



CRIME SCENE INVESTIGATION (CSI)

Forensics has gained publicity through TV shows such as *Cold Case* and the *CSI* series which instantly grab the attention of middle school students. However, forensics is also a field with a wide array of college and career pathways related to sciences and the criminal justice system. Forensics spans from traditional methods of forensic art and physical anthropology to new techniques such as digital forensics in which technicians unearth evidence from computers. This range provides great opportunities for students to engage in data collection and problem solving using a variety of strengths and leadership skills. Students will be challenged to weigh multiple potential answers to a problem in order to solve a case. The topic also includes great opportunities to use academic and technical vocabulary in the context of hands-on problem solving.

Unit Standards and Objectives 21st Century Skill: Problem Solving

Standard #1: Citizen Schools students will gather and evaluate information needed to solve a problem.

Lesson Objectives:

SWBAT...

- categorize evidence as Real, Demonstrative, Documentary, or Testimonial.
- understand their role as investigators, forensic scientists, and team members in this CSI apprenticeship.
- practice using the steps to define and secure a crime scene.
- find and collect evidence from the scene of the crime.
- analyze footprint evidence.
- collect evidence using the requirements for collecting evidence.
- explain the importance of the chain of custody of evidence in crime scene investigations.
- describe the four types of trace evidence.
- examine fiber trace evidence using a magnifying glass.
- identify trace evidence at a crime scene and explain how it might help solve the crime.
- collect and analyze DNA evidence.
- explain why DNA evidence is more reliable in court than other kinds of evidence.
- describe a forensic science career that they might be interested in pursuing.
- describe the crime they will be solving for the WOW! Case.
- identify digital evidence.
- begin solving their WOW! case by securing the crime scene, collecting evidence, analyzing evidence and drawing inferences.

Standard #2: Citizen Schools students will select an appropriate solution for the problem.

Lesson Objectives:

SWBAT...

- brainstorm several possible hypotheses for how to solve the crime.
- systematically eliminate the hypotheses that are not supported by fingerprint evidence.
- practice making inferences based on fictional crime scene evidence.
- analyze a variety of evidence to make and test a hypothesis about who committed the crime.
- brainstorm several possible hypotheses to solve the WOW! Case.
- test their hypotheses, eliminating solutions that prove inaccurate based on the analysis of evidence.
- finalize their solution to the WOW! Case by eliminating any remaining hypotheses and selecting the most appropriate solution.
- present their final WOW! Case solution providing concrete evidence for how they solved the crime.

Essential Questions

- How do forensic scientists use evidence and inference to solve crimes?
- Why is securing the crime scene essential when working to solve crime cases?



Performance Task Assessment (WOW!)

In the CSI WOW!, students will approach the scene of a fictitious crime and systematically work to solve the crime by securing the crime scene, making hypotheses about the crime, testing those hypotheses with the evidence they collect and using inferences to decide what happened and solve the case.

Goal: Students will solve a fictitious crime using the forensic/problem solving skills they've learned in the apprenticeship.

Role: Students will work in teams to take on the roles of crime scene investigators.

Audience: School community members will be invited to be present for the "crime scene." Community members will be invited to a WOW! day where students will walk them through a fictional crime scene and demonstrate the steps they took to solve the case.

Situation: Students have arrived at the scene of a crime and need to work together to collect evidence and solve the crime.

Product: Students will present their findings to an audience.

Standards: Students will be evaluated based on the 21st Century Skills [Problem Solving Rubric](#).

Lesson Plans At-A-Glance

Lesson Plans are available [here](#).

