



<p><b>Description</b></p> <p>Do you have what it takes to be a Tech Detective? Juniors and Cadettes will begin by practicing the art of forensic drawing by sketching a “suspect” as described by a “key witness.” Next, they learn how to obtain and analyze fingerprints from a crime scene. Finally, participants explore the role of DNA in forensics — what it is, what it does and how it helps solve crimes. They then get to perform an experiment to extract real DNA!</p>		
<p><b>Grade Level</b></p> <p>4-8 Juniors and Cadettes</p>	<p><b>Badge Program Outcomes</b></p> <p>Participants will:</p> <ul style="list-style-type: none"> <li>• Sketch a potential “Suspect” based off an “eye-witness” account.</li> <li>• Describe the importance of DNA to a criminal investigation and extract their own DNA.</li> <li>• Identify and detect eight different fingerprint patterns.</li> </ul>	<p><b>Girl Scout Badge Connections</b></p> <p>Special Agent Badge, <i>It’s Your Planet-Love It! Cadette Journey</i></p> <ul style="list-style-type: none"> <li>• Step 5: Practice the Art of Detection (Sketch a “suspect”).</li> <li>• Step 3: Try the Science (Forensic Chemistry).</li> <li>• Step 1: Investigate Investigation (Host an “Identify Crisis” party).</li> </ul>
<p><b>Duration</b></p> <p>2 hours</p>		

**Vocabulary**

*Familiarity with these terms and concepts will enhance students’ experience in the activity.*

- **Accidental whorl:** Ridges that form two separate fingerprint patterns on one finger.
- **Cell:** The basic structural unit of all organisms.
- **Central pocket loop:** Ridges that form a spiral like pattern with a central “pocket” or circle at the center of the print.
- **DNA (deoxyribonucleic acid):** The genetic material of living organisms, located in the chromosomes of each cell; the “blueprint” or “recipe” for life.
- **Double loop whorl:** Ridges that form an “s” shape of two distinct loop shapes.
- **Fingerprint:** Impression left by the ridges of one’s fingers.
- **Gene:** The basic physical unit of heredity.
- **Nucleus:** A large membrane-bound structure within a living cell, containing the cell’s hereditary material and controlling its metabolism, growth and reproduction.
- **Plain arch:** An even flow of ridges from one side of a finger to the other with a small rise or wave in the middle.
- **Plain whorl:** Ridges that flow in a concentric circular pattern forming a target like shape.
- **Radial loop:** Ridges that flow in a loop pattern beginning on the pinky side of the finger looping towards the thumb side of the finger.
- **Tented arch:** An even flow of ridges from one side of a finger to the other with a prominent rise or pinched wave in the middle.
- **Trait:** A genetically determined characteristic or condition, like hair-color, dimples or sex.
- **Ulnar loop:** Ridges that flow in a loop pattern beginning on the thumb side of the finger looping towards the pinky side of the finger.



### Post-Visit Activities

This lab only covers Steps 1, 3, and 5 of the Special Agent Badge. **To complete this badge, Steps 2 and 4 must be completed separately.** Below are some resources to help troop leaders complete the Special Agent Badge with their Scouts. You may also find additional resources and activities in the Cadette Badge booklet: Special Agent.

#### Step 2: Reveal Reality

*Try the eyewitness challenge:* Arrange to have someone run through your troop meeting, grab something, and run out. The person should not have too many distinguishing characteristics; he or she should look like they are trying to blend in. After the person has run through the meeting, wait about 10 minutes and then ask the girls to write down everything they remember about the person. They should then compare notes and see how accurate their “eyewitness” account was and how it compared to someone else’s. Here are some other links and videos for more information on accuracy of eyewitness reports, forensic science and the importance of observation skills.

- The following webpage offers a great deal of information on the many branches of forensic science. There is also a section with an activity that focuses on how to be a good eyewitness. <http://sciencespot.net/Pages/classforsci.html#crimescene>
- The following article gives some additional information on why eyewitness accounts are not very reliable. <http://www.howstuffworks.com/eyewitnesses-unreliable.htm>
- The following videos offer some tests to see how well the viewer pays attention and makes observations. [http://www.youtube.com/watch?v=IGQmdoK\\_ZfY](http://www.youtube.com/watch?v=IGQmdoK_ZfY)  
<http://www.youtube.com/watch?v=YcTgjR5iV1Y>

#### Step 4: Key into Body Language

*Check out voice analysis:* A person’s voice is just as unique as their fingerprint. Forensic analysts can use computer programs to identify and confirm a person’s voice, detect if they are lying, determine their mood or circumstances, and much more. Here are some links to learn more about forensic voice analysis and how it has been used to solve important crimes. After reading up about forensic voice analysis, try recording a conversation between several friends and see if you can recognize their voices and tell what their mood was at the time of the conversation.

- This website offers a more in-depth look at forensic voice and audio analysis. There is also a look at the importance of audio analysis in major crimes such as the Watergate scandal. <http://www.soundonsound.com/sos/jan10/articles/forensics.htm>
- This article from Scientific American discusses the reliability and science behind voice recognition and analysis used in criminal proceedings. It also includes some of the science behind how voice recognition software works and why it is and isn’t beneficial in an investigation. <https://www.scientificamerican.com/article/voice-analysis-should-be-used-with-caution-in-court/?redirect=1>
- This site provides a comprehensive overview of the science and applications behind forensic audio and video analysis. The site also includes other tutorials on many other forensic investigation techniques and science concepts. <http://www.forensicsciencesimplified.org/av/index.htm>