

Finding Fingerprints

We're tracking Agent Ennui to her meeting with B.O.R.E.D. but we need to know if she's been sneaking around the Motley Mission Control Headquarters. In this Motley Mission, we're going to practice taking fingerprints from another agent, and then try to find some hidden around the house!

Fingerprints are unique to each person!

Even identical twins have slightly different fingerprints from each other. However, relatives often have similar fingerprint characteristics.

Take the fingerprints from each finger on your hand and then ask your Responsible Adult if you can take their fingerprints and compare them with your own!

People who use science to solve crimes are called *forensic scientists*, and they need a lot of training to do their job well.

The science of identifying fingerprints is called *dactyloscopy*!

Taking Exemplar Fingerprints



We are taking exemplar fingerprints in this section, which are fingerprints that you can use to compare with latent or found fingerprints. The word exemplar comes from the same root as the word example!

Exemplar fingerprints are usually taken to keep on file for comparison with unknown fingerprints in the future. They are stored with identifying information about the person whose fingerprints they are.

You will need:

- ♥ A soft pencil (a #2 or HB pencil will work fine)
- ♥ A Fingerprinting Card (you can use a regular index card)
- ♥ A piece of scrap paper to make your printing pad (use printer paper, not construction paper)
- ♥ Transparent tape (glossy is best!)
- ♥ Scissors for cutting tape
- ♥ Someone to fingerprint (maybe several someones)



Make your "ink pad": Use your pencil on your scrap paper to scribble a really dark spot that's about an inch on a side. You don't have to push too hard – just keep scribbling. You're trying to lay down a thick layer of graphite, which is what makes the pencil write.

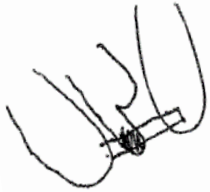
Real forensic scientists use a fingerprinting pad with special ink or a digital system that scans fingerprints into a computer!

Ink your subject's fingers: Have them rub their fingers gently over your ink pad until the whole finger is covered in graphite dust. Take one finger at a time. You may need to refresh your dark spot by scribbling in between fingers!



Tape lift your fingerprints

Take the finger you are printing and place a clean piece of transparent tape over it (be careful! Your fingers will also leave prints on the tape!)



Lift the tape up carefully and then place it on your Fingerprint Card. You should see a pattern of swirls and loops. Cut off extra tape if you need to.

Label the finger that the fingerprint is from in pen so you remember later!

Wash your hands! Graphite dust can be messy but it comes off with soap and water!

Fingerprinting in a police station or lab is done with an ink pad instead of tape and graphite, and prints are "rolled" from one side of a finger to the other to get the whole finger.

What do I do with my fingerprints?

Fingerprints contain certain patterns that can be used to describe them in general terms:



Arches look like hills



Loops look like an arch that goes back a little bit



Whorls look like swirls

There are lots of other smaller features of fingerprints, too! What can you see in your fingerprint? Use your magnifying glass to make it larger!

Fingerprint Comparisons

Not so long ago, fingerprint cards were filed in a cabinet, and when detectives needed to compare a fingerprint they had to take each card out and compare it with the fingerprint they were looking at.

To make this easier, classification systems were developed that described the features of different fingerprints. That meant you didn't have to look through quite as many fingerprints, but it was still very time consuming — a new fingerprint card takes about an hour or so to classify correctly by hand!

Computers are a super help for forensic scientists because they can compare prints very quickly, but it can still take more than an hour for the computer to complete a search!

Finding Latent Fingerprints

You can find patent fingerprints just by looking — if you touch something and leave a mark behind. If you didn't wash your hands after taking your fingerprints you may leave some patent fingerprints behind. Another way to see prints like this is by making an impression of your print. If you have some modeling clay, you can make fingerprints in that — ancient ceramics and pottery will sometimes have fingerprints on them from the potter's hands that are thousands of years old!