Week	Lesson Objectives	Agenda	Outcomes & Work Products
1	<ul style="list-style-type: none"> ● SWBAT categorize evidence as Real, Demonstrative, Documentary, or Testimonial. ● SWBAT understand their role as investigators, forensic scientists, and team members in this CSI apprenticeship. 	<ul style="list-style-type: none"> ● Hook: What is it and how is it used? ● Introduction of New Material: Types of Evidence and Basic Vocabulary ● Activity 1: Investigator's Agreement ● Activity 2: Investigator's Notebook ● Activity 3: Evidence in a Mini Mystery ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will have a clear understanding of the expectations for this apprenticeship. Students will also practice finding and identifying specific types of evidence within a case.
2	<ul style="list-style-type: none"> ● SWBAT practice using the steps to define and secure a crime scene. ● SWBAT find and collect evidence from the scene of the crime. 	<ul style="list-style-type: none"> ● Hook: Observing the Scene ● Introduction of New Material: Securing the Crime Scene ● Activity 1: Define the Scene ● Activity 2: Recording the Details ● Activity 3: The Investigation Begins ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will be able to identify and perform the 6 steps required to secure a crime scene. This will include additional practice in gathering evidence.
3	<ul style="list-style-type: none"> ● SWBAT brainstorm several possible hypotheses for how to solve the crime. ● SWBAT systematically eliminate the hypotheses that are not supported by fingerprint evidence. ● 	<ul style="list-style-type: none"> ● Hook: Chain of Proof ● Introduction of New Material: Crime Scene Hypothesis ● Activity 1: Fingerprints ● Activity 2: Collecting Fingerprints from a Crime Scene ● Activity 3: Making and Testing a Hypothesis ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will understand what a hypothesis is and practice making a crime scene hypothesis. Students will also learn how to collect fingerprint evidence from a scene and be able to test their hypothesis based on the fingerprint evidence.
4	<ul style="list-style-type: none"> ● SWBAT analyze footprint evidence. ● SWBAT practice making inferences based on fictional 	<ul style="list-style-type: none"> ● Hook: Following the Evidence ● Introduction of New Material: Evidence Based Inferencing ● Activity 1: Who did it? 	<ul style="list-style-type: none"> ● At the end of this lesson, students will understand the role that making inferences plays in solving crimes. Students will have several



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	crime scene evidence.	<ul style="list-style-type: none"> ● Activity 2: Dirt Detectives ● Activity 3: Footprint Forensics ● Assessment: Exit Ticket 	opportunities to practice making evidence based inferences. In the final activity, they will test footprint evidence before using inferencing to offer a solution to the crime.
5	<ul style="list-style-type: none"> ● SWBAT collect evidence using the requirements for collecting evidence. ● SWBAT explain the importance of the chain of custody of evidence in crime scene investigations. ● SWBAT analyze a variety of evidence to make and test a hypothesis about who committed the crime. 	<ul style="list-style-type: none"> ● Hook: Secure the Scene ● Introduction of New Material: Handling Evidence Properly ● Activity 1: Handling Crime Scene Evidence ● Activity 2: Making the Case ● Activity 3: Chain of Custody ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will understand how to handle evidence properly and the importance of doing so when working to solve crimes. They will become familiar with the chain of custody.
6	<ul style="list-style-type: none"> ● SWBAT collect and analyze DNA evidence. ● SWBAT explain why DNA evidence is more reliable in court than other kinds of evidence. ● 	<ul style="list-style-type: none"> ● Hook: What is it? ● Introduction of New Material: DNA Evidence ● Activity 1: DNA Extraction Lab ● Activity 2: DNA True or False ● Activity 3: What happens next? ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will understand the role that DNA evidence can play in crime scene investigations. They will also learn how DNA evidence is collected and analyzed.
7	<ul style="list-style-type: none"> ● SWBAT describe the four types of trace evidence. ● SWBAT examine fiber trace evidence using a magnifying glass. ● SWBAT identify trace evidence at a crime scene and explain how it might help solve the crime. 	<ul style="list-style-type: none"> ● Hook: Crime Scene Comic Strips ● Introduction of New Material: Trace Evidence ● Activity 1: Finding a Match ● Activity 2: Hair & Fiber Matches ● Activity 3: Crime Scene Categories ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will understand how to collect and analyze fiber and trace evidence. Students will also explore what makes a “match” for evidence in a case, in other words what degree of certainty is sufficient for a conviction.
8	<ul style="list-style-type: none"> ● SWBAT describe a forensic science career that they might be interested in pursuing. ● SWBAT describe the crime they will be solving for the WOW! Case. 	<ul style="list-style-type: none"> ● Hook: Forensic Careers in Action ● Introduction of New Material: Forensic Careers ● Activity 1: Mystery Career Pop-Ups ● Activity 2: The BIG Case- WOW! Introduction ● Activity 3: Securing the Big Case ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● At the end of this lesson, students will have a better understanding of careers within forensic science and the many professionals who have a role in crime scene investigations. They will also be introduced to the case they will be working on for their WOW! culminating project and will begin taking initial steps to solve the WOW! case.
9	<ul style="list-style-type: none"> ● SWBAT identify digital evidence. ● SWBAT begin solving their WOW! Case by securing the crime scene, collecting evidence, analyzing evidence and drawing inferences. ● SWBAT brainstorm several possible hypotheses to solve the WOW! Case. ● SWBAT test their hypotheses, eliminating solutions that prove inaccurate based on the analysis of evidence. 	<ul style="list-style-type: none"> ● Hook: Career Spotlight ● Introduction of New Material: Digital Evidence ● Activity 1: Secure the WOW! Crime Scene ● Activity 2: Make and Test a WOW! Hypothesis ● Activity 3: Using Inferencing to Solve the WOW! Crime ● Assessment: Exit Ticket 	<ul style="list-style-type: none"> ● Students will have a brief introduction to digital evidence. However, the lesson will mostly focus on the WOW!. At the end of this lesson, students will have solved their WOW! case. They will secure the crime scene, make and test their hypothesis by analyzing evidence, and use inferencing to solve the crime once all of the information and evidence has been collected and analyzed.
10	<ul style="list-style-type: none"> ● SWBAT finalize their solution to the WOW! Case by eliminating any remaining hypotheses and selecting the most appropriate solution. ● SWBAT present their final 	<ul style="list-style-type: none"> ● Hook: Which Career is for You? ● Introduction of New Material: Describing the Case ● Activity 1: Finalizing the WOW! Solution ● Activity 2: How Did You Get There? 	<ul style="list-style-type: none"> ● At the end of this lesson, students will have finalized their WOW! crime solutions. They will have worked together to prepare a presentation that will walk observers through the process they used to solve the crime and they



