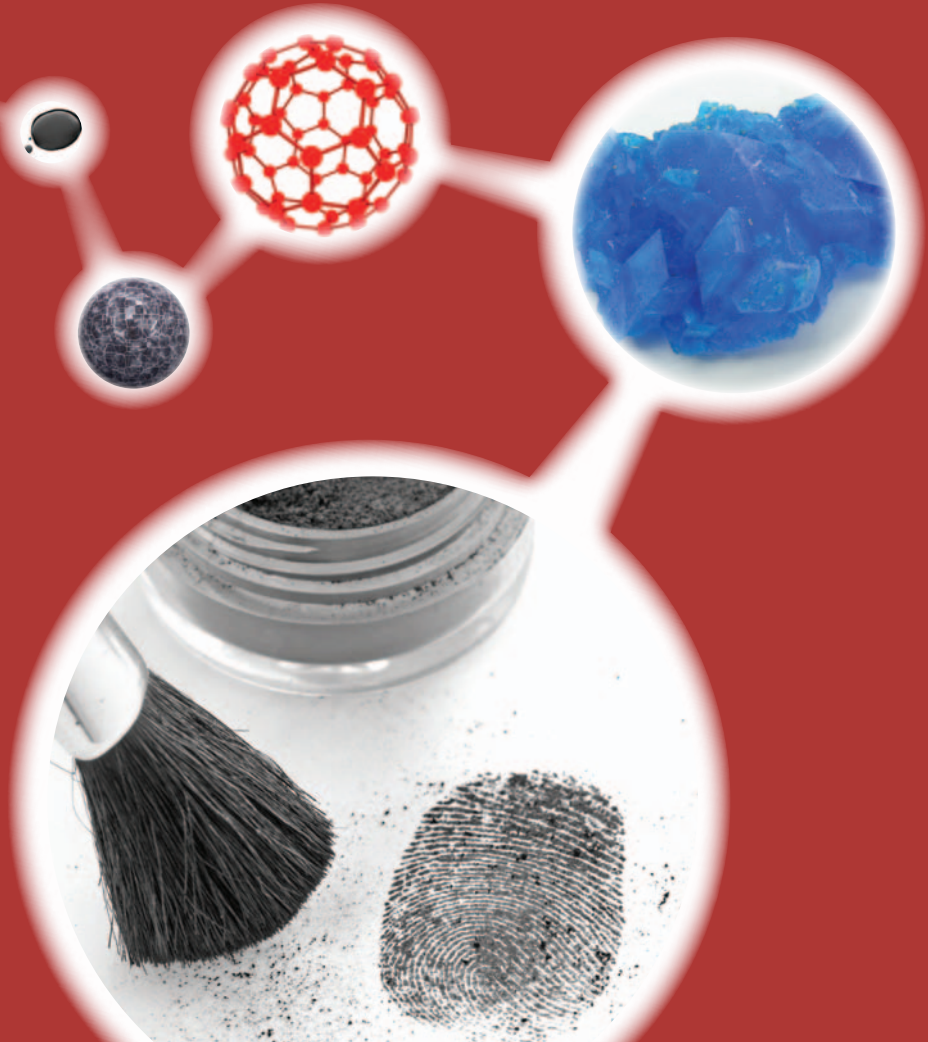


The silver fingerprint



Apparatus and chemicals

Sheets of unlined white paper, cut into 3cm squares. Use gloved hands to avoid placing fingerprints on these blanks.

Aqueous silver nitrate solution [2.5g in 44 cm³ distilled water]

Spray bottles

Tweezers to handle papers

Gloves; silver nitrate solution can stain the skin [as well as indentify latent prints!]

OCR Nationals Level 2 Science Unit 3

Gateway Science Suite Chemistry C6 'Chemistry out there'

Twenty First Century Science Suite Chemistry C5.2 [15]


The commonest and simplest procedure for revealing prints is powder dusting, which relies on the mechanical adherence of dusting powder particles to the moisture and oily deposits from the skin. This procedure is fine for fresh prints, but as time goes by the moisture content falls and the effectiveness of this procedure becomes less.

