

CSI: Durham



Becky Burns
Middle Grades
2016

The rationale for this unit is for students to learn the concept of evidence. Students need to learn how evidence is used to find the truth in order to solve cases. Students can use what they learn about evidence in multiple aspects of their lives. By learning how to better support their statements by using facts or evidence, they will have a stronger foundation for their decisions. The content of forensics is important for students to understand the basics of how criminal cases are solved. Students will have to use problem-solving skills as well as higher order thinking in order to examine the evidence and present their findings. They will have to use the evidence in order to support their statements. Students will complete several different samples of evidence, such as blood typing, hair and fiber analysis, and fingerprints. It is important for students to learn about their DNA and fingerprints to understand how they leave traces of themselves behind.

The elements of forensics make it particularly beneficial or appropriate for gifted learners because the content itself requires students to think critically. They have to problem solve, as well as use higher order thinking skills to draw conclusions about the evidence. By having students work in learning teams, students are able to collaborate with their peers in order to work through the evidence. They are able to question each other and through this questioning process, they actually drive each other to go deeper into the content as they each have to give supporting details to back up their claims. Students will work to complete their final product, which is as follows:

Their task is to analyze forensic evidence. They will be asked to document, collect, and analyze the evidence left at a crime scene in order to solve the crime. They will need to convince the district attorney that their suspect committed the

crime in order to get an arrest warrant. This challenge involves dealing with many types of forensic evidence at a crime scene, such as blood typing analysis, hair and fiber analysis, and fingerprint typing. They will develop an investigation so that they can collect evidence from the crime scene, analyze the evidence to determine a suspect, and then present their findings to the district attorney. A successful result will provide enough concrete evidence in which they have collected from the scene to convince the district attorney to pursue a judge to secure an arrest warrant for their suspect(s). Students will then write a letter from the defense attorney to give reasonable doubt that the suspect(s) committed the crime due to holes in their theories or possible lack of evidence. The complexity of having to examine the evidence that they are provided and use knowledge that they have gained earlier in the week in order to create their own method of evidence collection and examining the evidence. By working together on this project, it challenges the students to question each other. The levels in which the questions are asking each other drives this lesson into a deeper level where students have to go back and reexamine or use supporting details from the evidence while they are explaining their theories. Students are able to use their creativity to develop their theories of what actually happened.

The population of gifted students for whom this unit is intended are all middle school age and identified to be AIG. They come from a variety of backgrounds, but they have all at least read a mystery book or watched a show that involves solving a mystery. These students need to be challenged, they need to be active, they have an intense curiosity and need to have the freedom to be creative.

Content Goals and Outcomes:

Goal 1: Evaluate resources for point of view, bias, values, or intent of information.

Students will be able to:

- A. Analyze eyewitness testimony to determine if it is reliable information.
- B. Examine the relationship of the eyewitness to the suspect to determine if there is possibility of bias towards the suspect.
- C. Analyze all eyewitness testimony to determine if there are any discrepancies in the information given to police.
- D. Develop and describe theories of what could have happened at the scene based on testimonies given.

Process Goals and Outcomes:

Goal 2: Develop theories based on evidence.

Students will be able to:

- A. Examine and test their theories.
- B. Analyze the evidence to determine the truth.
- C. Formulate multiple perspectives as the evidence drives them to these conclusions.
- D. State assumptions and use evidence to support their assumption.
- E. Make inferences based on evidence.

Concept Goals and Outcomes:

Goal 3: To understand how evidence informs theory.

Students will be able to:

- A. Use evidence to support their theories
- B. Analyze evidence to develop their theories of what happened at the crime scene.
- C. Test their theories by examining the evidence and change their perspective as the evidence drives them in new directions.

