ScienceExpeditionaryForce
Bringing the Fun of Science to Everyone

Fingerprint Investigation

CONTENT STANDARD: Scientific Method

CONTENT TOPIC: Forensic Science

CONCEPT: Forensic science is any science used for the purposes of the law, and therefore provides impartial scientific evidence for use in the courts of law, and in a criminal investigation and trial. Forensic science is a multidisciplinary subject, drawing principally from chemistry and biology, but also from physics, geology, psychology, social science, etc.

CONTENT OBJECTIVE: To identify and learn about scientific methods.

INSTRUCTIONAL OBJECTIVES: The learner will:

- define fingerprint types.
- list and observe the characteristics of fingerprints.
- research fingerprints using tools and methods.

OUTLINE OF CONTENT:

I. Define fingerprints
II. Apply scientific methods to identify fingerprints
III. Define fingerprint types
IV. Draw conclusions based on observations.

GOAL: To enable students to demonstrate the process of science by posing questions and investigating phenomena through language, methods and instruments of science

THEME: Observing and Explaining- The senses are used to develop an awareness of an event or object and the properties thereof.

STANDARD(S): The learner will understand that:

The human senses and technological instruments are used to gather information from the environment.

BENCHMARK Information is gathered by using human senses and various instruments such as magnifying lenses, microscopes, telescopes, thermometers, magnets, scales, and balances.

CLASSROOM CONNECTORS

TIME REQUIRED: 30 minutes

MATERIALS: Pencils, Fingerprint sheet, and magnifying lens

SET/ INSTRUCTION:
Introduce self and let them know you will be using the hand signals and social contract that is in their classroom. (It is really important that the kids understand the teachers know their routine. This will help kids focus more on science when they feel that the routine will be followed).

Kinder and 1st grade:

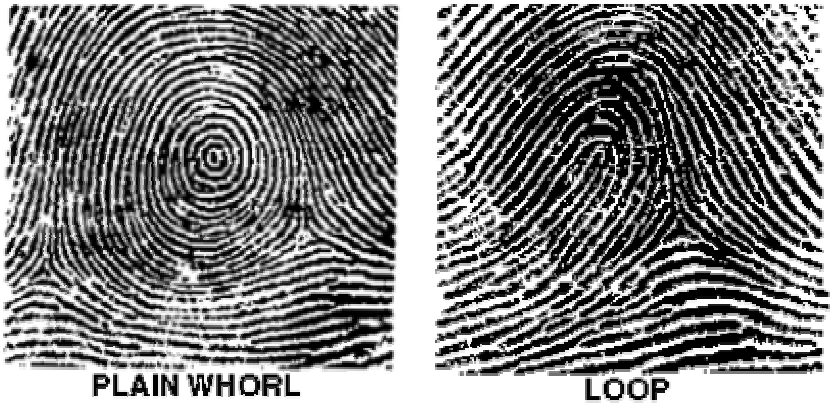
- **Observe and ASK QUESTIONS!!!**
- Every person is different (unique) and has different fingerprints.
- Every time you touch something you leave fingerprints.
- We can identify these fingerprints by the types of lines that make up our fingerprints. The lines make a loop, arch, or whirl (show them the Fingerprint sheet)

Every person in the world is unique. i.e. Every person is different. Scientists have ways of identifying each person by the use of different methods. One method is to look at our fingers and fingerprints. Explain that you are going to pass out magnifying glasses so they can look at their fingerprints. Ask them to take the magnifying glass and look at their finger tips. Notice the shapes and ridges on their fingertips. The ridges on each person's fingers are unique. Stress that fingerprints will never change.

Almost every time you touch something, you leave a fingerprint. Our hands are covered with sweat pores. Sweat is often mixed with other body oils and dirt and when you touch something with your fingers, the oils and dirt on your skin stick to the surface of the object leaving an imprint of your fingertips. Prints that you can see with the naked eye are called **visible prints**. Invisible prints are called **latent prints**. Most fingerprints are latent prints. A forensic scientist, which is like a detective, uses fingerprints as a way to help solve crimes.

There are three basic types of fingerprints - the **arch**, the **whorl** and the **loop**.

Arch patterns have lines that start at one side of the print and then rise toward the center of the print and leave on the other side of the print.



Whorl patterns have a lot of circles that do not leave either side of the print.

Loop patterns have lines that start on one side of the print and then rise toward the center of the print and leave on the same side of the print they start on.

ACTIVE PARTICIPATION:

(Divide the class into six groups.) Each student will make fingerprints of all five fingers of one hand, placing their fingerprints on the Fingerprint Record sheet. For grades K-1, explain and demonstrate experiment on one finger (and explain that they will do this for each finger) before you pass out materials and let them get started.

Experiment: Investigating Fingerprints:

1. Rub the pencil on the scratch paper until there is a dark smudge of graphite.
2. Beginning with the little finger, have each student rub it on the smudge until the fingertip is covered with graphite.
3. Then have students place a small piece of tape over their fingertips. Press the tape down gently.
4. Students should carefully remove the tape and stick it on a piece of clean white paper.
5. Have students repeat the process for the other four fingers of their hands. Have students place the pieces of tape on their Fingerprint Sheet for each finger.
6. Students should look at their fingerprints with the magnifying glass and try to identify what type of fingerprints they have.
7. Next to each fingerprint write down the type of fingerprint they have (use Fingerprint sheets). This will take a while.
8. Tape their sheet in their notebook.

If time allows:

9. Have each group report its results to the class, stating how many students had each type of fingerprint. Ask students to keep a class tally and use the results to create a chart or graph on their activity sheets.

10. Discuss the findings with the class: Is one type more common than another type? Is one type relatively rare?

CLOSURE:

1) What are the three main types of fingerprints? Do you think there are other types of fingerprints?

2) Can you leave a fingerprint on everything? What types of material do you think would not leave a fingerprint?

3) Based on what you learned during the lesson, what other types of evidence would investigators look for at a crime scene? How is the evidence gathered and stored? What do investigators do to ensure that the crime scene does not get contaminated?

4) How do you think detectives solved crimes 100 years ago? What tools did they have available back then? Do you think they were able to solve the majority of crimes? Why or why not?

5) Besides fingerprints another tool being used most recently by forensic scientists is DNA testing. Does anyone know what DNA testing is? What are the advantages of DNA testing? Are there any disadvantages?