urine specimens?</li> <li>● Why would a doctor request a urine culture performed on a patient?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Understand how urinalysis results can provide necessary information about the status of a patient’s health or drug misuse.</li> <li>● Use various types of techniques to identify components found in urine in order to identify abnormalities associated with medical patients.</li> <li>● Understand how the urinary system is critical to good health.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b> <b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<p style="text-align: center;"><b>Science and Engineering Practices</b></p> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>● Develop and use a model based on evidence to illustrate the relationships between</li> </ul>	<p style="text-align: center;"><b>Disciplinary Core Ideas (DCI)</b></p> <p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>● Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is</li> </ul>	<p style="text-align: center;"><b>Crosscutting Concepts</b></p> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including</li> </ul>

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<p>systems or between components of a system. (HS-LS1-2)</p> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3)</li> </ul>	<p>itself a component of the next level.</p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

**Math**

- MP.2 Reason abstractly and quantitatively.

**ELA**

- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)
- WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
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**Computer Science and Design Thinking**

- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

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- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

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- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
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- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

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- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Develop and use a model to imitate the functioning of the kidney.</p> <p>Construct explanations for kidney malfunctions and design solutions for those urinary problems.</p> <p>Analyze and interpret data from individual patient's urinalysis reports.</p>	<p>Individual Student Lab books.</p> <p>Microscope, laboratory equipment for urinalysis examination - Refractometer, Urinometer.</p> <p>Urine sample containers for student urine analysis labs.</p>	<p>Urinalysis labs - physical, chemical, and microscopic analyses using the student's urine samples.</p> <p>Kidney dialysis lab to demonstrate the functioning of the nephron.</p> <p>Inclusion of key vocabulary on the urinary system and terms associated with urinalysis techniques in</p>

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<p>Ask questions and define problems concerning urinary problems determined from abnormal urinalysis reports.</p> <p>Plan and carry out urinalysis investigations using their own urine as the investigative source of data.</p>	<p>Dialysis tubing; silver nitrate.</p> <p><b>Textbook:</b> Basic Medical Laboratory Techniques Barbara H. Estridge (2012)</p>	<p>analysis and explanation.</p> <p>Case studies will be used to determine health problems from urinalysis reports.</p> <p>Analysis on the physical, chemical, and microscopic analysis of urine.</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>Characteristics on the physical, chemical, and microscopic analysis of urine.</li> </ul>	<ul style="list-style-type: none"> <li>All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Microbiology	15 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Georgia girl who was infected with the bacterium that is the source of <b>Necrotizing Fasciitis</b>.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● How is the fundamental basis for the classification of the three types of Transmission-Based Precautions utilized in a laboratory facility?</li> <li>● Why is a hospital's infection control department critical for the safety of patients and workers? Why are isolation techniques used in some hospital cases?</li> <li>● Why is Quality Assurance an important aspect of bacteriology?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Identify microorganisms that may cause disease and will understand the interaction between microorganisms and disease.</li> <li>● Learn and understand the difference between viral and bacterial diseases.</li> <li>● Understand the importance in controlling microbe infection in the hospital or lab.</li> <li>● Understand the differences between normal flora, pathogens, and opportunistic pathogens.</li> <li>● Observe and learn about the life cycle of parasites and their effect on host organisms.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b>		
<p><b>Students who demonstrate understanding can:</b></p> <ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
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change.