Assessment Plan

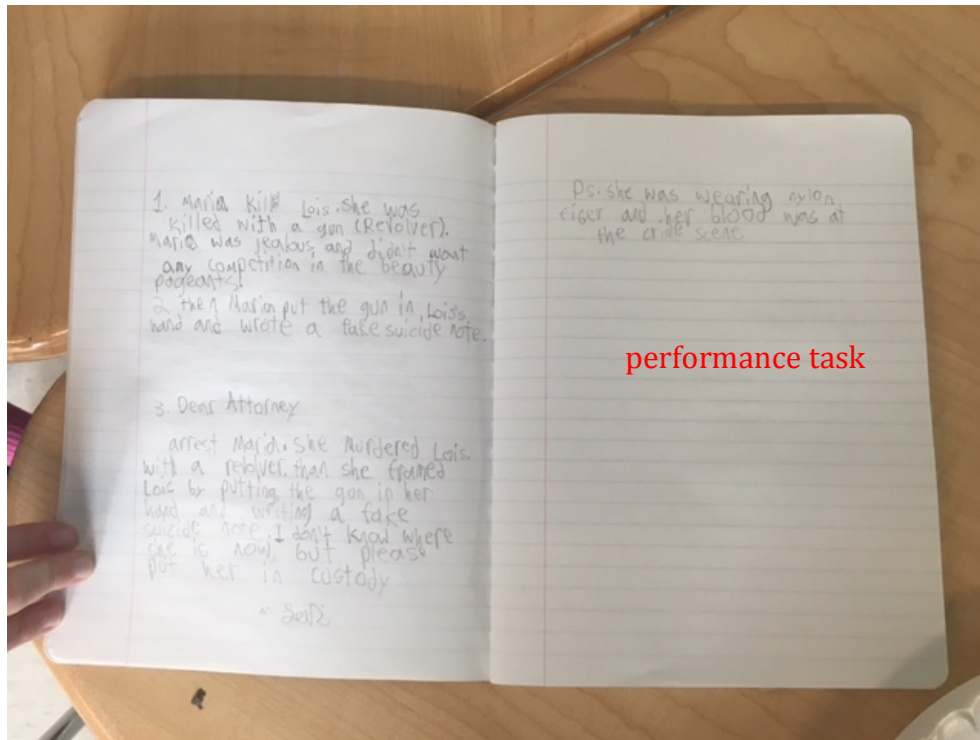
The evidence will show that students understand through a variety of formative and summative assessments. Some formative assessments that I will use in order to assess my students are listening to students' conversations. By walking around and listening to how students are using the vocabulary, what questions they are asking each other, and their participation in the group can easily tell me if the students understand. Another formative assessment is questioning. By asking the students particular questions, I am able to determine their understanding by the answers to the questions that I ask them. The summative assessments that I will use to analyze the level of student understanding are the performance task and reading through their evidence logs.

Their performance task is to analyze forensic evidence. They will be asked to document, collect, and analyze the evidence left at a crime scene in order to solve the crime. They will need to convince the district attorney that their suspect committed the crime in order to get an arrest warrant. This challenge involves dealing with many types of forensic evidence at a crime scene, such as blood typing analysis, hair and fiber analysis, and fingerprint typing. They will develop an investigation so that they can collect evidence from the crime scene, analyze the evidence to determine a suspect, and then present their findings to the district attorney. A successful result will provide enough concrete evidence in which they have collected from the scene to convince the district attorney to pursue a judge to secure an arrest warrant for their suspect(s). Students will then write a letter from the defense attorney to give reasonable doubt that the suspect(s) committed the

crime due to holes in their theories or possible lack of evidence. The rubric that will be used to assess this performance task can be found below.

	3	2	1	0
Explanation (x3)	Contains a very well written and accurate explanation	Provides an accurate explanation, but written dialog is hard to follow.	Gives partially accurate explanation.	Provides an inaccurate or no explanation.
Vocabulary (x2)	Fabulous use of vocabulary, and all is used correctly to enhance your argument for your suspect.	Good use of vocabulary. Could use more to help strengthen your argument.	Vocabulary is not used accurately, or very little vocabulary is used. Much more is needed to strengthen your argument.	No vocabulary is used.
Grammar (x2)	No grammatical errors.	Less than 3 grammatical errors.	4-7 grammatical errors.	Too many grammatical errors, please correct and return.

