

STEM Innovation Academy Unit Plan

Subject: NJIT FRSC 201- Introduction to Forensic Science Unit Title: Unit 1- History, Organization and Law in Forensic Science Grade: 12 th	Teacher: Ms. Dy-Anni Austin Duration: 12-80 min blocks (4 Weeks)
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Unit Summary

Forensic Science combines the diverse fields of physical and biological sciences to recreate the events surrounding a crime. In this unit students will examine a timeline that details the major contributions to the development of the field of forensic science. Describe the basic as well as specialized services offered by forensic laboratories. This unit is designed to address the fundamental aspects of forensic science. Students will explore the major disciplines within forensic science and the development of the field of forensic science over time. Students will also be able to relate how major scientific advances have contributed to the evolution of the field of forensic science, discuss the role of crime laboratories and the services they provide and have the opportunity to use general forensics websites to explore advancements in the field of forensic science.

Stage 1 – Desired Results

Enduring Understanding <i>Students will understand that...</i> <ul style="list-style-type: none"> The principles of scientific method are required in ALL forensic scientific analysis. Forensic science utilizes concepts from all scientific disciplines. Locard's exchange principle Comprehensive crime laboratories provide a variety of services including, but not limited to, a physical science unit, biology unit, firearms unit, document examination unit, photography unit, toxicology, fingerprint analysis, polygraph administration, voiceprint analysis, and crime-scene investigation 	Essential Questions <ul style="list-style-type: none"> What is the role of forensic science in modern society? How has the field of forensic science evolved over the past hundred years? How have scientific advancements contributed to the evolution of forensic science? How is the depiction of forensic science in popular culture misleading?
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Student Learning Objectives

<i>What students should be able to do after instruction.</i>	<i>Evidence Statements</i>
Define forensic science and list the major disciplines it encompasses.	HS-ETS1-1
Identify the major contributors to the development of forensic science and explain how scientific advancements account for the rapid growth of forensic laboratories in the past 40 years.	HS-ETS1-1 HS-LS1-2
Describe Locard's Exchange principle.	HS-LS1-2
Compare and contrast Frye and Daubert decisions relating the admissibility of scientific evidence in the courtroom and explain the role and responsibilities of the expert witness.	HS-ETS1-1 HS-LS1-2
Analyze how scientific advancements have contributed to the more effective use of forensic science in solving crimes	HS-ETS1-1 HS-LS1-2

The Student Learning Objectives above were developed using the following elements from the NRC document
A Framework for K-12 Science Education:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models:	Scientific Knowledge Assumes an Order and	<ul style="list-style-type: none"> Patterns

<p>Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)</p> <p>Asking Questions and Defining Problems:</p> <p>Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1)</p> <p>Engaging in Argument from Evidence:</p> <p>Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)</p>	<p>Consistency in Natural Systems Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)</p>	<ul style="list-style-type: none"> ○ Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. • Cause and effect <ul style="list-style-type: none"> ○ Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. • Structure and function <ul style="list-style-type: none"> ○ Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. <p>Connections to Nature of Science</p> <p>Science is a human endeavor</p> <ul style="list-style-type: none"> • Technological advances have influenced the progress of science and science has influenced advances in technology. <p>Science and engineering are influenced by society and society is influenced by science and engineering.</p>
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Stage 2 – Assessment Evidence

What activities truly support this as an honors level class? Use the last three stages of Bloom’s Taxonomy to address this section including 4-analyze- drawing connections among ideas, 5- evaluate- justify a stance or decision, 6- create- produce original work.

Performance Task 1: Deductive Reasoning Exercise: The Deadly Picnic. (approximately 1-80 min block) This exercise challenges students to critically analyze evidence and emphasizes the importance of thorough observation and note taking at the crime scene.

The Facts of the Case

Centerville police discovered the body of a 36-year-old white male (later identified as Gaven Brooks) in a field about twenty miles north of town. Mr. Brooks’s body was discovered at 7:30 p.m. on Friday, October 11. He was found lying face-up on a yellow, queen-size sheet. According to autopsy reports, one fatal gunshot to the back of the head ended

Mr. Brooks's life. Scientists estimate that death occurred at about 4:20 p.m. As investigators scanned the crime scene, they made the following notes:

- Paper plates filled with partially eaten fried chicken, deviled eggs, potato salad, and chocolate cake were located near Mr. Brooks's body.
- An open bottle of red wine and two partially filled glasses of wine were found next to the yellow sheet.
- A recently smoked cigarette butt was found near the sheet.
- Shoe Prints from the road to the field were those of a male, size 10, and a female, size 5. The only shoe prints from the field back to the road were those of a female, size 5.
- Car tracks of the same wheelbase and tread pattern as Mr. Brooks's automobile was found on the road. The car was not found at the scene.
- Mr. Brooks's car was found abandoned in an empty parking lot in downtown Centerville.