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- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies,(HS-LS3-1) and Key Skills**

- 9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).
- 9.4.12.CI.2 Identify career pathways that highlight personal talents, skills, and abilities (e.g.1.4.12 prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CI.3 Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.2 Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Develop and use a model to represent a pathogenic organism in a Newspaper Interview format.</p> <p>Plan and carry out an investigation of swab samples collected from various locations in the high school.</p> <p>Analyze and interpret the data from the collected bacterial samples. They will identify the sampled</p>	<p>Microbiology equipment including soy agar, incubator, petri dishes etc.</p> <p>Student lab books.</p> <p><b>POGILS:</b> “The Spread of Pathogens” and “Immunity”.</p>	<p><b>Formative:</b></p> <p>Labs which will include the identification of bacterial samples.</p> <p>Presentation of Newspaper Interview projects conducted on various types of pathogenic infections.</p>

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<p>bacteria, construct explanations for its presence, and design solutions to combat bacterial growth for each sample location.</p> <p>Develop and use models in the preparation of bacterial smears by performing Gram staining techniques and carry out investigations to identify gram-positive and gram-negative organisms.</p> <p>Plan and carry out an investigation to determine the spread of bacterial growth quantitatively on human hands by using a bacterial indicator lotion and UV light.</p> <p>Use data to analyze and interpret the investigative data using mathematics and computational skills to be represented in a comparative graphing form. Engage in argument from the evidence.</p>	<p><b>Textbook:</b> Basic Medical Laboratory Techniques Barbara H. Estridge (2012)</p>	<p>Disease challenge - Diagnosis and treatments.</p> <p><b>Summative:</b> Vocabulary and microbiology terms.</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>Microbiology CA</li> </ul>	<ul style="list-style-type: none"> <li>All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Hematology	15 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Heart structure similarities between a human heart model and a dissection of a fresh sheep/pig heart.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● Why is it critical that the biological safety standards need to be complied with in hematology labs in comparison to other laboratory departments?</li> <li>● Why is a secondary or acquired hematological condition important in the detection of a patients' health condition?</li> <li>● Why is the function of platelets important in a patient's diagnosis and how do pathological conditions contribute to abnormal platelet counts?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Understand how hematology investigations are directly linked to the functioning of the kidneys, lungs, and digestive bodily processes.</li> <li>● Understand the differences between veins, arteries, and capillaries demonstrated through venipuncture and lancet procedures.</li> <li>● Learn about hematological diseases – disorders of erythrocytes, leukocytes, and platelets along with secondary or acquired hematological diseases.</li> <li>● Observe and understand the differences between blood cell morphology in normal and abnormal blood samples.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b> <b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<p style="text-align: center;"><b>Science and Engineering Practices</b></p> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>● Develop and use a model based on evidence to illustrate the relationships between</li> </ul>	<p style="text-align: center;"><b>Disciplinary Core Ideas (DCI)</b></p> <p><b>LS1.A: Structure and Function:</b></p> <ul style="list-style-type: none"> <li>● Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is</li> </ul>	<p style="text-align: center;"><b>Crosscutting Concepts</b></p> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including</li> </ul>

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<p>systems or between components of a system. (HS-LS1-2)</p> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3)</li> </ul>	<p>itself a component of the next level.</p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

**Math**

- MP.2 Reason abstractly and quantitatively.

**ELA**

- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)
- WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
- WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)

**Computer Science and Design Thinking**

- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

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- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

- 9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).
- 9.4.12.CI.2 Identify career pathways that highlight personal talents, skills, and abilities (e.g. 1.4.12 prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CI.3 Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.2 Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Ask questions regarding components of blood found in medical blood work reports and will define the problem associated with abnormalities in blood results.</p> <p>Develop and use a model to prepare and stain a blood smear and then examine the stained blood cells vs. unstained blood cells.</p>	<p><b>POGIL</b> - Heart Patient Analysis</p> <p>Microscope; blood tissue slides.</p> <p>Venipuncture arm and lancets (demonstration purposes only)</p>	<p><b>Formative:</b></p> <p>Labs comparing slides with blood cell samples depicting hemophilia, leukemia, sickle cell anemia etc.</p> <p>Sheep/pig heart gross dissection.</p> <p>Students will diagnose and determine a heart procedure to be used in a patient.</p>