Student Work:



performance task

evidence log

DEPARTMENT OF CORRECTIONS
STATE OF CALIFORNIA

INMATE

THE GREAT ART HEIST
DAY 3

NAME: O'Reilly, Jim DOB: 06/25/1962 SEX: Male RACE: Black

HEIGHT: 5' 10" WEIGHT: 190 lbs HAIR: Brown EYES: Fair

SCARS: (Scar on forehead) A BLOOD TYPE: A CITIZENSHIP: U.S. citizen

PHOTOGRAPHING MARKS: Six fingers, right hand

OCCUPATION: Photographer

COPIES: Frequently wears expensive suits.

PERSONAL ASSOCIATES: Matt Caven, Cameron Judd, Edward Sheridan

REMARKS: Photographing birds, going on safaris, burglary

CRIMINAL RECORD: 08/14/2004: Criminal Threatening—Made verbal threats against museums for opening their doors late. Fined \$500.

05/13/1994: Grand Larceny—Suspect was trying to sell a diamond from Africa to an undercover police officer. Sentenced to 6 months in county lockup.

Jim, Matt, Janis, Judd, Bruce
Hire

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Science Eleutha 77

Ticket out the door:

• CSI isn't just like
Sherlock Holmes, but actually
really different, and more
harsh

• Doing this is really
fun. I'd have thought it
was boring.

Phoebe

Evidence Log

Suspect Chart

Complete the chart by filling in the following information.

Suspect	Motive	Opportunity	Means
Matt Caven	\$	They were in the building	fake as a cop
Jane Clark	\$	a few weeks before the theft	Talked to others
Charlie Fortin	\$	he was in the building, but was knocked out	steal while on guard
Cameron Judd	?	He was not mentioned	?
Bill Lettner	\$	He was knocked out during the theft, but left the keys in	get in on the trick
Jim O'Reilly	\$	He was in the building and hurt the guards	fake as a cop
Ed Sheridan	?	? who is he	?
Georgette Wilkins	She is the curator, the painting cost a lot more to the museum	She was in there during the theft	Steal (because she is the owner)

I believe Maria killed
Lois. Here is why I think
so:

- her handwriting matches the "suicide" note
- her hair matched the hair on the crime scene
- her blood matched the blood on the crime scene
- her fingerprint matched the fingerprint found on the window.

Her motive was that she and Lois were always in competition with each other and she was jealous of her when they were competing!

performance task

How does DNA fingerprinting verify
and identify forensic samples?

Summary of Evidence

Reza Rezaei, my brother, is a good favorite to have disappeared from my local neighborhood. I think they were stolen. He was a girl sitting a pocket on a lunchbox with my name on it, in Al Smith's class. Reza Thorpe, I would like you to please search the lockers of any identified possible suspects. Thank you.