<p>WOW! Case solution providing concrete evidence for how they solved the crime.</p>	<ul style="list-style-type: none"> ● Activity 3: Rehearsal ● Assessment: Exit Ticket 	<p>will have rehearsed this presentation in preparation for their WOW! day.</p>
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Lesson Elements	
<p>Hook Opening ritual used each week to build excitement</p>	<p>Each lesson will begin with a specific activity or challenge that will build student interest and participation as soon as they enter the classroom. The Hook activity will focus on the new material for that lesson or on review material from a previous lesson.</p>
<p>Assessment How you will measure student learning (i.e., exit tickets, student writing, student presentations, etc.)</p>	<p>At the end of each lesson, students will complete an exit ticket to assess their grasp of the day's objectives. This ticket will include questions and will be turned in before the students leave class each day. Additionally, they will be expected to use the skills they learn to independently solve a case for their WOW!.</p>
<p>Structures Learning structures, tools, or student grouping strategies</p>	<p>The apprenticeship includes multiple opportunities for small group work. Students will have frequent opportunities to work together in both teacher-led and independent activities as they master the protocols used in Crime Scene Investigations. It is recommended that all groupings be assigned by the teachers.</p>
<p>Procedures Special procedures used each class (i.e. handing out folders, rearranging seating, etc.)</p>	<p>This apprenticeship uses many materials. You will need to have procedures in place for how you will distribute and collect materials during each class. You will also need to have a procedure for how and where these materials will be stored between lessons. Investigator's Notebooks will need to be handed out at the beginning of each class and collected at the end of class. One option is to have the notebooks already at their seats when the students enter the classroom.</p>

Implementation Notes	
<p>Supplies Materials, tools, technology</p>	<ul style="list-style-type: none"> ● Markers- Secure from Citizen Schools Office ● Chart Paper - \$20 ● Investigator's Notebooks (1 per student)- \$20- Seek Donations ● Index Cards- \$3 ● Crime Scene Tape - \$15 ● Scotch Tape- \$5 ● Hammer- Bring from home ● Pencils- Secure from Citizen Schools Office ● White Copy Paper- Secure from Citizen Schools Office ● Fingerprint Dust- \$10 ● Paint Brushes (at least 1 per group)- \$12- See if you can borrow from school ● Large roll of butcher paper- \$15 ● Rubber Gloves- \$5 ● Labels- \$5 ● 3 \$1 bills- Bring from home ● Hand Lens (at least 1 per group)- \$30 total- See if you can borrow from school ● Blender- Bring from home ● ½ cup split peas- \$3 ● ⅛ tsp salt-\$1 ● Strainer- Bring from home ● Measuring Cup- Bring from home ● 2 tbsp liquid detergent- Bring from home ● Test Tubes- \$10