Investigators believe that a female friend of Mr. Brooks was responsible for his demise. After questioning family and friends, it was discovered that the deceased had frequent social outings with six women who live in or near Centerville. The women's names are Rita, Lauren, Gail, Janice, Elaine, and Peggy. Investigators gathered the following information about the six women:

- Janice works full-time as a caterer.
- Elaine and Gail are schoolteachers.
- Rita's mother says Rita arrived home in her own car at about 5 p.m.
- Peggy and Elaine live together in a two-bedroom apartment in downtown Centerville.
- Gail lives in a nearby town called Jordan.
- Elaine and Janice are very petite women—they wear size 4 jeans.
- Gail and Peggy are smokers.
- Rita's father owns a gun shop.
- Elaine attends a 5-p.m. yoga class in downtown Centerville every Friday afternoon and has not missed a class in two years.
- Peggy is deathly allergic to grapes.
- Lauren works at a chemical supply house.
- Rita lives in a country house about thirty miles west of Centerville.
- Gail is a vegan.
- Rita is a florist.
- Janice doesn't know how to drive.
- Elaine and Gail hate the color yellow.
- Lauren played center for a semi professional basketball team five years ago. She has red hair and is six feet, one inch tall.

Task Requirements:

- Based on the preceding information, students must determine who murdered Mr. Brooks and the general facts of the case.
- Write a brief narrative outlining what you believe happened to Mr. Brooks and why, then post your narrative to Padlet.

The Solution

The general facts of the case are that Mr. Brooks and one of the women took his car on a picnic north of Centerville. After dining, Mr. Brooks was killed by his female companion, who then drove back to town and abandoned his car. Based on the evidence, the murderer is Elaine. At least one piece of evidence eliminates every other suspect. Peggy is deathly allergic to grapes, so she would not have drunk the wine. Lauren is obviously a tall woman, so the shoe prints found in the field are too small to be hers. Janice does not know how to drive, so she could not have driven the car back to town by herself. Doubt may fall on Rita, who has no alibi until half an hour after the murder was committed. However, she would not have enough time to drive the twenty miles to Centerville, abandon the car there, then drive an additional thirty miles home and still arrive by 5:00. That leaves Gail and Elaine as possible suspects. Gail might fit the profile because she is a smoker and a cigarette butt was found near the body. However, there is no indication of the sex of the person who smoked the cigarette, so this alone is not sufficient proof. Moreover, Gail is a vegan, so she would not have eaten the chicken or deviled eggs. Elaine has the alibi that she was at a 5:00 aerobics class, but the class is in downtown Centerville, where the car was abandoned. This means that she would have had time to commit the murder and still make the class on time. Because all other suspects have been eliminated, Elaine must be the murderer.

DIFFERENTIATION: To accurately measure three-dimensional learning of the NGSS along with the CCSS for mathematics, modifications and/ or accommodations should be provided during instruction and assessment.

TECHNOLOGY: Chromebooks and internet. Padlet.

Performance Task 2: Ethical Failure Presentation (approximately 3- 80 min blocks)

Task Components:

As a group of 4 students, engage in a meaningful discussion about the ethical standards of a forensic scientist by studying the crime drug lab chemists Sonja Farak and Annie Dookhan. Use the Rubric for Classroom Discussion* to grade the quality of your discussion.

Deliverable: Develop an Ethical Failure Presentation using the [Ethical Failure Presentation Template](#) highlighting the main points of your discussion, including the ethical standards of a forensic scientist, what went wrong in these cases, and how we can implement policies so that ethical violations won't happen again. Use the Ethical Analysis Rubric to help guide your presentation. You can use the following texts to help you get started.

- Text 1
- Text 2
- Text 3
- Text 4

DIFFERENTIATION: To accurately measure three-dimensional learning of the NGSS along with the CCSS for mathematics, modifications and/ or accommodations should be provided during instruction and assessment.