Quick write/summary

TEACHER NAME		Lesson #
Rebecca Burns		1
MODEL	CONTENT AREA	GRADE LEVEL
Bruner	Science	7th
CONCEPTUAL LENS		LESSON TOPIC
Evidence		Forensic Analysis
LEARNING OBJECTIVES <i>(from State/Local Curriculum)</i>		
7.SI.1 Evaluate information resources based on specified criteria. 7.SI.1.1 Evaluate resources for reliability. (Reliability can be determined by currency, credibility, authority, etc. depending on the curriculum topic). 7.SI.1.2 Evaluate content for relevance to the assigned task. 7.SI.1.3 Evaluate resources for point of view, bias, values, or intent of information.		
THE ESSENTIAL UNDERSTANDING <i>(What is the overarching idea students will understand as a result of this lesson?)</i>		THE ESSENTIAL QUESTION <i>(What question will be asked to lead students to "uncover" the Essential Understanding)</i>
<i>Evidence informs theory</i>		<i>How does evidence inform theory?</i>
CONTENT KNOWLEDGE <i>(What factual information will students learn in this lesson?)</i>		PROCESS SKILLS <i>(What will students be able to do as a result of this lesson?)</i>
* Students will know that Crime Scene Investigators use specific tools and methods to inform knowledge. * Students will know that questions drive the scientific method * Students will know that Crime Scene Investigators are required to follow rules of ethics when they are conducting investigations.		Students will be able to: * Apply the Scientific Method to perform an effective observation. * Identify and apply tools used by Crime Scene Investigators. * Collect and organize data necessary to create inferences. * Analyze observational data to create generalizations.
GUIDING QUESTIONS <i>What questions will be asked to support instruction?</i> <i>Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding</i>		
Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What do Crime Scene Investigators do? What are some areas in which a CSI may specialize? What are some methods that CSI's use to collect evidence? What are some tools that CSI's use? What rules impact how CSI's stay	What methods did you observe the CSI's in the video using? What rules did they follow? What kinds of data did the CSI's collect? What characteristics did the CSI's possess?	What did you learn about being a Crime Scene Investigator? What strategies and/or methods did you use during your observations? How did you make inferences about your observations? What rules did you impose on

safe? What might CSI's need to do to stay safe?	What tools did they use? How did the CSI's act responsibly as they made their observations and collected their data? How can evidence help to inform your knowledge?	yourself and others working with you? How did you decide on these rules? How did you reach conclusions from your observations? How important is observation when working as a Crime Scene Investigator? How does information inform knowledge?
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DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.)

Content	Process	Product	Learning Environment
	Students work with an open-ended problem-solving experience. They will be using inference to create generalizations.		

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

Students will enter the classroom, observe a picture of a crime scene on the overhead, and brainstorm answers to the following question:

What do Crime Scene Investigators do?

Students will provide answers to the question, and the teacher will write the answers on the board. (How do they document evidence? How is evidence collected?)

Students will then be shown part of the video "The Real CSI" from Frontline on PBS.

Students will then be asked if there is anything that they would like to add to their previous list. We will have a class discussion about what crime scene investigators do before becoming CSIs themselves.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Students will be placed into groups of 4. From there, they will pick a "job" from the selection in an envelope that contains a brief description of that job. i.e. Photographer, Ballistics expert, etc.

Students will go to one of the five preset crime scenes. They will have three minutes to observe the scene, take notes, draw the crime scene, etc.

They will need to look for important evidence that they should collect, as well as clues that could tell them what happened during the crime.

Explain - Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.

Students will move back to a central meeting point and describe what they saw from the point of view of their expertise. Students will discuss the detailed observations while taking notes and coming to a group consensus.

Students will repeat this process until they have visited all crime scenes. The teacher may throw in some important need to know information before going back out into the field.

Elaborate —Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Students will now finalize their ideas for their theories of the crime scene. They will then be able to share their team's ideas with the other groups. Every group will share their ideas for each scene.

Evaluate: This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.

All students will have a chance to share their ideas, and students may defend their decisions using the evidence that they have collected from the scene. Post lesson questions will be asked to encourage students to reflect on the discipline.

TEACHER NAME		Lesson #
<i>Rebecca Burns</i>		<i>2</i>
MODEL	CONTENT AREA	GRADE LEVEL
<i>Taba Model</i>	<i>Science</i>	<i>7</i>
CONCEPTUAL LENS		LESSON TOPIC
<i>Evidence</i>		<i>Basic Forensics</i>
LEARNING OBJECTIVES (from State/Local Curriculum)		
7.SI.1.1 Evaluate resources for reliability. (Reliability can be determined by currency, credibility, authority, etc. depending on the curriculum topic). 7.SI.1.2 Evaluate content for relevance to the assigned task. 7.SI.1 Evaluate information resources based on specified criteria. 7.SI.1.3 Evaluate resources for point of view, bias, values, or intent of information.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to “uncover” the Essential Understanding)
<i>Evidence informs theory.</i>		<i>How does evidence inform theory?</i>
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)	
Students will know that eyewitness evidence is used in criminal cases. - Students will know that forensic evidence has been used over the years to help solve criminal events. - Students will explain how evidence determines theory.	<i>*Students will be able to interview witnesses</i> <i>*Students will be able to analyze that eyewitness testimony to help determine what really happened during a crime.</i> <i>*Students will be able to</i>	

