

Figuring Out Fingerprints (Superglue Fuming)

Sections



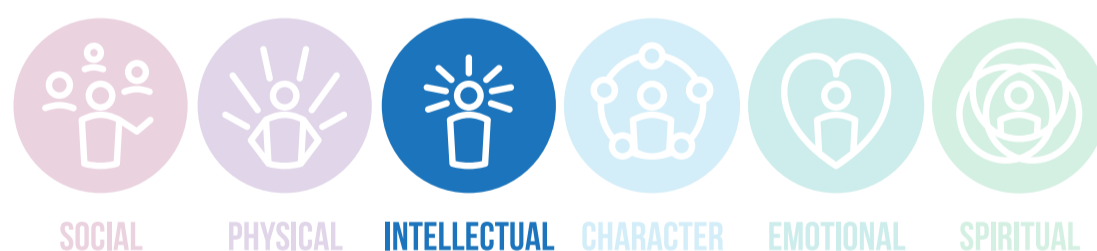
Challenge Areas



Scout Method Elements



SPICES Growth Areas



The Adventure

Take a dive into the world of forensic science and learn about fingerprint analysis.

Plan

1. Investigate fingerprint analysis, what it is and what are some of the underlying principles. Why can they be used to assist investigation of crimes? There is lots of information available on fingerprinting but you may like to start here: <https://www.azolifesciences.com/article/Fingerprint-Analysis-in-Forensic-Science.aspx#:~:text=Analyzing%20fingerprints%20left%20at%20the,%2C%20parole%2C%20and%20other%20details.>
2. Investigate types of fingerprints and how they can be collected.
3. Investigate methods of collecting reference (known) fingerprints and fingerprint rolling.
4. Investigate why latent fingerprints (fingerprints which are invisible to the naked eye) are left on surfaces and if/how the surface affects the fingerprint.
5. Investigate the components of superglue and how it can be used for fingerprinting.
6. Read the safety information and discuss with your leaders or another appropriate adult what safety equipment, precautions, and supervision may be required. Ensure that you have these safety measures in place before starting the 'Do' section.
7. Gather all the equipment that you need to make your fingerprint analysis experience. You will need the following equipment: superglue that contains cyanoacrylate, ink, paper with names of individuals providing reference prints, a non-porous and non-white surface for collecting the suspect print, a large bowl, boiling water, aluminium foil, and a small bowl.

Do

1. Get a leader or another patrol, which you can then swap with, to assemble a set of reference (known) fingerprints from a set of individuals and a suspect (unknown) print that matches a reference fingerprint. The reference prints should be visible (ideally taken using ink) whilst the suspect print should be a latent print and may be on any surface. The developed print will be white so black paper or a pen lid work well. The suspect print will develop best if it is fresh and oily. You may wish to run your hands through your hair or rub some moisturiser into them prior to depositing the print. You should not know which individual the suspect print belongs to, however, the person compiling the prints should.
2. Make sure that the ingredients of your superglue include cyanoacrylate, and ensure that you are using a previously unopened tube. If the tube has been opened, it should be less than a month since this was done.
3. Half fill a large bowl with boiling water and cover with a sheet of aluminium foil. Make sure that foil is tight across the top of the bowl.
4. Place the surface with the suspect fingerprint on top of the foiled container.
5. Add a few (approximately 5) drops of superglue to the foil next to the surface with the suspect fingerprint.
6. Create a miniature fuming cupboard by placing a small bowl upside down over the superglue and the surface with the suspect fingerprint. Once the superglue has been added, you should work quickly to minimise the loss of superglue fumes.
7. Allow the print to sit in the fuming cupboard for about 15 minutes, checking the progress of the print's development every 5 or so minutes by carefully lifting the bowl. Continue covering the print until it has developed.
8. Compare the suspect print to the reference sample and determine the individual that the suspect print came from. Try to identify the type of pattern and at least 5 points of minutiae.

Review

1. Were you able to correctly match the suspect fingerprint with the corresponding reference print? Why or why not?
2. Did the print develop as you expected it to?
3. What could you do that you think would improve the visualisation of the fingerprint? Do you think fuming the print for more or less time would help?
4. What did you enjoy most about fuming a fingerprint? What did you learn?
5. Do you think the surface that the fingerprint is deposited onto will affect the result? Why or why not?

Safety

- Superglue and this technique use cyanoacrylate, which is toxic. Make sure to use it in well-ventilated areas and avoid accidental inhalation.
- Superglue bonds and there is the risk that you could stick your fingers together. Superglue can be softened with a solvent such as acetone, which can be found in many nail polish removers.
- Superglue reacts strongly with some materials such as cotton and wool. It can also burn skin. Handle with care.
- This method uses boiling water. Take care when pouring to avoid burns and splashing. You may need an adult or older youth member to assist you with this.
- The bowl that forms the fuming cupboard will end up coated in a thin layer of superglue. As such, ensure that this bowl is no longer used for food.

Variations

- This challenge card can pair well with other forensic science-based challenge cards such as other challenge cards in the 'Figuring Out Fingerprints' series, Who Wrote It? Paper Chromatography, and Soil pH Testing, to create a forensics program or a 'Whodunit' night.
- The internet provides a range of different examples of homemade fuming cupboards. You may wish to look at these different methods to see which is most effective.
- Depending on the section, you can increase the difficulty of this activity by changing the number of reference fingerprints or changing the requirement of a successful match – i.e. if the youth need to just identify the individual or which finger it came from.
- Depending on the section and challenge area used, this challenge card can also be paired with a police station visit or some other law enforcement related community involvement.