Goals and Objectives

To expose students to the workings of a crime laboratory
To process and properly collect evidence for the purpose of prosecution
To learn to use the tools and methods of a crime scene investigator
To enhance problem-solving skills
To use technology, science, math, communication, reading, English, and writing skills to complete tasks
To learn about the history of forensics
To learn about all of the career aspects of a forensic scientist
Crime Scene Investigation

What You Will Do

Day 1—Introduction To Forensics and Crime Scene Investigation
- Complete a terminology activity
- Watch a PowerPoint® presentation
- Study the roles of the investigation team
- Form teams of four investigators
- Choose a team captain

Day 2—Practice Techniques
- Place and photograph tent cards (Activity 1)
- Make a paper bindle and seal evidence (Activity 2)
- Take measurements and sketch a crime scene (Activity 3)
- Take notes at a crime scene

Day 3—More Practice Techniques
- Make shoe Impressions (Activity 4)
- Take fingerprints (Activity 5)

Day 4—The Crime Scene (Activity 6)
- Read the crime scene scenario
- Sign in on the Crime Scene Log
- Photograph entire scene and determine the POE (point of entry)
- Identify and photograph the evidence (use tent cards)
- Draw and measure the scene (make a rough sketch)
- Collect, process, and properly remove evidence from the scene (shoe impressions, items around victim, etc.)
- Take notes at the crime scene
Day 5—Crime Scene Lab Activities (Activity 6 continued)
- Review various reports (Investigator’s Interviews, Search Warrants Issued, Report of Medical Examiner)
- Dust items from the crime scene for fingerprints
- Complete blood analysis activities

Day 6—More Crime Scene Lab Activities (Activity 6 continued)
- Examine and compare shoe impressions
- Compare fiber analysis
- Begin preparing final reports and sketches

Day 7—Prepare Final Reports
- Photographs arranged and labeled on poster board
- Rough and final sketches
- Crime Scene Notes form
- Evidence Collection form
- Fingerprint Comparison form
- Blood Typing and Enzyme Results form
- Shoe Impression Comparison form
- Textile Fibers form

Day 8—Research Careers in Forensics
- Complete career activities

Day 9—Research Famous Forensic Cases
- Study and report on a famous case

Day 10—Teacher Discretion Day
- Your teacher will tell you what to do
If you want to learn more about forensic science, visit and explore the CourtTV website at
www.courttv.com/forensics/education.html

The following website has a more complete glossary.
www.courttv.com/onair/shows/forensicsfiles/glossary

**autopsy**—thorough examination, both internal and external, of a body after death; it is usually performed to identify or confirm the cause of death

**ballistics**—the study of the firing, flight, and effects of bullets and/or other ammunition; used to match the marks left on the bullet or bullet fragments when they are fired to bullets fired from a specific gun

**bindle paper**—clean paper folded for the containment of trace evidence, sometimes included as part of the packaging for collecting trace evidence

**biohazard bag**—container for materials that have been exposed to blood or other biological fluids and have the potential to be contaminated with hepatitis, AIDS, or other contagions

**biological evidence**—evidence commonly recovered from crime scenes in the form of hair, tissue, bones, teeth, blood, or other bodily fluids

**blood splatter**—pattern of spilled blood; can provide information such as blood source, size of wound, type of wound, direction and speed the victim and/or criminal was moving when the victim was injured, and the type of weapon used

**boundaries**—perimeter around the area of a crime scene that could potentially contain evidence of a crime

**case identifier**—alphabet and/or numeric characters assigned to a particular case

**chain of custody**—a record of individuals who have had physical possession of the evidence and the process used to maintain and document the chronological history of the evidence. (Documents can include, but are not limited to, name or initials of the individual collecting the evidence, each person or entity subsequently having physical possession of it, dates the items were collected or transferred, where the item(s) were collected from, agency and case number, victim’s or suspect’s name (if known), and a brief description of the item.)
CSI Terminology (continued)