We are taking latent fingerprints in this mission, which are fingerprints that are left behind in the environment. These fingerprints are left behind because your skin has oils on it that help keep your skin soft, and when you touch something those oils are left behind. A lightweight powder will stick to the oils, giving you a fingerprint!

Fingerprinting is a tricky skill, so we're going to use some hand lotion (any skin safe oil will work in a pinch) to increase the amount of oil on our hands and leave better latent prints.

You will need:

- ♥ A soft brush (we are using a kabuki brush, but a fluffy blush brush works well)
- ♥ Fingerprinting powder
 - for light fingerprints, use baby powder or corn starch (our Craftables Kit contains corn starch)
 - for dark fingerprints, use cocoa powder
- ♥ A Fingerprinting Card that contrasts with your fingerprinting powder
 - for light fingerprints, use a dark grey or black card or construction paper
 - for dark fingerprints, you can use white
- ♥ Transparent tape (shiny is best)
- ♥ Hand lotion (or a skin friendly oil)

Leave some Latents

You or your target should make sure your hands are well-moisturized with lotion. This helps make better prints to find!



Think about things you touch every day — door handles, cups and glasses, even walls! The best prints are found on smooth, non-porous surfaces (remember we want to leave the oils behind, not soak them up), but forensic scientists can take prints from bedsheets, notepads, and wood using chemical techniques!

Try to touch things without pushing hard or wiggling your fingers.

- ♥ Pick up a glass like you're drinking from it and put it down (lipstick or lip balm can leave lip prints on a glass when you drink, which can also help to identify you)
- ♥ Turn the doorknob like you're leaving

- ♥ Put your hand on the wall or the stair railing to balance yourself
- ♥ Put your hand on a window like you're looking out for trouble

Don't try to get fingerprints from your computer keyboard — it can be done, but dust and powders are not good for computers, so we don't want to break anything today!

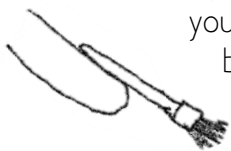
Looking at Latents

If you had a Responsible Adult or another agent make the fingerprints for you, then you'll have to find the likely spots to look for prints before you cover the whole house in fingerprint powder! Remember: look for smooth, hard places that people would touch frequently.

Use your magnifying glass to look for smudges or suspicious areas.

Dust up and Lift

- ♥ Use your brush to pick up some fingerprint powder and tap it to sprinkle the powder over your fingerprint site. Don't put too much on! We want the powder to stick to the oils left behind by your finger.



- ♥ Blow very gently on the powder to get rid of the loose extra (don't breathe in! Coughing on fingerprints is no good!)

- ♥ IF YOU NEED TO: Use your brush to gently get rid of a little more powder. Don't swipe or swirl — remember you want the powder to stick to the oils, so if you push the oils around you'll ruin your fingerprint. Use a gentle dabbing motion one or two times to pick up the extra powder.
- ♥ Take a piece of transparent tape (make it long enough that you won't get your fingerprints in the way) and lay it over the powdered print.
- ♥ Lift it up carefully and put it on your fingerprint card!



Forensic scientists sometimes use magnetic powders with a magnetic wand to avoid touching prints at all. They can also use a process called "fuming" to attach a chemical called cyanoacrylate (we know it as Super Glue) to fingerprints, or use other chemicals that react with the oils and amino acids in fingerprints and make them visible.

Flawed Fingerprints

Not getting the prints you want? Fingerprinting is a very delicate science so don't lose hope!

- ♥ Remember to use a gentle dabbing motion to pick up the extra powder.
- ♥ Forensic scientists often only get "partials," which are parts of a fingerprint. Sometimes this is enough to match, and sometimes it's not.
- ♥ Experiment with your powder — use less or more
- ♥ Make sure your brush is soft — stiff bristles will ruin your print
- ♥ Try a different hand lotion
- ♥ Don't push on your tape — just lay it down gently.