TECHNOLOGY: Chromebooks and internet.

Performance Task 3: Making a Murderer Project (approximately 3- 80 min blocks)

Task Components:

Objective: Students will determine what they believe to be the answer to the question “**Should Steven Avery have been convicted of the murder of Teresa Halbach?**” They will showcase their decision in the form of a Google Slideshow and present their findings to the class.

Day 1:

- Compile all documentation from each episode (10 episodes in total)
- Open the [Making a Murderer Presentation Template](#)
- Create a Title Page as your first slide
 - Title: Making a Murder: Final Decision
 - Your Name (first and Last) **4 students MAX per group**
- *Research:* Making a Murderer showcased the side of Steven Avery. In an attempt to be educated on both sides, research Teresa Halbach (prosecution's) side of the case
- Create 2 slides (in Google Slides) showcasing your research.
 - You must have at least 8 pieces of information
 - 2-3 pictures/videos that support what is in your slides.
- Make sure that your fonts are legible and colors do not blend.
- Create a Table of Contents page after your title page.

Day 2:

- Create an “Influential People” slide (you can create more than one) where you showcase 10 important people in the case.
 - You must insert a picture and the names of these 10 people.
 - *In your presentation, you will need to know who they are and why they were important to the case.
 - If you need to, add a description with each person’s picture/name.
- Add this/these slide(s) to your table of contents page
- Next, create a page/pages where you showcase evidence from the case.
 - You should show/list at least 10 pieces of evidence.
 - Be sure to include pictures and descriptions for this part.
- Create a timeline of events for the documentary- begin with Steven Avery’s first conviction and continue to present time (use the Doodle Timeline as a guide)
 - Add graphics, pictures, animations, video, etc. to make your presentation more appealing.
 - Add borders to pictures- ask if you don’t know how to do this
 - Add transitions to slides- If you don’t know how to do this- Google it!

First Half of Block on Day 3:

- Look over the rubric so that you know how you will be graded
- Be sure to finalize any work from Day 1 & Day 2
- Read through the rubric again and SELF-GRADE! You are now ready to present!

Scoring Rubric for Making a Murder Final Project

Scoring Elements	Not Yet	Approaches Expectations	Meets Expectations	Advanced
	0-3	4-6	7-9	10
TITLE PAGE	No title page	Title page lacks some information	Title Page present and all required information is included.	Title Page present and all required information is included.
TABLE OF CONTENTS & TIMELINE	No table of contents page or timeline	Table of contents lacks required information or does not align with pages within the presentation and/or timeline is not complete	Table of contents page is present and accurately depicts included pages within the presentation. Timeline is included, accurate and includes graphics.	Table of contents page is present and accurately depicts included pages within the presentation. Timeline is included, accurate and includes graphics.
TERESA HALBACH (PROSECUTION SIDE)	no evidence is presented showcasing the prosecution's side of the case	Very little (insufficient) evidence is presented showcasing the prosecution's side of the case	1-2 pieces of evidence are missing that showcases the prosecution's side of the case	All 8 pieces of evidence are presented showcasing the prosecution's side of the case.
INFLUENTIAL PEOPLE IN THE CASE	Absent from presentation	Only 1-5 influential people are presented	6-9 influential people are presented	All 10 influential people are showcased in presentation
EVIDENCE	No additional evidence is presented OR evidence is not showcased on additional slides	1-5 pieces of additional evidence is showcased	6-9 pieces of additional evidence are showcased	All 10 pieces of additional evidence are showcased in presentation
	0-10	11-18	19-24	25
VISUAL APPEAL	Project lacks visual appeal- colors do not contrast well, images are too small, transitions between slides are boring, too many words are on one slide, backgrounds are distracting, etc.	Project has some visual appeal, but lacks some components that make it "advanced."	Project has visual appeal for the most part, but is average and less than "advanced"	Project is visually appealing- colors contrast, words are large enough to be seen, not too wordy, pictures have borders, transitions between slides create interest, backgrounds provide visual appeal and are not distracting.
CONTENT KNOWLEDGE	Attempts to include content in explanations, but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.	Briefly notes content relevant to the prompt; shows basic or uneven understanding of the content; minor errors in explanation.	Accurately presents content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate content with thorough explanations that demonstrate in-depth understanding.
TOTAL POINTS				

DIFFERENTIATION: To accurately measure three-dimensional learning of the NGSS along with the CCSS for mathematics, modifications and/ or accommodations should be provided during instruction and assessment.

