

## **Instructor's Guide: Chapter 2**

### **Background**

In this chapter, the students will be introduced to three fingerprinting activities. The first series of activities will have the students create their own reference set of fingerprints using various types of fingerprinting media. The second activity will have the students learn the basic technique involved in dusting and lifting a latent print using a fingerprint brush and fingerprint powder. Lastly, the students will use some alternative fingerprint techniques and media to enhance and visualize latent prints. This unit will be revisited in more detail in Chapter 14, so collect and re-issue any materials that are not placed in the student notebooks.

### **Activity 2.1 Making a Fingerprint Reference Set with an Ink Pad**

**Time:** Two to three class periods

**Hand-outs:**

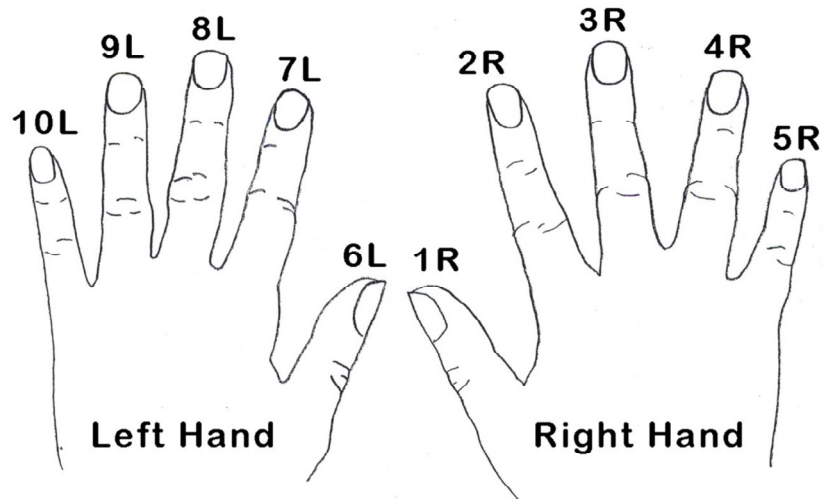
Practice sheets for 1R to 5R and 6L to 10L fingerprint impressions  
Reference Fingerprint ID Card

**Materials:**

Ink pad (one per group)  
Ink roller (one)  
Petri dish or non-porous surface on which to apply fingerprint ink (each group)  
or  
Substitute with rub off fingerprint ink pad (<http://www.dactekstore.com>)  
  
Clear packaging tape (one per group) or lifting tape (Lynn Peavy, Armor Forensics)  
Scissors (one pair per group)  
Practice sheets (as many sheets as there are students)  
Copies of fingerprint ID cards (1 set per student)

**Activity Protocol:**

1. Distribute inkpads and fingerprinting practice sheets to your students.
2. Demonstrate fingertip inking and fingerprinting transfer technique (see page 46 of the Student Guide).
3. Have your students make five (5) transfers of each finger onto the practice sheet (the finger numbering system is shown below and in Figure 2.4 of the Student Guide).
4. Once the students have practiced using the practice sheets, have them make their reference set on the Fingerprint ID Card. Save all the students' fingerprint practice sheets and Fingerprint ID Cards.



*Numbering system for the fingers of the left and right hands.*

The following three pages show fingerprint practice sheets and a Fingerprint ID Card that can be used as templates for this activity.





### Fingerprint ID Card

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Signature of Person Fingerprinted: \_\_\_\_\_

1R thumb	2R index	3R middle	4R ring	5R little

6L thumb	7L index	8L middle	9L ring	10L little

**Notes:**

1. *Ink pads, clear packaging tape, and dispensers can be purchased at any stationary supply store (Office Max, Staples, etc.). Alternatively, purchase a set of “Inkless Fingerprint Pads.” They will not stain as dark but they have the advantage that less cleanup will be required in removing residual ink from the fingers than that needed to remove traditional ink.*
2. *When making photocopies of the students’ fingerprints from the original transfers, it is recommended that the originals be made from fingerprint ink (as opposed to having been made from an ink blotter). Prints having the darkest ridges with the best contrast will make the best copies.*
3. *To make fingerprinting a little easier, place the fingerprint practice sheet along the edge of the table.*
4. *A good fingerprint will resemble a rectangle. Emphasize to the students that they should evenly cover the entire fingertip with ink, apply even pressure during the transfer process, and roll from edge to edge. Thumbs should be rolled away from the body. All other digits should be rolled towards the body.*