Ninhydrin reagent may be used to develop old prints as this reagent reacts with the amino acids left behind. Ninhydrin is toxic and the spray can be hazardous.

However, another reagent may be used for developing latent prints: Silver nitrate solution. It reacts with the sodium chloride in sweat in a simple ionic reaction, and silver chloride is formed. On exposure to sunlight this decomposes into finely divided black metallic silver, depositing on the contact ridges and so making the print visible.

Procedure:

- 1 Take one of the paper squares and make a thumb print by first rubbing the thumb against your forehead to pick up sweat, and then transfer the print to the paper by rolling the thumb carefully until the whole print is made. Lift the thumb quickly off the paper to avoid smudging the print.


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- 2 Place the square on a protected surface and spray with the silver nitrate solution from a distant of 15 cm.
- 3 Allow this to dry and expose to bright sunlight. The print will become visible in about 15 minutes.
- 4 Once developed, the print may be scanned and filed. The image may then be expanded and different features identified. For example, the patterns formed by fingerprints fall into three well-defined categories: arches, loops and whorls (fig. 1) and other features include those shown in fig. 2.

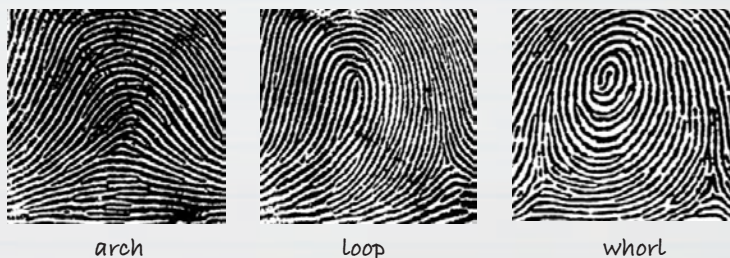


Figure 1

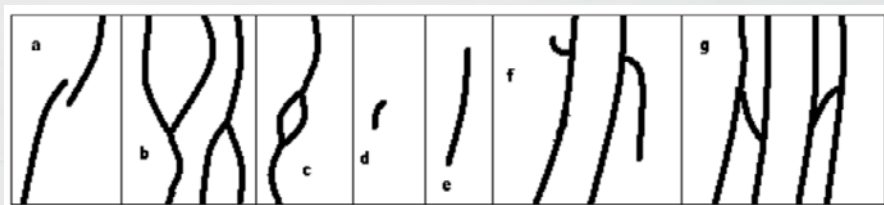
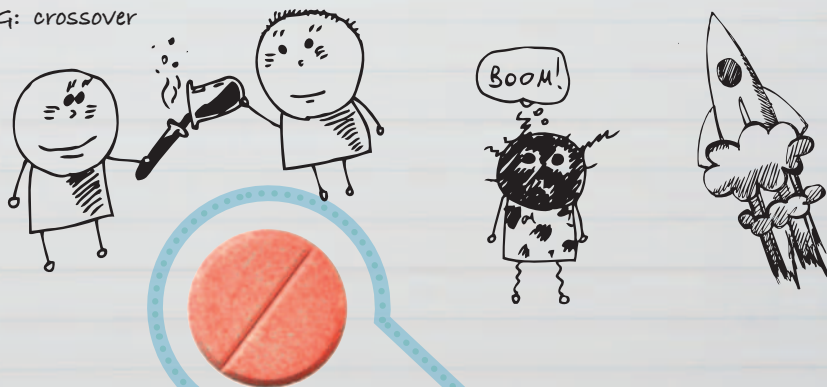


Figure 2

- A: ridge termination
- B: fork
- C: lake
- D: island
- E: short independent ridge
- F: hook
- G: crossover



Extensions and questions

Each member of the group makes another fingerprint, which is then given to their teacher. The teacher collates the fingerprints and selects one (known only to the them). The collated fingerprints and the one selected fingerprint are given back to the group. The group then have to identify whose fingerprint they have been given.

Make a print and place it in a paper envelope for a week [or longer] and examine whether the print is still detectable after that time.

Examine whether it is possible to use this procedure on other surfaces, such as plastic credit cards.