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<p>In small groups, students will analyze and interpret data from a heart patient suffering from angina. They will construct explanations for the patient's condition and design a solution to be used as a form of corrective treatment.</p> <p>Engage in argument from the evidence each group had determined to arrive at the most effective means of treatment for the patient.</p>	<p><b>Textbook:</b> <u>Basic Clinical Laboratory Techniques</u> Barbara H. Estridge (2012)</p>	<p>Formal report submitted by each group in the diagnosis of the heart patient. <b>Summative:</b> Techniques and Vocabulary</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>Hematology patient diagnosis CA</li> </ul>	<ul style="list-style-type: none"> <li>All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>		<b>Time Frame/Pacing</b>
Pharmaceutical Research and Development		20 days
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>• Interactions of common medications, such as aspirin, and vitamins.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>• How are drugs, both over the counter or doctor prescribed, similar to poisons?</li> <li>• When are medicinal drugs necessary in the treatment of disease?</li> <li>• Are FDA approved drugs safe?</li> <li>• Why aren't nutritional supplements tested by the FDA?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• Understand the nature of disease, modes of transmission, pharmacokinetics, and treatment options.</li> <li>• Understand each phase of drug development from the initial identification of a disease, how the disease affects each body system, and the development of a drug as a curative agent.</li> <li>• Realize the cost and time involved in the development of new drugs.</li> <li>• Learn further about the FDA regulations that were first presented in the Hazards unit of study.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b>		
<b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>• HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>• HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas (DCI)</b>	<b>Crosscutting Concepts</b>
<p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>• Develop and use a model based on evidence to illustrate the relationships between</li> </ul>	<p><b>LS1.A: Structure and Function;</b></p> <ul style="list-style-type: none"> <li>• Multicellular organisms have a hierarchical structural organization, in which any one</li> </ul>	<p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>• Models (e.g., physical, mathematical, computer models) can be used to simulate</li> </ul>

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<p>systems or between components of a system. (HS-LS1-2)</p> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HSLS1-3)</li> </ul>	<p>system is made up of numerous parts and is itself a component of the next level.</p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system’s internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

**Math**

- MP.2 Reason abstractly and quantitatively.

**ELA**

- SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)
- WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)
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- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate



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change.

- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

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- 9.4.12.CI.3 Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
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- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

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- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Obtain and evaluate information on the outbreak of a "new disease".</p> <p>Plan and carry out an investigation as to how to treat the disease by developing and using a model. They will first identify the target system the disease is affecting and then develop the most effective means of treatment for the patient.</p>	<p><b>Pharmaceutical Research Module.</b></p> <p><b>Video:</b> The Poisoner's Handbook Deborah Blum</p> <p><b>Book:</b> Selected readings from <u>The Poisoner’s Handbook</u> (2010)</p> <p><b>Textbook:</b> Basic Medical Laboratory Techniques</p>	<p><b>Formative:</b></p> <p>Drug development phases performed as lab activities.</p> <p>Posters depicting a specific poison.</p> <p>Final product of drug development including the packaging and drug information insert.</p>