- **collect /collection**—the process of identifying, documenting, gathering, and packaging or retaining physical evidence
- **comparison samples**—term used to refer to material/evidence found that can be compared to samples from people, tools, and physical locations; sometimes called an elimination sample
- **composite drawing**—sketch, usually of a suspect, produced by an artist, from eyewitnesses who describe the person to the artist, sometimes as he or she draws
- **cross contamination**—undesirable transfer of material between two or more sources of physical evidence (DNA) from another source
- **DNA**—the molecule that encodes genetic information; a chemical substance contained in cells that determines each person’s individual characteristics. It acts like a genetic fingerprint. An individual’s DNA is unique except in cases of identical twins
- **documentation**—written notes, audio/videotapes, printed forms, sketches and/or photographs that form a detailed record of the scene, evidence recovered, and actions taken during the search of the crime scene, including chain of custody information
- **evidence**—something that can help identify the responsible persons, establish an element of crime, reconstruct crime events or link crimes
- **forensic science**—application of science to analyze evidence involved in criminal and civil litigation
- **genetic fingerprinting**—use of DNA to identify individuals
- **impression evidence**—objects or materials that have retained the characteristics of other objects or materials through direct physical contact
- **latent print**—print impression that is not readily visible and it is made by contact with a surface
- **luminol**—chemical that is capable of detecting blood or bloodstains—even if they are very diluted and even if someone has tried very hard to remove them
- **M.O. (method of operation or modus operandi)**—pattern of how crimes are committed; a common M.O. often means the same person or people are committing the crimes; it can also sometimes identify potential victims and crime sites
**CSI Terminology (continued)**

**Crime Scene Investigation**

- **personal protective equipment (PPE)**—items such as disposable (latex) gloves, masks, shoe covers and eye protection that are used to keep biological or chemical hazards from contacting the skin, eyes, and mucus membranes and to avoid contamination of the crime scene.

- **projectile trajectory analysis**—method for identifying the path of a high speed object, such as the path of a bullet from a gun, through space.

- **serology**—science that deals with the properties and reactions of serums, especially blood serum.

- **trace evidence**—physical evidence that results from the transfer of small quantities of materials (hair, textile fibers, paint chips, glass fragments, gunshot residue particles).

- **transient evidence**—evidence that will, because of its nature or the conditions at the scene, lose its evidentiary value if not preserved or protected, such as footprints in the rain or snow.

- **walkthrough**—carefully walking through the scene before starting any work to evaluate the situation, identify potential evidence, and determine resources needed; after work as completed, it is done to ensure the scene has been effectively and completely processed.
CSI Personnel and Procedures

Crime Scene Investigation

The Photographer

A photograph is a two-dimensional reproduction of the crime scene. It serves as the permanent record of the crime scene. Everyone involved in the investigation will have an opportunity to look at these photographs (the District Attorney, the defense counsel, homicide detectives, etc). They are also very important to you because the photographs will serve as “memory joggers” when you have to get up on the witness stand and testify. Good pictures are essential because most trials do not take place until a year or more has passed. The downside to a photograph is that it is difficult to get accurate information on distances between objects and room dimensions. Certain objects may not be visible in a photograph or cannot be readily identified.

Description of a good photographer
The photographer must be a person who has a keen eye for little things like scratches marks on a victim’s arm, small blood spatters on the wall, or a misplaced piece of furniture. They must work quickly yet thoroughly because they are the first ones allowed on the scene. Obviously, they need to know how to work a camera and like to take pictures. They must also be able to work well with their team members and communicate things that they have noticed with their acute sense of awareness and discriminating observations.

The Sketcher

The crime scene sketch is the simplest and most effective method of recording the positions of physical evidence, the placement of objects within an area, the physical dimensions of that area. Crime scene sketches are divided into two areas: the rough sketch of field drawing and the finished product.

Rough Sketch
Once the crime scene has been photographed and before the evidence is disturbed, the investigator prepares the rough sketch. The rough sketch:

- Must provide all the details necessary to complete a finished drawing
- Must identify every object in the room
- Need not be to scale, but not drawn out of proportion that it will not confuse the investigator after leaving the area
Needs to have measurements verified by someone else. It is always preferable to work with an assistant when possible.

May be introduced as evidence in court. It is important that it is accurate and no additions or changes should be made once the investigator leaves the scene.

Needs to be marked “N” for North to orient the drawing.

Needs a legend to explain any symbols that are used to identify various objects (in small areas, various objects may be lettered or numbered and keyed in the legend).

It is a good idea to designate a symbol on the sketch that shows the location of the camera for each photograph taken.

With the completion of the rough sketch, the investigator is now free to collect and secure the evidence. When complete, the next step is to return to your office and prepare the final sketch.

