STEM Innovation Academy Unit Plan

Subject: NJIT FRSC 201- Introduction to Forensic Science **Unit Title:** Unit 2- Crime Scene Basics **Grade:** 12th	**Teacher:** Ms. Dy-Anni Austin **Duration:** 18-80 min blocks (6 Weeks)

Unit Overview

Forensic science utilizes all levels of scientific inquiry, specifically chemistry and physics, to analyze physical evidence with the ultimate goal of recreating the events of the crime for a jury in a court of law. Students will also identify and compare various types of physical evidence and compare their values to forensic investigation. Students will address the fundamental aspects of crime scene investigation and the identification and comparison of physical evidence. Students will be able to define physical evidence and describe how it is collected and packaged as well as identify and compare various types of physical evidence and compare their values to forensic investigation. Understand the importance of following the principles of scientific method and the need for collecting control samples at every crime scene. Forensic Science also 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. Explain proper crime scene procedure and understand the necessity for establishing a chain of custody. Detail the role that evidence plays in recreating the events of a crime. Describe the two types of evidence that can be found at a crime scene and differentiate between class and individual evidence. Understand the importance of following the principles of scientific method and the need for collecting control samples at every crime scene. Define proper evidence collection procedure. It is assumed students have working knowledge of a compound light microscope but a review during this unit is advisable

Stage 1 – Desired Results

Enduring Understanding *Students will understand that…*	**Essential Questions**
• Physical evidence is crucial in linking victims and suspects to a crime scene. • Physical evidence must be collected in a specific and strategic manner, as well as systematically documented, in order to ensure that no tampering or contamination occurs. • Physical evidence can link specific persons or objects to a crime scene, or may contain class characteristics linking a type of object to a crime scene. • Physical evidence collected from crime scenes (i.e. fingerprints and DNA) are shared on national databases. This dramatically enhances the role of forensic science in criminal investigation. • Forensic science utilizes concepts from all scientific disciplines. • The principles of scientific method are required in ALL forensic scientific analysis. • Physical evidence is indispensable in crime scene recreation.	• Why is it important to collect evidence in a procedural manner? • What is the difference between the identification and comparison of physical evidence? • Why is it important that physical evidence collected from a crime scene is shared on national databases? • How can physical evidence be used to reconstruct a crime scene? • What are the proper techniques in order to properly process evidence? • What information can be gained from the proper processing of evidence at a crime scene?

Student Learning Objectives

What students should be able to do after instruction.	*Evidence Statements*
Identify the common types of physical evidence encountered at crime scenes and describe proper techniques for packaging common types of physical evidence.	HS-LS1-2 HS-LS2-7

Explain the difference between the identification and comparison of physical evidence.	HS-LS1-2 HS-LS2-7
Define and contrast individual and class characteristics of physical evidence.	HS-LS1-2 HS-LS2-7
Assess the value of class characteristics to crime scene investigation.	HS-PS4-1
Define the crime scene and identify the steps followed in crime scene investigation.	HS-PS1-1 HS-PS1-2
Describe the use and information obtained from physical evidence found at the crime scene.	HS-PS1-1 HS-PS1-2
Demonstrate proper documentation of the crime scene, various techniques used to effectively search a crime scene and proper techniques used to collect, package, and preserve physical evidence at a crime scene.	HS-PS1-1 HS-PS1-2 HS-PS1-5
Summarize and present crime scene reports including sketches, photographs, notes and lab analysis results	HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS1-5

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: Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Constructing Explanations and Designing Solutions:** Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1) **Using Mathematics and Computational Thinking:** Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (HS-LS2-1) Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2)	**ETS1.A: Defining and Delimiting Engineering Problems** Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. **ETS1.B: Developing Possible Solutions:** When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (HS-ETS1-3)	• **Systems and System Models:** 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) • **Cause and Effect:**Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS2-8),(HS-LS4-6) • **Scale, Proportion, and Quantity:** The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS-LS2-1) • **Patterns:**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. (HS-LS4-1),(HS-LS4-3)

Create or revise a simulation of a phenomenon, designed device, process, or system. (HS-LS4-6) Engaging in Argument from Evidence: Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS2-6)	Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (HS-ETS1-4) **ETS1.C: Optimizing the Design Solution:** Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (HS-ETS1-2) Scientific Knowledge Assumes an Order and Consistency in Natural Systems Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)	• **Science is a Human Endeavor:** Technological advances have influenced the progress of science and science has influenced advances in technology. (HS-LS3-3) • Science and engineering are influenced by society and society is influenced by science and engineering. (HS-LS3-3)

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-<u>analyze</u>- drawing connections among ideas, 5- <u>evaluate</u>- justify a stance or decision, 6- <u>create</u>- produce original work.