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<p>Obtain, evaluate, and then communicate information about the fictional disease.</p> <p>Engage in argument from evidence they have analyzed and interpreted the data.</p> <p>Ask questions concerning the mode of infection of the patient and define the problems in developing a compound (drug) to arrest the spread of the disease.</p> <p>Use mathematics and computational thinking when examining the cost of drug development by pharmaceutical companies.</p> <p>Plan and carry out an investigation on a particular type of poison after watching the video, The Poisoner's Handbook.</p>	<p>Barbara H. Estridge (2012)</p>	<p><b>Summative:</b> Assessments relating to each phase of drug development - terminology and techniques.</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>● Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>● HSS and AMASIN Analysis CA</li> </ul>	<ul style="list-style-type: none"> <li>● All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>	<b>Time Frame/Pacing</b>	
Neurology	15 days	
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>● Optical illusions projected to the students.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>● How is the structure and function of the eyeball important in sight, i.e., do we see with our eyes or our brains? Visual illusions discussed to emphasize how our brain "sees" and interprets images.</li> <li>● How does the "normal" brain function for vision, reasoning, and thought processes and how is a right-brain individual different from that of a left-brain person?</li> <li>● How does the brain function in a patient who has undergone a frontal lobotomy or is affected by neurological disorders such as Schizophrenia, depression, and autism?</li> <li>● Is there a genetic basis for mental disorders, such as Alzheimer's or Schizophrenia?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>● Understand the basic needs of patients suffering from mental conditions.</li> <li>● Examine the ethical implications of neural surgeries and treatments used in dealing with mental illness throughout history.</li> <li>● Learn about the structure and functions of the brain and its impact on all of the other body systems.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b> <b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>● HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>● HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<p style="text-align: center;"><b>Science and Engineering Practices</b></p> <p><b>Developing and Using Models</b></p>	<p style="text-align: center;"><b>Disciplinary Core Ideas (DCI)</b></p> <p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>● Multicellular organisms have a hierarchical</li> </ul>	<p style="text-align: center;"><b>Crosscutting Concepts</b></p> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>● Models (e.g., physical, mathematical,</li> </ul>

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<ul style="list-style-type: none"> <li>Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)</li> </ul> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HSLS1-3)</li> </ul>	<p>structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.</p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system’s internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Interdisciplinary Connections: Math, ELA, and Computer Science and Design Thinking**

<p><b>Math</b></p> <ul style="list-style-type: none"> <li>MP.2 Reason abstractly and quantitatively.</li> </ul> <p><b>ELA</b></p> <ul style="list-style-type: none"> <li>SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2)</li> <li>WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)</li> <li>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)</li> </ul> <p><b>Computer Science and Design Thinking</b></p>
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- 8.1.12.DA.1 Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.
- 8.1.12.DA.5 Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
- 8.1.12.DA.6 Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.

**Career Readiness, Life Literacies, and Key Skills**

- 9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12 prof.CR3a).
- 9.4.12.CI.2 Identify career pathways that highlight personal talents, skills, and abilities (e.g. 1.4.12 prof.CR2b, 2.2.12.LF.8).
- 9.4.12.CI.3 Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.2 Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).
- 9.4.12.DC.7 Evaluate the influence of digital communities on the nature, content and responsibilities of careers, and other aspects of society (e.g., 6.1.12.CivicsPD.16.a).
- 9.4.12.IML.3 Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8)
- 9.4.12.IML.4 Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
- 9.4.12.TL.2 Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.

**Social-Emotional Learning Competencies**

- **Self Awareness:** Recognize one’s feelings and thoughts
- **Self Management:** Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors
- **Responsible Decision Making:** Develop, implement, and model effective problem-solving and critical thinking skills
- **Social Awareness:** Demonstrate an awareness of the differences among individuals, groups, and others’ cultures
- **Relationship Skills:** Establish and maintain healthy relationships, utilize positive communication and social skills to interact effectively with others

Learning Targets	Investigations/Resources	Formative Assessment
<p>Ask questions about the normal functioning of the brain and define the problems when finding a cure for various types of brain malfunctions.</p> <p>Plan and carry out investigations on the structure and function of the brain.</p>	<p>Activities to include: Visual recognition of the blind spot, dominant eye vision, and interpretation of various parts of the brain and the sensory system.</p> <p>Student powerpoint presentation on a specific area of the brain.</p>	<p><b>Formative:</b> Labs including: Dissection of the sheep eye; Determination of individual vision acuity; Simulation of Doctor/Patient Visit.</p>