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	<ul style="list-style-type: none"> ● Meat Tenderizer, Pineapple Juice, or Contact Lens Cleaning Solution- \$2 ● Rubbing alcohol- \$5
Budget	Total cost of apprenticeship: \$99
Supporting Materials & Resources handouts, books, materials	<p>If there are any materials or resources that you use in your profession that will support or supplement this unit, you should feel free to share them with the class. The students will appreciate the real life connection to your profession and what they are learning in the apprenticeship.</p> <p>The Big Case handouts can be found here.</p>
Location Tables/desks, or classroom, gym, kitchen, outside, etc.	You will need space for students to sit at tables or desks grouped into tables (3 students per group). Ideally, there should be an ample amount of work space. You will also need an open space to set up crime scenes. Additionally, you will need somewhere on-site to store projects and materials from week to week. See if there is space for this in the CS office.
Choice and Voice Key decisions students make	Because this apprenticeship focuses on problem solving, students will be able to use their ideas to systematically guide them as they work to solve fictitious cases. They will be able to use their own reasoning to choose which possible solution to each case is the best possible solution.
Modifications for Student Needs Supports and changes to help meet the needs of all learners	<p>In order to meet the needs of all the learners in this apprenticeship, common modifications include:</p> <ul style="list-style-type: none"> ● Adjust student groups ● Provide additional time to complete tasks ● Provide extra guidance as students work independently <p>This can be a great apprenticeship for English Language Learners, since it involves a lot of hands-on activities. Consider modifications for ELL students:</p> <ul style="list-style-type: none"> ● Plan for extra time for students to complete work as needed ● Provide additional visual reinforcement when explaining and giving directions ● Make sure ELLs have a clear line of sight to all of the demonstrations ● Modified visual references
Student Background Knowledge and Skills Needed Academic skills, social emotional skills or developmental milestones needed	<p>Students of varying levels of development, background, etc. are well suited to participate in this apprenticeship. Instead of background knowledge and skills, ideally, students will bring the following to the apprenticeship:</p> <ul style="list-style-type: none"> ● Interest in problem solving and gathering information to come up with possible solutions ● Interest in working together as part of a team to come up with solutions
College and Career Readiness Connections to college and career	<p>College Connection: Students who are interested in problem solving and forensics might be interested in college courses that focus on math, science, engineering and research.</p> <p>Career Connections: Students who are interested in forensics might be interested in career pathways related to sciences and the criminal justice system. People who work in these fields are often tasked with gathering information to come up with solutions to unique and challenging problems.</p>
Co-Teaching Roles Recommendations for co-teaching and planning	It is recommended to use Team Teach or One Teach, One Assist and tradeoff who is the lead for the majority of this apprenticeship. This will allow students to get to know both the CT(s) and the TL and allow for a shared teaching experience throughout the apprenticeship. Plan ahead which teacher will lead which activity. While students are working collaboratively (whether in groups or in pairs) both teachers should circulate the room to provide guidance and answer questions as needed.
Special Resources Field trips, excursions, guest speakers	Plan for guests to support the WOW! performance task. On the WOW! day, students will present their crime scene solutions and describe the processes they used to arrive at their conclusion.
Road Map to WOW! Visual overview for students of their 10 week apprenticeship	<p>Note to CT/ TL: Create a poster-sized visual of the information listed below, display and reference weekly in your classroom.</p> <p>Visual overview for students of their 10 week apprenticeship:</p> <p>Week 1: Types of Evidence Week 2: Securing a Crime Scene</p>






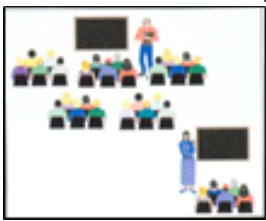

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Week 3: Crime Scene Hypothesis
Week 4: Evidence Based Inferencing
Week 5: Handling Evidence Properly
Week 6: DNA Evidence
Week 7: Trace Evidence
Week 8: Introduction to the WOW! Crime Scene
Week 9: Solving our WOW! Case
Week 10: WOW! Rehearsal
WOW!