	<i>determine the inconsistencies with stories from eyewitness testimony.</i> <i>*Students will be able to explain how evidence collection has evolved over the years.</i>
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GUIDING QUESTIONS		
<i>What questions will be asked to support instruction?</i> <i>Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding</i>		

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
* What is forensic evidence? * What problems can arise from eyewitness accounts of events? * How do you determine what is evidence and what is not? *What do we mean when we say an eyewitness account? *Why is forensic evidence used to solve a crime? *Based on the initial evidence, what is your theory of events that lead up to the crime? *What kind of evidence could be important and may not be depicted in the picture?	* If the eyewitness account changed from the original, how did it evolve over time? * What belongs together? * Why do these pieces of evidence belong together? *How can eyewitness evidence be skewed? *What are some factors that investigators would need to take into account when interviewing a witness? * What evidence would be needed in order to convince you of the validity of the eyewitness testimony? * How has evidence collection evolved through the years?	*Imagine that you find yourself interviewing a witness. How would you determine the best way to use this evidence? *What could you do to help reinforce the evidence of eyewitness testimony? *How does evidence determine theory? * Which advance in forensic evidence collection do you feel was most significant? Why? * What type of evidence collection would you improve if you were a crime scene investigator or a forensic scientist? * How can evidence make or break a case? - How does evidence inform theory?

DIFFERENTIATION			
<i>(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.</i>			

Content	Process	Product	Learning Environment
	Students will learn through the use of open-ended questioning. This instructional strategy/method is designed to develop conceptual understanding.		

PLANNED LEARNING EXPERIENCES			
<i>(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)</i>			

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

As students enter the room, there will be a photo of a crime scene. Students will be asked to observe the scene and to start looking for

connections.

The teacher will ask: "What would you collect for evidence? Why?"

LISTING: Students will list all evidence they see in the photo that could potentially tell them what happened. As a group we will create a list of at least 20 items so we can start breaking down the evidence into groups based on type of evidence.

GROUP: Students will be asked the following questions: What pieces of evidence belong together? Why do you think these items belong in the same group of evidence? What are the different types of evidence? What evidence is of greater (or lesser) value? How is evidence analyzed? By whom is evidence analyzed? How is evidence collected

Groups will then share out their groupings and explain why they grouped their evidence this way.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

The teacher will ask the students what is similar about the group's findings in their evidence? Students will then be asked to create headings for their like evidence groups. (**LABELING**) Students will then be asked, "What **are some** other examples of evidence that could belong in these groups?"

Students will then compare their groups and labels to other groups. Students will be asked to **REGROUP** their evidence lists into even smaller categories that can be similar and rename the groups. Students will then be asked, "Why do you feel that these particular groups of evidence belong together?"

Explain - Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.

- Students will brainstorm and share their ideas for how evidence informs theory after determining what they have learned as a result of the grouping of evidence activity. After all groups have had a chance to present their ideas, students will have a chance to debate their ideas. (**GENERALIZATION**) Based on your conversations that we have done, what have you learned about evidence?

Elaborate —Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Additional learning experience if time is needed:

- Students will be given the following scenario: You observe a paper bag and spilled groceries on a sidewalk. No one is near the groceries. What are two inferences you could make? Predict what might happen next.
- Students will then be given another scenario that includes a picture of the crime scene and more details of what was found in the room. Students will be asked the following question. If you were an investigator assigned to this case, what evidence would you collect?
- Students will be given pages 14 & 15 from Prentice Hall Forensic Science textbook. Students will answer the 6 Analyze and Conclude questions at the end. Groups will discuss what evidence they would collect and how does this evidence determine theory of the scene?

Evaluate: This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.

Extension activity for inference.

