Fingerprinting
Primary Audience: Any

Video: Watch the video, COSI Workshop: Fingerprinting

Introduction: Forensics is the use of science and technology to investigate and establish facts, especially in criminal and civil courts of law. Forensic scientists study the evidence from crime scenes to find out “Whodunit?” Forensics involves many branches of science, including:

- Anthropology—remains of bodies, especially skeletons
- Ballistics—evidence from weapons
- Botany—qualities of plants, seeds and pollen
- Chemistry—analysis of unknown substances
- Dactylography—fingerprints, palm prints and footprints
- Entomology—presence and effects of insects, especially during decomposition
- Genetics—DNA code and family genealogy
- Geology—qualities of the soil, rocks and earth
- Pathology—autopsies and other post-mortem examinations
- Phonetics—speech and writing style
- Psychological Profiling—mental characteristics of suspects
- Toxicology—poisons and other harmful substances

The influence of popular movies and television series might give you the idea that forensic scientists are experts in all areas of science and spend most of their time investigating murder and other high-profile crimes. However, many investigations involve robbery, assault and drunk driving, and each scientist brings their own expertise from their own branch of science. In this activity, learn how fingerprints are analyzed by forensic scientists!

Materials:
- Two pieces of paper and a pencil
- Washable markers
- Ruler
- Paper towel or wipes for cleanup
- Your fingers
- Optional: Magnifying glass

Instructions:
1. Using the ruler, draw ten boxes on one piece of paper. Label each box with the name of each finger; left thumb, left index, etc.
2. On the other piece of paper, draw a large ink dot with a marker. While the ink is
still wet, lightly roll your finger in one direction across the ink spot. Do not rub or roll the finger back and forth or you will not get a readable print. Carefully roll your inked finger in the same direction into the appropriately labeled box on the other piece of paper.

a. You may need a few practice rolls! It may be easier to roll finger away from your body and thumbs toward your body.

3. Repeat for each finger and thumb.

4. Analyze your fingerprints – can you find a loop, a whorl, or an arch? If possible, compare to someone else’s fingerprints. How are they similar? How are they different? Try using the ruler to measure each fingerprint.

![Fingerprints](image.png)

**Figure 1: Image from the Oregon Museum of Science and Industry**

**What’s going on?**
Take a look at the skin on your fingertips (if possible, use a magnifying glass). The lines or ridges on your fingers, toes, palms and soles of your feet help you grip things and provide traction on slippery surfaces. These ridges pick up oil, dirt and dust. When you touch something, you leave a mark behind called a fingerprint. We are born with our own unique fingerprints: ridge patterns that will never change.

There are three general patterns of fingerprints: loop, whorl, and arch. A loop has ridges that come in on one side of the finger, make a sharp curve and exit out the same side. A whorl swirls around in circles. An arch enters on one side, rises and lowers in the middle and exits out the opposite side. Loops are most common, followed by whorls and arches.

Dactylographers analyze fingerprints left behind at a crime scene. The prints are dusted with powder and transferred to transparent tape. The prints are analyzed and compared to prints in a database or collected from suspects.

**Interactive Questions**: Look around the room. Where do you leave fingerprints? What surfaces do you think pick up fingerprints better than others?

**Additional Resources**: Reach out to the COSI Department of Science Content if you have any questions or comments!