TECHNOLOGY: Chromebooks and internet.

Other Evidence:

Before	During	After
<p>KWL – Students will list what they know and what they want to know about the main topics of this unit.</p> <p>Brainstorming – Students will discuss what they know about Scientific Inquiry by breaking down the word and coming up with various meanings.</p> <p>Quick Writes – Before each lesson students will be asked to write their thoughts and questions for the day pertaining to the objectives.</p> <p>Pretest – Students will be given an assessment to understand their knowledge on the unit before any instruction is given.</p>	<p>Journals – Students will complete daily journal reflections and take notes when necessary.</p> <p>Lab Investigations – Students will complete one or more lab investigation(s) exploring and utilizing chemistry principles.</p> <p>Daily Assignments – Students will be given vocabulary assignments and calculation problems.</p> <p>Observations – Students will write down any observations in their journals as witnessed in class or during their labs.</p> <p>Think-Pair-Share – Students will work in pairs to discuss vocabulary and reinforce rules as they are introduced.</p>	<p>Unit Test – Students will be given a test after the unit has been completed and Presentations have been given</p> <p>PowerPoint Project – Students will create a PowerPoint Presentation (as a group) of this unit. This will include various concepts, experimental data, vocabulary, and applications in the “real world”.</p>

	Quizzes – Give short quizzes or Exit Cards - to show mastery of concepts needed before moving to the next concept.	
Student Self-Assessment and Reflection: Students will write down their questions and or comments of the day's events. They will write their questions about any topics or problems they may have, and they will discuss them as a class the following day. Students will also write down any observations they experienced during labs and/or lecture presentations into their Journals.		
Stage 3 – Learning Plan		
Differentiated Instruction (by student readiness): Tiers 2-3: Students who have scored a 3 or below (approaching expectations) on the ELA and Math NJSLAs <ol style="list-style-type: none"> 1. Scaffolding 2. Group work 3. Peer tutoring 4. One on one discussions 5. Office hour appointments 6. Laboratory Investigations 7. Group PowerPoint Presentation 8. Unit Test Tier 1: Students who have scored a 4 or 5 (met or exceeded expectations) on the ELA and Math NJSLAs <ol style="list-style-type: none"> 1. One on one discussions 2. Office hour appointments 3. Laboratory Investigations 4. Group PowerPoint Presentation 5. Unit Test 		
Learning Activities <ol style="list-style-type: none"> 1. The Science Spot http://sciencespot.net/Pages/classforsci.html 2. History of Forensic Science: www.crimezzz.net/forensic_history 3. Criminal Fact Investigation Index: www.tncrimlaw.com/forensic/fsbindx 4. Forensic History Timeline: http://forensicsciencecentral.co.uk 5. History timeline CBS TV: www.cbsnews.com/htdocs/forensics/timeline 6. The CSI Effect 7. Bertillon System 8. Anthropometry's Demise 9. Locard's Exchange Principle Lab 10. FBI Crime Lab Documentary 11. Making a Murderer Project 12. 13. 		
Vocabulary: expert witness, Locard's Exchange Principle, Scientific Method		
Literacy and Math Connections: <i>English Language Arts/Literacy –</i>		

RST.11-12.1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

RST.11-12.2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

RST.11-12.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

RST.11-12.8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Mathematics –

4.5 B. Communication

1. Use communication to organize and clarify their mathematical thinking

4.5 D Reasoning

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

4.5 C Connections

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

Expert/Field Experiences:

NJIT Forensic Science Mock Apartment

David Fisher

University Heights, NJ 07102

Connection to End of Year Project:

Students will participate in a Murder in Miniature Project based on Fransis Glessner Lee’s Nutshells for approximately 3 weeks. For this final project, in a team of up to two students, you will design and create a diorama of a crime scene (murder). You will give your diorama a title and brief description along with a detailed crime scene sketch and autopsy report of the victim. You will then give a presentation (from the perspective of a prosecutor) linking all of the evidence to a particular suspect. This three part project will be your ‘final exam’ grade in this college course. It will count as ONE test grade and TWO authentic assessment grades for the 4th marking period at STEM. This project has three parts: Diorama, Written Portion, and Prosecution Presentation. [Murder in Miniature Worksheet with Rubric](#). This unit provides opportunities for self-organization, group cooperation, and idea sharing, as well as proper research techniques, repeat trials, error analysis, and communication of results through a presentation or model.