**Final Sketch**
The purpose of the finished sketch is to give the investigator a clear picture of the crime scene. As is often the case, a year or more will pass before the matter reaches court. The sketch will serve to refresh the investigator’s memory as well as to preserve the scene so that if it became necessary, the scene could be reconstructed perfectly.

**Sketching Techniques and Hints**
Immediately following the photographing of the scene, the investigator should begin his or her sketch. The best starting point is usually to record room dimensions. Next, figure out the POE (point of entry). Begin the sketch from the investigator’s left, and fill in details in a clockwise fashion. Place all the windows and doors, then place the position of the furniture. The final task is to record the location of the physical evidence and assign each piece with a letter or number that is keyed to the legend. If the investigators, victims or witnesses have moved anything, ensure that these objects are returned to their original position before placing them in the sketch.

Never add or delete anything on the sketch once leaving the scene and place only important items on the sketch. Don’t trust your memory because it will fail with time.
Description of a good crime scene sketcher
A crime scene sketcher must be able to pay attention to detail, like to draw (although artistic skill is not mandatory), and enjoy math. A perfectionist who likes working with measurements, angles, graph paper, and diagrams are generally best suited for this position. They must also like to work with others and be stern enough to tell people not to touch or move anything until the sketch is finished!!

Evidence Collector
Collecting evidence and getting it back to the lab without contaminating it is vitally important to a case. Many cases have been “thrown out” due to the mishandling of evidence. That is why it is vital that you take every precaution not to contaminate the evidence by using proper packaging techniques.
First priority goes to the evidence that is being deteriorated by time or by the elements. This evidence is called transient evidence.
Collect the evidence in the order that is most logical and conserves movement.
Don’t move anything until it has been examined for trace evidence.
Package evidence so that it does not break, spoil, become lost, or contaminated!
Package items separately.
Paper or plastic? Always use paper to store evidence.
If it is wet, be sure to dry it properly before packaging (evidence can get moldy).
When sealing the package, be sure to tape it so that there can be no unauthorized access.
Always wear gloves at the crime scene.
Always use universal precautions! Wear latex gloves when handling blood, urine, or other bodily fluids. As a general rule, don’t touch any fluids that do not belong to you. Wash your hands when you get finished handling the evidence.
Use tweezers to pick up smaller items. Never touch anything with your bare hands.
Don’t overlook anything. Even a sunflower seed on the ground could be evidence (especially if it has been in someone’s mouth).
Description of a good evidence collector
An evidence collector must have a strong stomach and cannot be afraid of getting dirty. They must be very cognizant of their duties and not easily distracted. For example, they cannot get caught up in a conversation and forget to properly seal an envelop. The evidence collector needs good vision so that trace evidence can be collected rather than overlooked.

Note Taker
In this case and at this crime scene, the note taker has two jobs. The first job is taking notes over crime scene. Make notations over placement of objects, the position of the body, blood spatters, bugs or insects that are on the body, etc. Anything and everything is note-worthy.

The more detailed your notes are, the better off you are.

The notes taken will help to reconstruct the crime scene after it is longer available to you.

Notes should contain any of your own thoughts and any “memory joggers” that will help you remember the specifics about the case.

Be sure to work closely with the crime scene sketcher and the photographer so that nothing is missed.

Notes need to be typed up and placed in the file so that they do not get lost. They are a very important permanent record about the crime scene.

Description of a good note taker
A good note taker works and communicates well with others. They are very detailed in their writing and have a good command on the English language. Their handwriting needs to be legible and typing skills are a must. The note taker needs to be perceptive, intuitive, and logical in their thinking patterns.

The second job is that you will do is provide leadership for your team. You will be the one who assists the sketcher on double-checking measurements. You will be the one to question the photographer to make sure that all the evidence, strange marks, or footprints were photographed. Once the POE has been established, photographs have been taken, and notes have been written, it will be your responsibility to make sure that your evidence collector does a thorough and proper job. If asked, you will be the one who holds the envelope while the evidence is placed into it.
Qualities of a good leader

► delegates responsibility
► is not afraid to get his/her hands dirty
► is there to help, not take over
► has high expectations of his/her team members
► sets the standard or example for his/her team members
► takes responsibility for the quality of work of the members; takes the blame for poor work quality, passes the credit on to team members for a job well done
► is the first one there, last one to leave
Activity 1: Making/Placing Tent Cards

Crime Scene Investigation

During this activity you will make “tent cards” that can be used when you are photographing a crime scene. You will also properly place the tent cards and practice photographing a crime scene. For this activity your teacher will tell you how many tent cards to make. For real life crime scenes, or when completing crime scene reenactments, you will need as many tent cards as there is evidence to photograph.

