Dusting For Fingerprints

Topic

Detecting prints on various surfaces

Introduction

In section 3 you learned that the ridges and valleys on the ends of our fingers (the side opposite the finger nail) make up a unique fingerprint pattern. We leave traces of fingerprint patterns on everything we touch. You can see this pattern as a three-dimensional imprint in wet glue or paint, but more usually as a two-dimensional trace on the surfaces of things we touch. If our fingers are covered in substances such as paint or blood, these two-dimensional prints are visible. More often, the prints are invisible, or latent; we can only see them if something is done to make them visible. Latent prints are made because the human body releases perspiration and oil, which coat the skin. Perspiration, consisting of water and salt, leaves the body through pores on the ridges of fingerprints. Oil is released from sebaceous glands under the skin and moves up to the skin's surface. These substances mark surfaces with which they come into contact, leaving a fingerprint. Scientists have developed several methods to make latent prints visible; the method used depends on the surface on which the print is found. In this experiment, you will use the traditional powder method. In the first part of the experiment, you will consider the circumstances in which fingers make the most easily visible fingerprints. In the second part of the experiment, you will discover which of a range of different surface textures displays the best fingerprint patterns.

Time required

Part A: 20 minutes
Part B: 30 minutes (depending on the number of surfaces tested)

Materials

For Part A:
shiny dark surface such as a plastic plate or a laminated book cover
newspaper to protect surfaces
dust cloth
200 g talcum powder in shaker jar
a small wisp of absorbent cotton (alternatively, use a feather)

For Part B:
variety of different surfaces – hard plastic (such as that found on light switches), wallpaper, paint sample, glass, porcelain, rubber floor tile, cork, cardboard, fabric, metal (aluminum foil)
talcum powder in a shaker jar (about 5 g)

graphite powder in a shaker jar (about 10 g)
shaker jar
soft brush/absorbent cotton
newspaper to protect surfaces
hand cream
1 sheet white unlined paper (8½ × 11)
1 sheet black paper (8½ × 11)
white sticky labels
pen
clear tape (preferably wide)
scissors

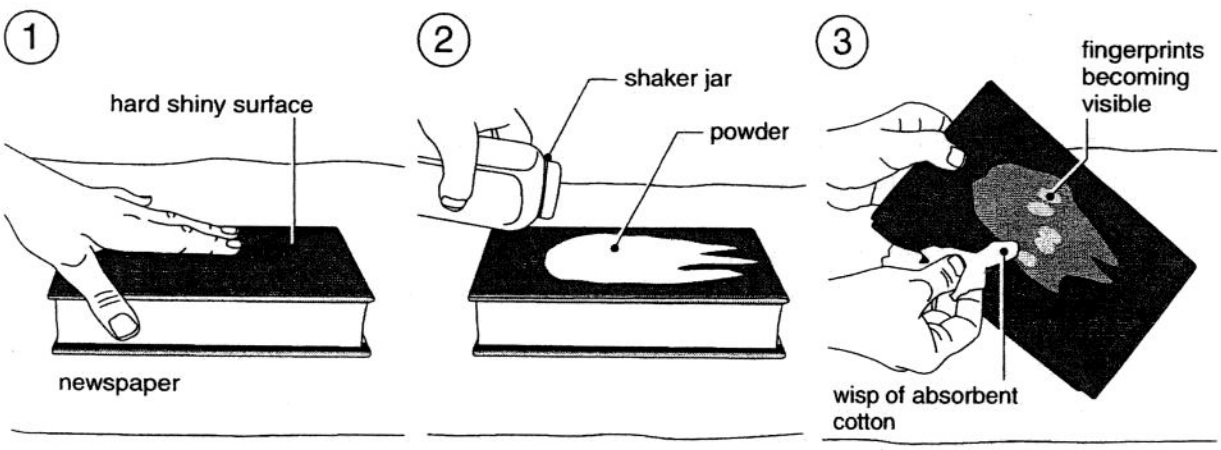
Safety note

Please read the general safety precautions at the beginning of the book.