Modifications

Special Education/ 504:	English Language Learners:
<ul style="list-style-type: none"> -Adhere to all modifications and health concerns stated in each IEP. -Give students a MENU option, allowing students to pick assignments from different levels based on difficulty. -Accommodate Instructional Strategies: reading aloud 	<ul style="list-style-type: none"> - Use manipulatives to promote conceptual understanding and enhance vocabulary usage - Provide graphic representations, gestures, drawings, equations, realia, and pictures during all segments of instruction - During i-Ready lessons, click on “Español” to hear

<p>text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time</p> <ul style="list-style-type: none"> -Allow students to demonstrate understanding of a problem by drawing the picture of the answer and then explaining the reasoning orally and/or writing , such as Read-Draw-Write -Provide breaks between tasks, use positive reinforcement, use proximity -Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum by using manipulatives -Implement supports for students with disabilities (click here) - Make use of strategies imbedded within lessons -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 17-18) 	<p>specific words in Spanish</p> <ul style="list-style-type: none"> - Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information - Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve word problems - Utilize program translations (if available) for L1/ L2 students - Reword questions in simpler language - Make use of the ELL Mathematical Language Routines (click here for additional information) -Scaffolding instruction for ELL Learners -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 16-17)
Gifted and Talented:	Students at Risk for Failure:
<ul style="list-style-type: none"> - Elevated contextual complexity - Inquiry based or open ended assignments and projects - More time to study concepts with greater depth - Promote the synthesis of concepts and making real world connections - Provide students with enrichment practice that are imbedded in the curriculum such as: <ul style="list-style-type: none"> ● Application / Conceptual Development ● Are you ready for more? - Provide opportunities for math competitions - Alternative instruction pathways available - Common Core Approach to Differentiate Instruction: Students with Disabilities (pg. 20) 	<ul style="list-style-type: none"> - Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum - Modify Instructional Strategies, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Peer Support - Constant parental/ guardian contact - Provide academic contracts to students & guardians - Create an interactive notebook with samples, key vocabulary words, student goals/ objectives. - Plan to address students at risk in your learning tasks, instructions, and directions. Anticipate where the needs will be, then address them prior to lessons. -Common Core Approach to Differentiate Instruction: Students with Disabilities (pg 19)

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

<https://www.state.nj.us/education/cccs/2014/career/9.pdf>

<ul style="list-style-type: none"> ● CRP1. Act as a responsible and contributing citizen and employee. ● CRP2. Apply appropriate academic and technical skills. ● CRP3. Attend to personal health and financial well-being. ● CRP4. Communicate clearly and effectively and 	<ul style="list-style-type: none"> ● CRP7. Employ valid and reliable research strategies. ● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP9. Model integrity, ethical leadership and effective management. ● CRP10. Plan education and career paths aligned to
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<p>with reason.</p> <ul style="list-style-type: none"> ● CRP5. Consider the environmental, social and economic impacts of decisions. ● CRP6. Demonstrate creativity and innovation. 	<p>personal goals.</p> <ul style="list-style-type: none"> ● CRP11. Use technology to enhance productivity. ● CRP12. Work productively in teams while using cultural global competence.
<p>Students are given an opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are encouraged to reason through experiences that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, calculators, and educational websites.</p>	

<p align="center">Technology Standards:</p> <p>Students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.</p> <p align="center">https://www.state.nj.us/education/cccs/2014/tech/</p>	
<p>8.1 Educational Technology:</p> <p>All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.</p> <ul style="list-style-type: none"> A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations. B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology. C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. E. Research and Information Fluency: Students apply digital tools to gather, evaluate, and use of information. F. Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. 	<p>8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:</p> <p>All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.</p> <ul style="list-style-type: none"> A. The Nature of Technology: Creativity and Innovation- Technology systems impact every aspect of the world in which we live. B. Technology and Society: Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society. C. Design: The design process is a systematic approach to solving problems. D. Abilities in a Technological World: The designed world in a product of a design process that provides the means to convert resources into products and systems. E. Computational Thinking: Programming- Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