Co-Teaching Structures Guide

Teaching Model	Description	Why should we use it?	When should we use it?
Parallel Teaching 	Class is split into two (or more) small teams. <u>Same</u> content is taught to each team.	<ul style="list-style-type: none"> ·Low student-teacher ratio ·Greater proximity to high-risk students ·Co-teachers have equal presence and responsibility in the classroom 	<ul style="list-style-type: none"> ·We can plan effectively together to ensure we teach the same content to each group well ·Classroom's physical structure permits it ·Lessons with heavy independent work ·Need to provide a lot of individual attention
Station Teaching 	Class is split into two (or more) small teams. <u>Different</u> material taught to each group simultaneously and then teams switch or teachers switch.	<ul style="list-style-type: none"> ·Low student-teacher ratio ·Co-teachers have equal presence and responsibility in the classroom ·More variety in teaching methods for teachers and students 	<ul style="list-style-type: none"> ·When a lesson can be split into two mutually exclusive and equally timed parts (e.g. using a camera/critiquing a photo, chopping vegetables/measuring ingredients) ·Classroom's physical structure permits it ·Lessons with a lot of knowledge or skill-building
Team Teaching 	Both teachers actively teach the material taking turns during the lesson to lead teach. While one teacher is lead teaching the other goes around to groups or individual students.	<ul style="list-style-type: none"> ·One teacher can pay attention to high-risks students while one teacher leads the full class ·Co-teachers have equal presence and responsibility in the classroom 	<ul style="list-style-type: none"> ·When it's difficult to effectively split a lesson into two stations ·When a lesson has lectures and independent practice time ·If most SPED students can follow whole-group instruction ·Best with well-developed co-teaching relationship ·Lessons with a lot of group work
Alternative Teaching 	One teacher remediates a small group of students (pre-teach, re-teach, supplement, or enrich) and catches them up for the main lesson being taught by the other teacher.	<ul style="list-style-type: none"> ·Low student-teacher ratio ·To remediate in class for a small group of students ·To catch students up who may not have understood/missed previous lesson 	<ul style="list-style-type: none"> ·When the benefits from a few minutes of remediation/ pre-teaching will pre-empt greater misunderstandings for the lesson ·Classroom's physical structure permits small group in one part of the room.(CTs should not be left alone in the classroom with students.)
One Teach, One Assist 	One teacher lead teaches the whole lesson and the other teacher works with individual students.	<ul style="list-style-type: none"> ·To redirect behavior from an especially low functioning student. ·To pay greater attention to a student who needs one-on-one interaction in order to keep up 	<ul style="list-style-type: none"> ·If there is a particularly high-needs student(s) in the classroom that need specific support ·During direct-teach sections of the lesson



The Pitch

- **Teacher's Note:** Have the crime scene set up ahead of time. You will not need a lot of space, but the visual of a crime scene marked off with crime scene tape will grab the students' attention. This is the scene of a car break-in where money has been stolen.
 - Place a desk on its side representing the car.
 - Place torn up paper on the floor and desk representing glass from a broken window.
 - Place several \$1 bills on the floor heading away from the car as though they were dropped accidentally.
 - Place a hammer with visual fingerprints on it on the floor near the "glass".
 - Mark the scene off with crime scene tape.
- **Ask:** Are you wondering what happened here? Do you like gathering clues to solve mysteries?
- **Say:** If so, the CSI apprenticeship might be a good match for you!
- **Introduce Self:** My name is _____ and I am a _____. (Tell the students something about what you do here.)
- **Explain:** Right now you are looking at crime scene. This is the scene of a car break-in where money was stolen from the front seat. CSI investigators have already marked off the crime scene with crime scene tape. In the CSI apprenticeship, we'll be working together to solve crimes similar to this one. We'll learn about the crucial steps to securing a crime scene and analyzing evidence to help us solve cases. At the end of our apprenticeship, you will work in groups to solve your very own case as part of our WOW! project. Being a crime scene investigator takes a lot of careful work and attention to detail, but if you are interested in solving crimes than this apprenticeship could be the one for you!

Materials Needed for Pitch Day

- Desk
- Torn up Paper
- Several \$1 bills (there is no required # here.)
- Hammer with visible fingerprint on it
- Crime Scene Tape

Apprenticeship in Action

Coming Soon! Share student work and your ideas with Amy Hoffmaster (amyhoffmaster@citizenschools.org), and your apprenticeship could be featured here.

Apprenticeship Description for WOW! Communications

The CSI Apprenticeship focuses on problem solving and the forensic sciences. Students will learn how to approach fictitious crime scenes systematically as they gather information and use reasoning to solve crimes. Throughout the apprenticeship, students will be introduced to various types of evidence as they work together to solve these crimes. By the end of the apprenticeship, students will be able to independently approach a fictitious crime scene and gather the evidence needed to solve the crime. The apprenticeship will culminate with students working in small groups to independently solve a crime by making observations and drawing conclusions from various kinds of evidence gathered at a fictitious crime scene they encounter for their WOW! project. Learning to use problem solving skills as they work together will give students the tools to approach problems they encounter in the classroom and in their daily lives.



Apprenticeship Acknowledgements

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Securing a Crime Scene

1. Establish the boundaries of the crime scene.
2. Mark perimeters with crime scene tape or police barriers.
3. Remove unnecessary individuals from the scene. Gather witnesses.
4. Determine if evidence is present. If so, log evidence.
5. Record conditions of the area and anything that affects the scene (details).
6. Release the crime scene.