The picture on page 13 shows tent cards and evidence that might be photographed at a crime scene.

Materials needed
- note cards—any size; lined or unlined (your teacher will tell you how many)
- permanent marker, such as a Sharpie
- camera (digital or film, optional)

Directions
1. Take a single note card in your hand and hold it vertically.
2. Fold it in half. If the note cards have lines, fold so that the lines are inside.
3. Stand the card up on a flat surface so that it looks like a small tent.
4. Take a marker and write the numeral 1 on the card. It needs to be big enough so that it is visible from a distance and can be seen in a photograph.
5. Follow these same steps and number the rest of the cards. You should have tent cards sequentially numbered from 1 to however many cards you have.

Placing tent cards at the crime scene
1. Since crime scenes are be worked from the outside in, place your first tent card next to the first piece of evidence (the evidence closest to the yellow tape).
2. Take a picture of the evidence with the tent card right beside it. Depending on your camera and your teacher’s instructions, take or pretend to take the picture.
3. Leave the evidence and the tent card. Do not pick up the tent card after you have taken the picture.
4. The second piece of evidence you come to, place tent card number “2” next to it, take a picture of it, and leave it there.
5. Work your way towards the center of the crime scene. Follow your teacher’s instructions about taking or pretending to take pictures, but do not touch the evidence.

Remember

Work the crime scene from the outside to the inside.

Never touch the evidence. If a crime scene involves a body, do not touch it. It is the property of the Medical Examiner.

Do not do cover up any evidence with your tent card.
Activity 2: Sealing the Evidence

During this activity you will make a paper bindle that can be used for the collection and preservation of small pieces of evidence. If you need help, ask your teacher for a sample with the folds marked on it.

**Materials needed**
- a piece of paper
- a pen
- piece of tape
- tweezers
- gloves

**Directions**
1. Take a plain white sheet of paper and fold it in half.
2. Take the folded paper and fold it again in thirds. (Fold left side in one-third, then fold right side in one-third on top of left.
3. Tape the loose edge down, vertically from top to bottom.
4. In the bottom section, there is now a pocket. You can then slip a piece of evidence into that pocket.
5. Fold the top portion of the envelope down about 1 inch to make a flap.
6. Tape the flap down, horizontally, leaving no loose edge without tape.
7. Label the bindle by listing the type of evidence it contains, your name, and the date.

This finished bindle was made from yellow paper so it could be seen. It shows what your finished bindle should look like.
8. Next, put the case number on the bindle. This is how you make the case number:

Write down today’s date without any dashes or slashes. For example, if today is November 21st, 2005, you would write: 112105; if it was January 3rd, you would write 010305.

Next, you must assign a number to it. If it were the first case of the day, it would be 01. If it were the fifth case you worked on November 21st, 2005, it would be 05.

112105-01 First case of the day
112105-02 Second case of the day
112105-03 Third case of the day

Follow the same principles when sealing larger envelopes. Nothing should be able to get in or out.

Remember

When sealing an envelope, be sure to do it in such a way that the tip of a pen cannot penetrate the envelope. Tape it along every edge so that nothing can get in or out of the envelope.
Activity 3: Sketching a Crime Scene

Crime Scene Investigation

During this activity, you will draw a rough draft sketch that will include a legend marking the details of the crime scene. Examples of sketches can be found on pages 20 – 22.

Background Information of the Crime

A murder was committed during the night. The victim was identified as a single, 32-year-old, male. His body was found lying on the floor of his office at 5:45 AM by the custodial staff. He was already dead; the body was cold and stiff. The room was a mess, as if a struggle had taken place. Soon afterwards, the medical examiner (ME) arrived and took the body back to the lab in order to perform an autopsy to determine the cause of death. Before he left, they outlined the position of the body with tape.

The report from the ME is conclusive. A blunt object fractured his skull. He had some bruising on his face; his arms and hands were also scratched.

None of the other items at the scene were disturbed after the body was discovered.

