



Description

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!

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| <p>Grade Level 4-8 Juniors and Cadettes</p> | <p>Badge Program Outcomes Participants will:</p> <ul style="list-style-type: none"> • Practice their observation skills and examine puzzles logically. • Examine and identify their own fingerprints and analyze and categorize fingerprints by their patterns. | <p>Girl Scout Badge Connections Detective Badge, <i>It’s Your Journey – Love It!</i></p> <ul style="list-style-type: none"> • Step 1: Practice the power of observation (Powers of Observation). • Step 3: Fingerprint for Fun (Fingerprint Science). • Step 4: Try out Detective Science (DNA Spooling). |
| <p>Duration 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:** The impression left by ridges on the human finger.
- **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.
- **Observation:** The act of perceiving or noticing.
- **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 4 of the Detective Badge. To complete this badge, Steps 2 and 5 will need to be completed separately. Below are some resources to help troop leaders to complete the Detective badge with their troop. You may also find additional resources and activities in the Junior Badge Booklet: Detective.

Step 2: Communicate in Code

Learn to communicate in Morse code. Using the key on the next page, girls can learn to write secret messages to their friends using Morse code. Below you will also find useful and interesting links about Morse code and other secret modes of communication.

- This article by the History Channel gives a great overview and history of Morse code and the telegraph. <http://www.history.com/topics/inventions/telegraph>
- This article by the History Channel highlights the importance of coded messages during war-time, particularly focusing on the Choctaw indigenous people in World War I. <http://www.history.com/news/world-war-is-native-american-code-talkers>
- This activity by Scientific American gives background information on Caesar ciphers as well as instructions for making your own Caesar cipher. There are also additional links to other types of cryptography and how to use them! <https://www.scientificamerican.com/article/crack-the-code-make-a-caesar-cipher/>

Step 5: Follow the clues to solve a real mystery!

Solve a cyber-mystery down in The Tech's Cyber Detectives exhibit. Learn all the skills necessary for protecting cyber data at the available training stations. Then put your cyber sleuthing skills to the test in one of the mission rooms to protect the ACME Recycling Company from cyber sabotage!

- PBS Kids CSI-mysteries. This site has three short games that are CSI-themed and kid-friendly. Follow the clues to solve the mysteries presented in Hat Snatcher, Tugboat Thug and Squeak Sneak. <http://pbskids.org/fetch/games/index.html>
- Interview a real CSI agent! This site has a Q and A interview with a real forensic expert in the field of forensic archaeology. She gives a lot of great information on what it's really like in the field of forensics and what you need to do to pursue forensics as a career. <http://www.planet-science.com/categories/over-11s/careers/2010/09/real-life-csi-abi-carter.aspx>



International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A ● ■
 B ■ ● ● ●
 C ■ ● ■ ●
 D ■ ● ●
 E ●
 F ● ● ■ ●
 G ■ ■ ●
 H ● ● ● ●
 I ● ●
 J ● ■ ■ ■
 K ■ ● ■
 L ● ■ ● ●
 M ■ ■
 N ■ ●
 O ■ ■ ■
 P ● ■ ■ ●
 Q ■ ■ ● ■
 R ● ■ ●
 S ● ● ●
 T ■

U ● ● ■
 V ● ● ● ■
 W ● ■ ■
 X ■ ● ● ■
 Y ■ ● ■ ■
 Z ■ ■ ● ●

1 ● ■ ■ ■ ■
 2 ● ● ■ ■ ■
 3 ● ● ● ■ ■
 4 ● ● ● ● ■
 5 ● ● ● ● ●
 6 ■ ● ● ● ●
 7 ■ ■ ● ● ●
 8 ■ ■ ■ ● ●
 9 ■ ■ ■ ■ ●
 0 ■ ■ ■ ■ ■