Performance Task 1: Probability and the Product Rule. (approximately 2-80 min blocks)

Physical evidence often lacks individual characteristics that can tie a suspect conclusively to a crime scene. In such cases, prosecutors must rely on evidence with class characteristics to link the suspect to the crime. The likelihood that the suspect and victim are related depends on the number of pieces of evidence linking them and the uniqueness of the evidence. Present the students with the following three cases in which several pieces of evidence link a suspect and a crime. The lists indicate the evidence found in each case, and, for each piece of evidence, the frequency of that characteristic in the population at large. Ask the students to indicate in which case they believe the evidence most

strongly suggests the suspect is guilty (note that these percentages are used as examples only and are NOT scientifically accurate):

Case 1	Case 2	Case 3
Blond hair (32%)	Red hair (11%)	Brown hair (51%)
Type O blood (43%)	Type B blood (12%)	Type AB blood (3%)
Arch fingerprints (5%)	Loop fingerprints (65%)	Whorl fingerprints (33%)

After students have guessed, ask them how they came to their answers. Then introduce the product rule and ask the students to apply it to see whether their guesses were correct. (The correct answer should be Case 3. The likelihood that two individuals would share the stated characteristics in case 3 is 0.5%, compared with 0.69% for Case 1 and 0.86% for Case 2.) This demonstration can be used to emphasize the uncertainty inherent in dealing with class evidence and the importance of having multiple pieces of evidence to tie a suspect to a crime.

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 2: Mock Crime Scene. (approximately 2-80 min blocks)

A mock crime scene can be set up in a classroom. Students are encouraged to become familiar with proper packaging and handling of common types of physical evidence. Emphasize preparation and use of the druggist fold. All pertinent information should be recorded in a notebook. Sketches may be made of the crime scene. A crime scene sketch kit, which includes an excellent instructional manual on sketching, is available from Sirchie Finger Print Laboratories, 100 Hunter Place, Youngsville, NC 27596.

Crime Scene Sketch.

Materials:

- Graph paper
- Notepad
- Rulers
- Tape measure/meter sticks
- Mock crime scene

Procedure:

You have been introduced to the appropriate steps to process a crime scene. An important part of this process is surveying the scene and taking diligent notes of it. You must also create a sketch of the scene. With a partner or small group, you must create a sketch of the scene presented to you and keep notes of what evidence you find. In your sketch you must provide an accurate depiction of the entire scene with dimension measurements, as well as location measurements for all pieces of physical evidence.

Follow-Up Questions:

1. Why is it important to take diligent notes when processing the crime scene?

2. What is the chain of custody?

3. Why do we sketch the crime scene as well as take photographs of it?

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TECHNOLOGY: Chromebooks and internet.

Performance Task 2: How to Process a Crime Scene Video Project . (approximately 6-80 min blocks)

You are now experts in Crime Scene Processing! Your goal is to make a video that explains and teaches others how to process a crime scene using the Seven S'. (6-9 days MAX)

Step 1: You may work as a team of 4. Scan the Code➡ to add your names to the sign up sheet

Step 2: FAMILIARIZE YOURSELVES WITH THE RUBRIC. This is how I will grade your videos.

Step 3: Brainstorm a crime scene, add your notes to the sign up sheet. Your scene may entail a stabbing, poisoning, theft and assault, hit and run, accidental death, etc. Be creative! Use the **storyboard** to help you map out your scenes. Here are two examples of STEM student-made Crime Scene How-To Videos that follow the rubric: **Video Exemplar 1 and Video Exemplar 2.** Video 3 does not follow the rubric, but it is still very helpful and gives you an idea of how it all will come together (**Video 3**)! You may use your phones for video recording and editing. **** Check your video clips as you go, especially for audio quality. If I can not hear it, I can not grade it!**

a. Be sure you know which personnel does what job at the scene! Choose which group member will represent the different personnel at the crime scene. Is one person playing two roles? How will you differentiate between each character for the video? List your plans below:

Personnel	**Who is playing this role?**	**What is their job?**	**What will they be wearing?**
Police Officer:			
CSI:			

Medical Examiner			
Detective:			

Step 4: Choose your evidence (5 pieces of evidence minimum)