Materials needed
- pencil
- graph paper
- tape measure
- ruler
- clipboard or book (to write on)
- compass

Directions
1. Enter the room in groups of three. One CSI will be the sketcher; the other two will do the measuring.

2. Look around the room. What do you see that could be considered a piece of evidence? Make a mental note of where they are so that they will not be forgotten in the sketch.

3. Begin measuring and sketching. The sketcher must get information from the measurers before he or she can accurately draw the area. For this activity, one block on the graph paper equals one foot. For other crime scenes, you will have to set other scales.
4. Measure the length and the width of the room with the measuring tape. Find north, using a compass if necessary, and mark your sketch with the letter “N.” Find the location of all the doors and windows (escape routes) and place them respectively on the graph paper.

5. Make a legend. The legend should include shapes that represent objects inside the crime scene. Example: a square shape could represent a chair and a rectangular shape could represent a desk.

6. Draw a letter beside each piece of physical evidence and identify what each letter stands for on the sketch. For example: A = bloody paperweight  B = broken glass
Have this written out on your sketch or on a separate sheet of paper and attach it to your sketch.

7. The CSIs who are measuring should identify the location of objects in the crime scene. Locate two fixed points for each piece of evidence. Remember that fixed points should not be objects that are going to move around, such as a desk or chair. A good example of a fixed point is the northeast corner of the room and something that is permanently attached to the wall such as a light or pencil sharpener. You also want to choose fixed points that are in the closest proximity to the piece of physical evidence you want to record on your sketch. Keep in mind that it is OK to have different fixed points for each piece of physical evidence.

8. Measure the distances between the physical evidence and the two fixed points. Record your findings on the “Measurements for Physical Evidence” chart found on page 18.

9. Repeat the process with all pieces of physical evidence. if you need more charts, ask your teacher for another copy of page 19.

10. Next, working with your sketcher, draw dashed lines from the physical evidence to the fixed points. Write the distance above the dashed lines. Pull this information from the “Measurements of Physical Evidence” chart on pages 18 and 19.
11. Now you know how to do a rough sketch. If time allows, do a final sketch on a clean sheet of graph paper. For the final sketch, do the following:

- Use a black ink pen. Make straight lines by using a ruler.
- Draw everything in proportion (a paperweight should not be larger than a chair) and include a legend
- Put the names of all team members on the sketch

### Measurements of Physical Evidence

<table>
<thead>
<tr>
<th>Evidence description/name: <strong>paperweight</strong></th>
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<tbody>
<tr>
<td>What is Fixed Point 1? NE corner of room</td>
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<tr>
<td>Distance from Fixed Point 1 3 ft 6 in</td>
</tr>
<tr>
<td>What is Fixed Point 2? pencil sharpener</td>
</tr>
<tr>
<td>Distance from Fixed Point 2 5 ft 8 in</td>
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</tbody>
</table>

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<tr>
<th>Evidence description/name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is Fixed Point 1? NE corner of room</td>
</tr>
<tr>
<td>Distance from Fixed Point 1</td>
</tr>
<tr>
<td>What is Fixed Point 2?</td>
</tr>
<tr>
<td>Distance from Fixed Point 2</td>
</tr>
</tbody>
</table>

Length of room ______________________________________________________

Width of room _______________________________________________________
## Activity 3: Sketching a Crime Scene (continued)

### Crime Scene Investigation

<table>
<thead>
<tr>
<th>Evidence description/name:</th>
<th>What is Fixed Point 1?</th>
<th>Distance from Fixed Point 1</th>
<th>What is Fixed Point 2?</th>
<th>Distance from Fixed Point 2</th>
</tr>
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<tbody>
<tr>
<td>Evidence description/name:</td>
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Length of room ________________________________

Width of room ________________________________
A fixed point can be anything in the crime scene that won’t move, such as:

- a corner of a room
- a vent
- a safe
- a window
Activity 3: Sketching a Crime Scene (continued)

Labeling and Orienting the Rough Sketch

Do Not Cross Police Line  Do Not Cross Police
Day 2

Activity 3: Sketching a Crime Scene (continued)

Crime Scene Investigation

Finished Product

A: Three-hole punch
B: Earring
C: Note
D: Body
E: Desk
F: Chair
G: Safe
H: Table
I: Chairs
J: Plant
K: Outlet

The room measures 24 feet X 17 feet