Activity: Forensics Clues

Grades: 2-8  
Concepts: forensic biologist, DNA profiling, fingerprint  
Length: 45 minutes  
Materials: pencil, paper, tape, and a ruler

Background Information:
What is a fingerprint?
A fingerprint is a trace from a human finger left on an object. The finger has small structures similar to mountains and valleys. These are unique to every person, and they can be used to identify people. There are many ways to identify a person’s fingerprint and forensic scientists use these techniques to identify a person. Once the fingerprints are taken and labeled, forensic scientists classify them. The three basic patterns are the whorl, arch, and loop. There are many more, but these are a good start for this activity!

![](https://www.cyberbee.com/whodunnit/classify.html)

Learn more about fingerprints by watching this video:
[https://thekidshouldseethis.com/post/fingerprint-science](https://thekidshouldseethis.com/post/fingerprint-science)

What is DNA profiling?
DNA profiling is used to identify a person’s DNA characteristics. It is the process where a DNA pattern, or a profile, is obtained from a person or sample of bodily tissue. Although we are all different, our DNA is actually identical to other people’s, but we have polymorphisms that we inherit from our parents that makes us unique. Differences in our polymorphisms gives us a unique combination of DNA that can be analyzed for a DNA profile. These DNA profiles can be used to identify the origin of a sample at a crime scene.

How does a forensic biologist solve crimes using evidence?
Who uses fingerprints and DNA profiling to solve crimes? Forensic biologists! Forensic biologists use DNA and other evidence from a crime scene to identify the culprit. They use DNA because it is the most important evidence a scientist can collect at a crime scene since it has the most potential to be irrefutable, unbiased evidence. Identifying and implementing DNA has five steps: isolation, quantification, polymerase chain reaction (PCR), short tandem polymerase chain reaction (STR-PCR), and interpretation. PCR takes the isolation of DNA from anything else and replicates it to make a larger sample. Then, STR-PCR takes it again a replicates parts of the DNA to help interpret the DNA profile of a person. This process can take up to 5-10 days! Keep learning using the link:
[www.environmentalscience.org/career/forensic-biologist](http://www.environmentalscience.org/career/forensic-biologist)
Think about what else could be considered as evidence at a crime scene? Where could a forensic biologist get DNA evidence from a crime scene? How are your fingerprints different from other family members?

**Activity:**
*Start by reading* through the Background Information.

**What's the Problem:** Today you will take your fingerprint like evidence at a crime scene.

**Set up your lab:** Just like a forensic biologist, you need to set up your lab with two pieces of paper, a pencil, and tape. Set this out on the table and sketch out a very dark rectangle on your first piece of paper. This will be for taking your fingerprint.

**Take your print:** Now that you have your lab set up, you can start taking your prints. Press your finger into the dark rectangle until it covers the top part of your finger. Take a piece of tape and press it onto your finger again. Peel off the piece of tape and place it down on the other piece of paper. Label the fingerprint with which finger it was taken from. Do this for all ten fingers. You can do this again for everyone in your family.

**Examine your sample:** Once you are done taking your fingerprint, you can classify each of your fingerprints using the examples shown on the first page for each print that you took. What are the differences? Are your fingerprints all the same? Do you notice any patterns? Can you find the forks and dead ends on your finger prints?

**Make it Better:** Have a family member make another fingerprint for comparison without telling you what finger it is. Use this as your evidence. Can you figure out what finger it is and who it belongs to?

**Going Deeper:** Forensic biologists can also use foot prints to help them figure out who the person is. Try tracing a foot on a piece of paper. Then, measure the footprint and multiply by 100 and divide by 15 to get the person’s height. Is it close? What other things do you think you could use?

**Definitions**
- **DNA Profiling:** the process of identifying an individual’s DNA characteristics
- **Evidence:** a set of facts or information that indicates if a belief is true
- **Replicate:** to make a copy of something
- **Sample:** a small part of something that is supposed to help show the whole of something

**Reading and Resources:**

**Books and Articles**
- *Officer Panda: Fingerprint Detective* by Ashley Crowley
- *CSI Expert! Science for Kids* by Karen Schulz
- *What Floats? What Sinks?: A Look at Density* by Jennifer Boothroyd
- *Fingerprint Evidence* by Emily Sohn
  
  [www.sciencenewsforstudents.org/article/fingerprint-evidence](http://www.sciencenewsforstudents.org/article/fingerprint-evidence)

**Videos**
- DragonflyTV Kids Do Science- Forensics
  [www.youtube.com/watch?v=0FS_eT5PR1Q](https://www.youtube.com/watch?v=0FS_eT5PR1Q)
- See Your Own Fingerprints!
  [www.youtube.com/watch?v=cZKGpq_fttw](https://www.youtube.com/watch?v=cZKGpq_fttw)
- The Real Science of Forensics
  [www.youtube.com/watch?v=h3-Pj-zbEq8](https://www.youtube.com/watch?v=h3-Pj-zbEq8)
- Fingerprint Facts for Kids
  [https://kids.kiddle.co/Fingerprint](https://kids.kiddle.co/Fingerprint)

Check out more great resources at [www.isek.iastate.edu](http://www.isek.iastate.edu)!

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