- Students will answer the communicating piece on page 15 of Prentice Hall Forensic Science Textbook. Students will write a one-page summary of the evidence and their inferences that will persuade the principal to take action against the stolen MP3 player.

TEACHER NAME		Lesson #
Rebecca Burns		3
MODEL	CONTENT AREA	GRADE LEVEL
Simulation	Science	7 th Grade
CONCEPTUAL LENS		LESSON TOPIC
Evidence		Documenting the Crime Scene
LEARNING OBJECTIVES (from State/Local Curriculum)		
7.SI.1 Evaluate information resources based on specified criteria. 7.SI.1.1 Evaluate resources for reliability. (Reliability can be determined by currency, credibility, authority, etc. depending on the curriculum topic). 7.SI.1.2 Evaluate content for relevance to the assigned task. 7.SI.1.3 Evaluate resources for point of view, bias, values, or intent of information.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Evidence inform Theory		How does evidence inform theory?
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)		PROCESS SKILLS (What will students be able to do as a result of this lesson?)
* Students will know that Crime Scene Investigators use specific tools and methods to inform knowledge. * Students will know that questions drive the scientific method * Students will know that Crime Scene Investigators are required to follow rules of ethics when they are conducting investigations.		Students will be able to: * Apply the Scientific Method to perform an effective observation. * Collect and organize data necessary to create inferences. * Evaluate evidence from a crime scene to provide truth to theory.
GUIDING QUESTIONS What questions will be asked to support instruction? Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding		
Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
• What is the first thing you should do when you arrive to a crime scene? • How would you document the evidence that you see? • How would you collect the	• Why did you determine that this was evidence? • How could this be used to help determine what actually happened?	• How did you come to this conclusion? • How does the evidence tell you what happened? • What did you feel was the most crucial piece of evidence?

evidence that you have found? • Why is proper evidence collection important? • What could happen if evidence is not collected properly? • Look around the room, what evidence do you see? • What is your initial theory on what happened? • What evidence supports this theory?	• How did you come to this conclusion? • How could this possibly be linked to another piece of evidence that you collected? • What was the process that you used to collect this evidence? • Based on these initial findings, what do you think happened here? • How does the evidence support your theory?	• Why was sketching the crime scene before collecting any evidence so important? • If you didn't sketch it first, how could this pose a problem for you later when you are analyzing your evidence? • How does evidence support theory?	
DIFFERENTIATION <i>(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.</i>			
Content	Process	Product	Learning Environment
	Students work with an open-ended problem-solving experience. They will be using inference to create generalizations.		

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

When students walk into the room, they will have 5 minutes to look at the crime scene that has been set up. They will then complete one of the following online simulations:

Students will complete "Rookie Training" or "Canine Caper" online at forensics.rice.edu.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Students will be introduced to the crime scene as evidence has been pre-planted before students enter the room. The teacher asks the Pre-Lesson questions.

Students are asked to examine the crime scene without touching anything. Students are to sketch the crime scene and include major points of reference such as desks, doors, etc.

Students will then place numbered cones next to the evidence so they can photograph the evidence before using proper collection techniques.

(Students will use what they have previously learned to properly collect evidence.) They will make sure that everything is documented before collecting the evidence.

Explain - Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.

Students will share their theories of what happened at this crime scene based on the evidence that they have collected. They will also discuss the pieces of evidence that was found around the room.

During lesson questions will be asked.

Students will then analyze their evidence.

Elaborate —Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Students will now finalize their ideas for their theories of the crime scene based on the evidence that they have processed. They will then be able to share their team's ideas with the other groups. Every group will share their ideas for each scene.

Students will then answer the following questions:

What evidence supports your theory? What evidence might disprove your theory? How did the evidence help your theory evolve? What evidence was most crucial to your theory?

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

All students will have a chance to share their ideas and evidence findings. Students may defend their decisions using the evidence that they have collected from the scene. Students will do so by presenting evidence in a way that would be geared towards convincing the District Attorney to get an arrest warrant for their suspect based on their findings in their evidence.