- One body fluid (Body fluid can include 'blood spatter' painted or drawn on paper/clothes, empty drink cans, chewed gum (in a plastic bag or sealed petri dish so it's not gross!)
- Four of your choice- You must use two items of evidence that I have "in stock" to use in your crime scene. Here are some examples of 'evidence' I have that you can choose from:
    - Printouts of knives, guns, cigarette butts
    - Animal hairs collected from your own pets (Ms. Austin can provide)
    - Scraps of fabric cut or ripped from clothes (Ms. Austin can provide)
    - Broken test tube glass in a sealed petri dish (Ms. Austin can provide)
    - Old cell phones and other odds and ends found at thrift stores/at home
- **The Murder Victim:** The rubric references a body (murder victim in the crime scene) but if you prefer that your crime scenes reflect a robbery, feel free to change those parts! One of the group members may choose to be the body (though it does NOT count this as 'participating' in the video - they must also play some other role). You may also draw a body outline in chalk if the scene is outside, or on a large piece of bulletin board paper.

As you get started thinking about the evidence you will put in your scene, choose things that will fit inside the provided evidence bag (1-gallon zip lock bag). Other things you will need/can be found in your supply bag:

1. **Evidence bags** - gallon sized ziplock bags
2. **Other Evidence collection containers** - brown paper bags for body fluid items, smaller rigid containers for fragile items are available
3. **Masking tape** - used for sealing the evidence bags and for taping evidence labels to bags
4. **Printed** evidence labels (6 to a page)
5. **Crime Scene/Police tape** - You may also use yellow streamers from the dollar store!
6. **Create a Common Approach Path** - create by cutting out squares of cardboard/poster board, or use construction paper sheets. I have provided six squares to each group.
7. **Measuring tape** or yard stick
8. **Ruler** (to include in crime scene photos)
9. **Evidence markers** - Use mine or make these out of cardstock
10. **White paper** - used to make paper bindles (see this video if you are not familiar with the druggist fold)
11. **White Cardstock paper** - used for the crime scene sketch.

Step 5: Use the Storyboard template to map out your video. Submit the final storyboard to the bin.

Step 6: Set up your crime scene - place "body" and evidence. Begin filming - Feel free to film in chunks. You must discuss the Seven S' of Crime Scene Investigation

- **How to Secure the Scene** – Done by the 1st responding police: checking safety of individuals and preserving evidence
- **How to Separate the Witnesses** - Witnesses must not be allowed to talk to one another.
- **How to Scan the Scene** - Determine the primary and secondary crime scenes and decide what to photograph. Use a **Common Approach Path**.
- **How to See the Scene** - Photos of the overall area and close up photos should be taken.
- **How to Sketch the Scene** - A rough sketch and a neater final copy of the crime scene drawn to scale must be

made.

- **How to Search for Evidence** - A spiral, grid, linear or quadrant pattern should be walked and the location of evidence marked, photographed and sketched, then collected.
- **How to Secure the Collected Evidence** - All evidence must be properly packaged, sealed and labeled using specific techniques and procedures.

While filming - divide and conquer!

- ➔ Someone design props that you will use to help you differentiate between the different roles
- ➔ Someone put together a script if needed
- ➔ Someone work on sketching the scene
- ➔ Someone photograph each piece of evidence
- ➔ Someone edit the "How-To" Process a Crime Scene- Video Project Slideshow Presentation template and add the storyboard, forensic photos, and crime scene sketch on a google slideshow that you share with the team. Post a link to the sign up sheet and submit to google classroom.
- ➔ Someone provide the text and voice-overs
- ➔ Someone edit the videos together and submit the final video to google classroom

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Step 7: Before you submit your final video, watch it! Be sure the audio is clear and the video is complete. **5-10 minutes MAX**. Self assess using the Rubric, this is how Ms. Austin will grade your project. Provide a link to your video and slideshow on the signup sheet and submit to google classroom before screening day!