**Additional / Alternative Activities**

1. If you have fingerprint powder and brushes, have your students practice lifting their own prints off of glass slides. These slides are prepared by having the students press an oily fingertip against them. The forehead and nose are excellent sources of skin oil. A student can rub a fingertip across their forehead, for example, and then press that finger against the surface of a glass slide. The student should layer a piece of clear adhesive tape over the print, gently pull it off the slide, and lay the tape with the transferred print onto a sheet of white paper.

**Activity 2.2 Making a Fingerprint Reference Set Using Fingerprint Ink**

**Time:** Two to three class periods

**Handouts:** Practice sheet for 1R through 5R and 6L through 10L fingerprint impressions  
Fingerprint ID Card (see templates at the beginning of this section).

**Materials:**

Fingerprint ink (one tube)

Ink roller (one)

Petri dish or non-porous surface on which to apply fingerprint ink (each group)

or

Substitute with rub off fingerprint ink pad (<http://www.dactekstore.com>)

Clear packaging tape and dispensers (one per group) or lifting tape (Lynn Peavy, Armor Forensics)

**Activity Protocol:**

1. Place a dab of fingerprinting ink on the outside surface of a Petri dish. (Any smooth, non-absorbing surface will work for this exercise. For example, you can use the non-sticky side of wide acrylic packaging tape, a pane of glass, or a square of smooth tile.)
2. Spread the dab of fingerprinting ink with a roller.
3. Place the spread fingerprinting ink in a central area of your room and have your students ink their fingers for transfer onto the practice sheets and onto the Fingerprint ID Card.
4. Save all of the students' practice sheets and Fingerprint ID Cards.

**Notes:**

1. *Fingerprint ink can be purchased from Armor Forensics, Lynn Peavey, or from your local art store*
2. *An ink roller can be purchased from Armor Forensics or Lynn Peavey.*
3. *See Activity 2.1 for additional notes.*



**Activity 2.3 Making a Fingerprint Reference Set from Pencil Graphite**

**Time:** One-half to one class period

**Materials:**

- No. 2 Pencil (1 per person)
- Scratch paper (1 per person)
- Scotch tape (1 per lab group)
- Scissors (1 per person)
- Fingerprint ID card (1 per person, see page 25)

**Activity Protocol:** The protocol for this activity is described in the student text.

**Notes:**

*When making a reference set of fingerprints with ink, the impression transferred onto the surface is a mirror image of the real print. If you use the graphite method, be sure that your students place a clean (no prints), second piece of tape sticky side down directly onto the sticky side of the original piece of tape carrying the original transfer. This will create a print in an orientation consistent with prints made by ink.*



## Activity 2.4 Lifting a Latent Fingerprint with Dusting Powder

**Time:** One-half to one class period

### Materials:

Fingerprint brush (1 per lab group) or Magnetic fingerprint brush (TexWand)  
 Fingerprint powder (1 per lab group) or Magnetic fingerprint powder  
 Glass microscope slide (1 per person)  
 Lifting tape or packaging tape (1 per lab group)  
 Dust mask (1 per person) to prevent students from inhaling dusting powder  
 Students' reference prints

**Activity Protocol:** Divide the class into small groups and distribute the materials listed above. The protocol for this activity can be found in the student text.