TEACHER NAME		Lesson #
Rebecca Burns		4
MODEL	CONTENT AREA	GRADE LEVEL
Questioning	Science	Grade 7
CONCEPTUAL LENS		LESSON TOPIC
Evidence		Forensic Analysis
LEARNING OBJECTIVES (from State/Local Curriculum)		
7.SI.1 Evaluate information resources based on specified criteria. 7.SI.1.1 Evaluate resources for reliability. (Reliability can be determined by currency, credibility, authority, etc. depending on the curriculum topic). 7.SI.1.2 Evaluate content for relevance to the assigned task. 7.SI.1.3 Evaluate resources for point of view, bias, values, or intent of information.		
THE ESSENTIAL UNDERSTANDING (What is the overarching idea students will understand as a result of this lesson?)		THE ESSENTIAL QUESTION (What question will be asked to lead students to "uncover" the Essential Understanding)
Evidence informs theory		How does evidence inform theory?
CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)		PROCESS SKILLS (What will students be able to do as a result of this lesson?)
* Students will know that Crime Scene Investigators use specific tools and methods to inform knowledge. * Students will know that questions drive the scientific method * Students will know that Crime Scene Investigators are required to follow rules of ethics when they are conducting investigations		Students will be able to: * Apply the Scientific Method to perform an effective observation. * Identify and apply tools used by Crime Scene Investigators. * Collect and organize data necessary to create inferences. * Analyze observational data to create generalizations.
GUIDING QUESTIONS What questions will be asked to support instruction? Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding		
Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:

1. What evidence supports your theory? 2. What would you include in your request for an arrest warrant? 3. What evidence is most important for your case? 4. How can you ensure that enough evidence is presented to the DA? 5. Why is it important to handle evidence properly? 6. What would happen if evidence is not handled properly? 7. What can be done if evidence is contaminated? 8. Why should you not include your personal bias when evaluating a crime scene?	1. What would the fingerprint evidence tell you? 2. How would you lift the prints? 3. How would you collect the footprint evidence? 4. What seems out of place at the scene of the crime? 5. How could you determine if the victim wrote the note that was found? 6. Why might this be important to determine? 7. How does all of the evidence factor into making an arrest? 8. What is the DA’s job?	1. What did you find to be the most important piece of evidence that you collected? 2. Why do you feel this was the most important? 3. How did it help to determine the cause of the incident? 4. How does this piece of evidence relate to the whole picture of the crime scene? 5. When is one piece of evidence enough to get a conviction? 6. Why should you try to link more than one piece of evidence to your suspect? 7. What evidence might a DA use to obtain an arrest warrant based on your evidence? 8. Why are you confident that you have provided enough evidence to present in order to have the suspect convicted? 9. How can the defense prove reasonable doubt based on the evidence that you have collected?	
DIFFERENTIATION <i>(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.</i>			
Content	Process	Product	Learning Environment
	Students will be grouped according to like ability groups with attention paid to particular learning styles		

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.

As students enter the classroom, the crime scene from yesterday will be reviewed.

The teacher then reviews the scene, and has an open discussion with the class about the evidence that can be seen. We also discuss what this evidence can tell you from your observations.

Explore - In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.

Students are then divided into groups by readiness. They will be given a small packet of independent work to complete on handwriting analysis and fingerprint analysis. Students will be given 15 minutes to complete the packet before each group reports their results. They will use their new information to help them analyze the crime scene in a next part of the lesson. Students will be introduced to the crime scene that will be set up in section of the room or in a spare classroom.

Explain - Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.

The teacher then asks the Pre-Lesson Questions listed above. Teacher will ask students to answer the questions. Students are then encouraged to ask their own questions or make a connection to one of their questions when answering the teacher's questions.

Elaborate —Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways

Students will use their knowledge of crime scene analysis to start documenting the scene and collecting evidence.

Students will answer the during lesson questions that are listed above when completing the tasks. Students not already chosen the first round will randomly be called to answer the questions above.