Procedure

Part A: Making a fingerprint

1. Protect the work surface or table with newspaper.
2. Wipe the hard shiny surface with the dust cloth.
3. Touch the surface with the pad of your finger (the part opposite the nail) as in diagram 1 below. Do not press down too firmly.
4. Shake talcum powder over the surface (see diagram 2 below).
5. Dust the excess powder away from the surface very lightly with a few fibers of absorbent cotton (or a feather) as in diagram 3 below. Do not brush the surface too hard, or you will brush away the lines of the fingerprint.
6. Record in data table A on the next page if fingerprints are visible. Use the first row for "unwashed hands."
7. Wash your hands and repeat steps 2 to 6, recording the result in the second row of data table A.
8. Rub hand cream on your hands and repeat steps 2 to 6, recording the result in the third row of data table A.
9. Carefully dispose of the newspaper covering the table (try to avoid spilling the excess powder).



Touching the surface *Shaking powder over the surface* *Removing excess powder*

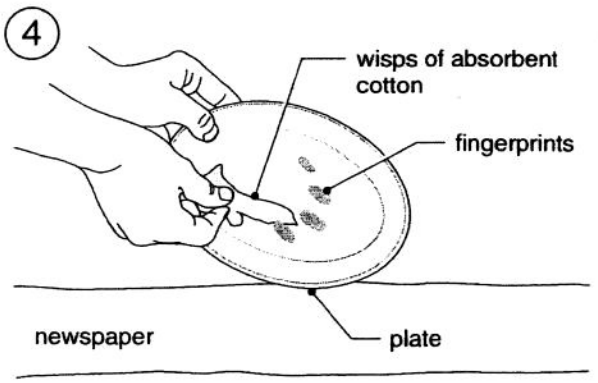
DATA TABLE A

Condition of hands	Is the fingerprint visible using powder?
Unwashed	
Clean	
Hand cream applied	

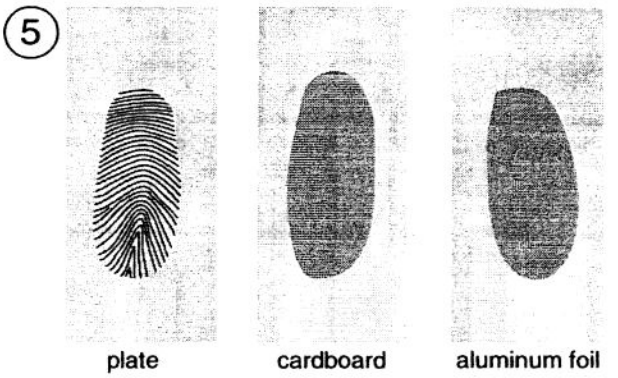
Part B: Making the latent prints visible

Decide who is going to make the fingerprints and apply the powder to make them visible (this is person A), and who is going to be responsible for making a record of the prints (person B).

1. Protect the work surface or table with newspaper.
2. Person A rubs a little hand cream into his hands.
3. Person A selects the first item with which to work and writes its name in data table B on the next page. He then presses the pads of his fingers lightly onto the chosen surface. (Using more than one finger will give a better result for this part of the experiment.)
4. Choose the best color of powder to make the latent print visible. If the surface is dark in color, use talcum powder; if the surface is light in color, use graphite powder.
5. Person A shakes a little of the powder over the place touched by the fingers.
6. Person A dusts the excess powder away from the surface very lightly with a few fibers of absorbent cotton. The powder should outline the shape of the fingerprint (see diagram 4 on the next page).
7. Person B cuts a length of clear tape (4 – 5 cm long) and presses it carefully down over the print. She then lifts the tape carefully away from the surface.
8. If black powder was used, place the tape print on the sheet of white paper. Write the name of the object from which the print was taken next to it (see diagram 5 on the next page).
9. If white powder was used, place the tape print on the sheet of black paper. Write the name of the object from which the print was taken on a sticky label. Place the label next to the relevant print.
10. Look at the fingerprint on the tape. Estimate the quality of the fingerprint by judging the clarity of the lines of the fingerprint pattern (excellent/good/poor/non-existent). Enter this estimation in data table B next to the name of the surface used.
11. Repeat steps 2 to 10 for other surfaces.
12. Carefully dispose of the newspaper covering the table (avoid spilling the excess powder).



Fingerprints made visible by the application of powder



Labeled tape prints on the sheet of paper

DATA TABLE B	
Surface on which fingerprint made	Quality of print (excellent/good/poor/non-existent)

Analysis

Part A: Making a fingerprint

1. How did the fingerprints made with clean and dirty hands compare with those made after hand cream had been applied?

Part B: Making the latent print visible

1. Which surface gave the best print?
2. Which surfaces gave the worst or no prints?

Want to know more?

See Section 10: Our Findings