Item	Rubric Description	Pts
Secure the Scene	• Show the process of securing the crime scene with Crime Tape. • Briefly explain the importance of securing the scene. • Include the use and importance of the Common Approach Path • Briefly interview any witnesses.	10
CIS Outfit	• During your video, describe the outfit that a CSI would wear. You may find parts to actually wear, or just talk about each piece.	5
Search the Scene	• Choose a search method and demonstrate searching the scene for evidence. • Place evidence numbers at each item of evidence. • Demonstrate the job of the Medical Examiner.	10
Photos in video	• Determine the primary and secondary crime scenes and decide what to photograph. • Discuss the importance of forensic photography in your video, including the reason for the four types of photographs. • Video record the photographer taking one set of photos of one piece of evidence.	10
Photographs	• Take the necessary four photographs of all 5 pieces of evidence plus the body. • Create a google slideshow to post all of your photos, including a written photograph record. • Each piece of evidence gets its own slide, labeled with the evidence number. • Take a picture of your final storyboard and add it to the slideshow presentation.	10
Sketch in video	• Show and describe how to make a crime scene sketch, including the Key. • Show and describe how to take measurements for ONE item of evidence.	10

Sketch turned in	• Upload a picture of your sketch to the slideshow. It must be neat, clean, and accurate. • Evidence marker numbers must match between the photos and sketch key. • The sketch must include measured locations for all pieces of evidence.	10
Evidence Collection	• In your video describe how to collect ONE piece of evidence individually and why it is collected/packaged in that way. • Include and show how to label and seal ONE evidence bag using the label and tape.	10
Chain of Custody	• In your video include a short description of the chain of custody and why it is important for using evidence in court.	5
Audio and visual	• Video is clear, important parts easy to see, audio easy to hear and understand. • Voice-overs are used for portions of the video that contain text (this serves to keep the audience engaged)	10
Professionalism	• Students are professional, all students actively participate (student playing body has other role) • Final video is between 5-10 minutes long • Final Video and slideshow presentation (containing forensic photography, crime scene sketch, and storyboard) have been posted to google classroom	10
	TOTAL	/100

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TECHNOLOGY: Chromebooks and internet.

Other Evidence:

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

	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

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

1. One on one discussions
2. Office hour appointments
3. Laboratory Investigations
4. Group PowerPoint Presentation
5. Unit Test

Learning Activities

1. Direct vs. Circumstantial Evidence
2. Evidence Collection Activity
3. Class vs. Individual Evidence
4. Securing the Crime Scene
5. Separating the Witnesses
6. Scanning the Scene
7. Seeing the Scene: Forensic Photography
8. Sketching the Scene: Crime Scene Sketch
9. Search for Evidence
10. Secure and Collect Evidence
11. Seven S' Video Project
12. Crime scene investigation protocol: www.nij.gov/topics/law-enforcement/investigations/crime-scene
13. Criminal Fact Investigation Index: www.tncrimlaw.com/forensic/fsbindx
14. Crime scene investigation protocol: www.nij.gov/topics/law-enforcement/investigations/crime-scene
15. FBI Guide for Law Enforcement: https://www.fbi.gov/about-us/lab/forensic-science-communications/fsc/april2000/twgcsi.pdf

Vocabulary:

class characteristics, comparison, identification., individual characteristics. product rule, rapid DNA, buccal swab, chain of custody, finished sketch, physical evidence, rough sketch, standard/reference sample, substrate control

Literacy and Math Connections:

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.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
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.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
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 A. Problem Solving

3. Select and apply a variety of appropriate problem-solving strategies to solve problems.

4.5 B. Communication

1. Use communication to organize and clarify their mathematical thinking

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

3. Analyze and evaluate the mathematical thinking and strategies of others.

4.5 C Connections

2. Use connections among mathematical ideas to explain concepts.

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

4. Apply mathematics in practical situations and in other disciplines.

4.5 D Reasoning

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

5. Make and investigate mathematical conjectures

4.5 E Representations

1. Create and use representations to organize, record, and communicate mathematical ideas as pictorial or symbolic.

2. Select, apply, and translate among mathematical representations to solve problems.

4.5 F. Technology

6. Use computer-based laboratory technology for mathematical applications in the sciences

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 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 trails, error analysis, and communication of results through a presentation or model.

Modifications

Special Education/ 504:	English Language Learners:
-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 text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time -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)	- 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 specific words in Spanish - 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:**
- 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: ● Application / Conceptual Development ● Are you ready for more? - Provide opportunities for math competitions - Alternative instruction pathways available - Common Core Approach to Differentiate Instruction:	- 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

Students with Disabilities (pg. 20)	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

• **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 with reason. • **CRP5**. Consider the environmental, social and economic impacts of decisions. • **CRP6**. Demonstrate creativity and innovation.	• **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 personal goals. • **CRP11**. Use technology to enhance productivity. • **CRP12**. Work productively in teams while using cultural global competence.

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.

Technology Standards:

udents 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.

https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology: 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. 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	**8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:** 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. 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

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.	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.