The teacher will then introduce the argumentative inquiry lab that students will design and complete. Students will be in groups of four. Students will make a claim of what happened to lead up to the scene they are observing. (Students will answer in complete sentences) They will then state their evidence for this claim. Students will design a lab to prove their claim. Students will list their reasoning in order to justify their evidence. Higher readiness groups will be asked to present their findings as support for the defense side and will answer the following question, "How can the DA's findings be replaced with reasonable doubt with the evidence that is found" Students will write a letter to the DA providing the evidence that they have collected to try and obtain an arrest warrant. Then they will write a piece for the defense to try and claim their clients innocence. Students will create a PowerPoint poster for their presentation of their findings.

When all groups have finished, groups will report their findings to the class. Students will have the opportunity to defend their claims. The groups will then answer the Post Lesson Questions, listed above. Students will volunteer the answers and feedback will be discussed as whole group.

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

Teacher ends independent work time by announcing it is almost time to go. The teacher will ask the students what they have learned from the lesson.

Students will present their presentations to the rest of the class.

Finally, students are given an exit ticket in order to answer the following question. Based on what we have learned, How does evidence inform theory?

Unit Resources

Teacher Resources:

Cocroft, Clarence. *Prentice Hall Forensic Science*. Boston, MA: Pearson, 2009. Print.

This book contains some great information that students may use as a resource for your middle school forensics course. It defines vocabulary, as well as has some ready-made labs that you can adapt and use however you would like for your classroom. At the end of each lesson, there are questions that can be used to assess student understanding.

"FRONTLINE: The Real CSI." *PBS*. PBS, n.d. Web. 03 Apr. 2016.

This video contains some good information about forensics as it is used to help solve criminal cases. It gives the viewer some ideas to chew on about the reliability of evidence and the errors that can occur. It follows an actual crime scene investigator to a scene and the investigator describes some basics of what they do when they arrive on the scene. It gives the viewer some good insight into what actually happens at a crime scene versus what might be misconstrued from watching movies or television shows for entertainment purposes.

Russo, Tom. *Crime Scene 1*. 1997. The Case of Lois McArthur: A Forensics Investigation Kit.

This kit contains the needed materials for students to complete a forensic investigation. Students are able to complete blood typing, hair analysis, fiber analysis, and fingerprint analysis in order to narrow down their suspect.

Trimpe, T. "Forensic Science Lesson Plans." *The Science Spot*. N.p., 2006. Web. 03 Feb. 2016.

The Science Spot has great forensics lessons that include PowerPoints, labs, as well as guided notes. There are video links to various forensic videos with ready made guided viewing questions that students can complete while watching the videos. This website is great for quick, ready-made lessons that one can use in a pinch. You can also take these ideas and easily adapt them to make them your own.

Student Resources:

"CSI: THE EXPERIENCE — Web Adventures." *CSI: THE EXPERIENCE — Web Adventures*. N.p., n.d. Web. 03 May 2016.

Students can use this site to navigate through cases. They can go through a more guided training called “rookie training.” After that, they are able to explore more on their own by using their skills learned in rookie training. This site really gives students a chance to explore and virtually collect and analyze evidence, as well as complete a virtual forensic autopsy.

Russo, Tom. *Crime Scene 1*. 1997. The Case of Lois McArthur: A Forensics Investigation Kit.

This kit contains the needed materials for students to complete a forensic investigation. Students are able to complete blood typing, hair analysis, fiber analysis, and fingerprint analysis in order to narrow down their suspect.

Schindler, Howard, and Dennis Mucenski. *Science Sleuths: Solving Mysteries Using Scientific Inquiry*. Waco, TX: Prufrock, 2010. Print.

Students can have the chance to dig into evidence by reading police case files. It includes all necessary information needed to solve the case. These lessons are stretched over three days, and students are asked to develop a theory based on the evidence they have in front of them. They are then challenged the next day when more evidence is given that could prove their theories completely wrong. These are great if you want students to make predictions, think critically, and use problem-solving skills.