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<p>Analyze and interpret data when learning about the psychological disorders associated with brain abnormalities. They will construct explanations and design solutions for those neurological conditions.</p> <p>Engage in argument when examining evidence from early brain surgeries especially during the beginning of the 20th century and their ethical implications.</p> <p>Plan and carry out an investigation on the structure and function of the eye and its association with the brain.</p>	<p><u>Book of the Brain: How It Works</u> (2019)</p> <p>Preserved/fresh sheep brains.</p> <p>Eye chart and peripheral vision testing charts.</p> <p><b>Textbook:</b> <u>Basic Clinical Laboratory Techniques</u> Barbara H. Estridge (2012)</p>	<p><b>Summative:</b> Terminology and case studies.</p>
<p><b>Instructional Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>		
<ul style="list-style-type: none"> <li>Group work and projects in this unit will be designed to allow the struggling learners to scaffold their learning and develop skills for working on larger projects by breaking down tasks. All students will be given opportunities to use different learning modalities to advance their understanding using varied strategies that accentuate their own learning style. Gifted learners will have the opportunity to challenge their problem solving skills by asking more complex questions and exploring concepts in greater depth.</li> </ul>		
<p><b>Common Assessment(s)</b></p>	<p><b>Assessment Modifications and/or Accommodations (ELL, Special Education, Gifted, At-Risk of Failure, 504) When Appropriate</b></p>	
<ul style="list-style-type: none"> <li>Neurology CA</li> </ul>	<ul style="list-style-type: none"> <li>All assessments will be modified in accordance with specifications from CST as enumerated in each student's educational plan. This may include, but is not limited to, extra time, clarification of questions, reading questions aloud, word banks, and alternate testing sites.</li> </ul>	

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<b>Unit Title</b>		<b>Time Frame/Pacing</b>
Obesity and Homeostasis		10 days
<b>Phenomena/Anchoring Activity/Anchoring Question/Essential Questions</b>		
<p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>Student discussion about how obese people are treated in our society.</li> </ul> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>How does a diet lacking in any one of the major food groups affect the overall health of an individual? In other words, is it healthy to eliminate one particular food group, such as carbohydrates or fats etc.?</li> <li>How do diets, such as, Atkins or South Beach diet, affect the general public's perception of food requirements?</li> <li>How has the emphasis that our society places on food wants and needs affected our society in an adverse manner?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>Understand the fundamentals of nutrition and the consequences of poor eating habits.</li> <li>Learn of vitamin and mineral needs to maintain a healthy body.</li> <li>Understand that obesity is the underlying cause of patient diseases.</li> </ul>		
<b>NJ Standards/NGSS Performance Expectations Taught and Assessed</b>		
<b>Students who demonstrate understanding can:</b>		
<ul style="list-style-type: none"> <li>HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</li> <li>HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</li> </ul>		
<b>3-Dimensional Learning Components</b>		
<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas (DCI)</b>	<b>Crosscutting Concepts</b>
<p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)</li> </ul>	<p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.</li> </ul>	<p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information</li> </ul>

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<p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3)</li> </ul>	<ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</li> </ul>	<p>flows—within and between systems at different scales. (HS-LS1-2)</p> <p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)</li> </ul> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)</li> </ul>
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**Math**

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**ELA**

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Learning Targets	Investigations/Resources	Formative Assessment
<p>Engage in argument from evidence presented in the video, "Fat: What We Are Not Being Told".</p> <p>Plan and carry out investigations on the individual choice of foods which will be based upon their own record of food choices over a one week period.</p> <p>Use mathematics and computational thinking in the evaluation of carbohydrates, lipids, and proteins in various food sources.</p>	<p><b>Video:</b> "Fat: What We Are Not Being Told"</p> <p><b>Textbook:</b> <u>Basic Clinical Laboratory Techniques</u> Barbara H. Estridge (2012)</p>	<p><b>Formative:</b> Activities to include: food label analysis; student record of food choices.</p> <p>Student reaction paper on the video.</p> <p>Activity on identifying food label components (vitamins and food additives).</p>

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<p>Construct explanations for the obesity problem and design solutions to address this problem.</p>		<p><b>Summative:</b> Terminology and medical case studies.</p>
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