### Notes:

1. *Because of the nature of the dusting powder, make sure your students have a facemask to prevent inhaling of any particulates during the dusting and recovering process.*
2. *Inexpensive fingerprint dusting kits can be assembled from art brushes and from dusting powder prepared by grinding charcoal with a mortar and pestle.*

### Alternative / Additional Activities:

1. Have your students produce a latent print on a glass slide and then exchange the slide along with the reference prints with another student. The objective is for the students to dust, lift, and match the fingerprint with the correct one from the reference set. The student will report their results to each other for accuracy in the analysis.
2. Make a set of your own reference fingerprints for the class. Make photocopies and place them in sheet protectors. Give one copy to each student. Prepare stations where all the materials necessary for dusting and lifting fingerprints are available. Before class, make enough of your own latent prints on glass slides so that each student has one to work with. Keep track of which print comes from which digit. On test day, provide ten (10) students with glass slides of your latent print. They are to dust and lift the prints at the fingerprinting station within a limited time period. When they

return to their seats, they will use the reference set of fingerprints to determine the digit number (1R through 10L) from which the print originated. After the first group is finished at the fingerprinting station, send the next group of ten (10) students to perform the fingerprint lifts. Continue this practical until all students have completed the assignment.



## Activity 2.5 Developing Fingerprints with Super Glue Fumes

**Time:** One-half to one class period

### Materials:

- Super Glue (hardware store; 1 tube per class)
- Ten-gallon aquarium tank with lid (1 per class)
- Coffee cup warmer (1 per class)
- Pre-warmed beaker of water to humidify the chamber (1 per class)
- Four-inch square of aluminum foil (1 per class)
- Fingerprint brush (1 per lab group) or Magnetic fingerprint brush (TexWand)
- Fingerprint powder (1 per lab group) or Magnetic fingerprint powder
- Glass slide (1 per person) and/or empty beverage can (1 per lab group)
- Latex gloves (for each student handling the Super Glue)
- Safety glasses (for all students)
- Lab coats (for students handling Super Glue)
- Microwave oven or hot plate
- Chemical fume hood

**Activity Protocol:** As the fumes given off by Super Glue are toxic, make sure the fuming is performed in a hood or well-ventilated area. Avoid inhaling the fumes. The protocol for this activity can be found in the student text.

***Note: Super Glue is not only instantly-bonding, its fumes are toxic. This activity should only be performed in a chemical fume hood or a very well ventilated area. The students handling these materials should be well protected with gloves, lab coats, and safety glasses.***

### Additional / Alternative Activity:

Have your students retrieve recently discarded aluminum cans from the campus lunch area. (Make sure the students wear latex gloves during this collection process.) The students will then recover fingerprints and lip prints from these objects using superglue and fingerprint powder.



## Activity 2.6 Visualizing Prints Using Biological Stains

**Time:** One-half class period

**Materials:**

Crystal Violet and/or Methylene Blue (1 bottle per lab group)  
Weigh boats or similar small plastic containers (2 per lab group)  
Masking tape, duct tape and/or scotch tape (1 roll per class)  
Forceps (two pairs per lab group)  
Gloves and lab glasses (1 set per student)

**Activity Protocol:** The protocol for this activity is described in the student text.

**Note:** *Due to the nature of biological stains it is recommended that students wear gloves and eye protection.*

**Additional / Alternative Activity:**

You may wish to try different biological dyes such as Safranin, Malachite Green, Methyl Orange, or Iodine.



## Review Questions for Chapter Two

1. What is a latent fingerprint?

*A fingerprint difficult to see without enhancement by dyes, powders, optical lighting, or other means of development.*

2. What biological functions do the ridges that make a fingerprint serve?

*They are used to aid in gripping objects.*

3. Do identical twins have identical fingerprints?

*No.*

4. What type of fingerprint (visible, plastic, or latent) might be made by an auto mechanic who has oil on his fingers when he closes the engine hood of your white Toyota?

*Visible.*

5. Give an example of how a plastic type fingerprint could be formed.

***Made by the fingers on the hand of a potter removing a bowl from a potter's wheel.***

6. Why does fingerprinting powder stick to a fingerprint?

***The powder sticks to skin oil.***

7. What precautions should be taken developing fingerprints with the fumes from heated Super Glue?

***Wear protective clothing (lab coat, safety glasses, gloves) and perform the fuming in a chemical hood.***