The DNA of our Fingerprints

A closer look at our fingerprints
Lesson Number: 2

Title: Fingerprints

Grade/Age Level: 5

Time: 60 minutes

Materials:
* A Fingerprint picture
* Different Human Fingerprint Patterns picture
* A Fingerprint-Recognizing Device picture
* DNA Fingerprinting picture
* Applicant Fingerprint Form
* Fingerprints from Mystery Candy Jar sheet
* Five Suspects' Fingerprints sheet
* Jar filled with Candy for students at end of lesson

Each Student:
Fingered Felons Worksheet
Let's Examine Fingerprints (homework)
Fingered Felons Questions (homework)
Types if Fingerprints (homework)
Scratch Paper
Two (2) Sharpened #2 pencils
Roll of Scotch Tape

Standards/ Common Curriculum Goal(s):
CCSS.ELA-Literacy.W.5.1b
CCSS.ELA-Literacy.RST.6-8.1

Anticipatory Set: 5 minutes
Ask the students, “why should we learn about fingerprints?” “Are two fingerprints alike? Why or why not.” “Do you know what fingerprints are? Are they useful? What for?” “Fingerprints are used for crime scenes, etc. They have helped governments worldwide identify criminals for more than 100 years. Other visible characteristics change, but your fingerprints stay the same.”

Objective and Purpose: 2 minutes
The students will be able to look deeper into fingerprints by looking at the many different patterns there are for fingerprints. After we have done that, we will take our own fingerprints and compare them to that of your neighbors and your parents/guardians.
Procedure:

1. Tell students that we are going to be learning about fingerprints and how they are unique and important.
2. Put up the different pictures of fingerprints and how fingerprints are detected. Go over each picture and talk about why it is important.
3. Spend some time on the fingerprint patterns as they will need to know the different types of fingerprints.
4. Ask if any students have any questions about the photographs they saw and answer them accordingly (Check for Understanding).
5. Tell students that you now have a mystery for them to solve. Bring out the jar of candy and tell them “Well, I had this jar filled with candy to pass out to you all for a treat, but it looks like someone took all the candy! So, our job right now is to be detective and try to use the evidence we just learned about and find the crook who stole the candy. During lunch, I took fingerprints from the jar and I also learned of five suspects – but don’t worry, none of them are you! Let’s see if we can solve the case.”
6. Show them the fingerprints found from the jar. Have them closely look at the fingerprint pattern and remember it.
7. Next, show them the suspect list with all of the suspects’ fingerprints listed. Have them look at the fingerprints for about a minute and then have them raise their hand when they believe they know who did it.
8. Choose students to give their answer and why they believe so. If students are wrong, show the fingerprint again and then the suspect list. Repeat this until someone gets it right! *Hand out candy at end of lesson*
9. Now tell students that they are going to be taking their own fingerprints of their non-dominant hand and they will need to get out two #2 pencils and scratch paper.
10. While students are getting out their materials, pass out the fingered felons’ worksheet in which they will need to do their fingerprints.
11. Show them your example that you completed earlier (Modeling)
12. Show them how to get their fingerprints by rubbing their pencil on a scratch piece of paper (hard) and then rubbing their finger over the pencil markings. Then direct students to take a piece of scotch tape and put it over the finger with pencil marking on it. Have them pull the tape up and place it on the correct box on their worksheet (go over what each finger is called).
13. Ask students if they have any questions and then let them begin if none.
14. Let students work while you circulate the room to see how they are doing and answer any questions.
15. If some students finish early, have them complete the opposite hand so they will have both sets of fingerprints completed. If some students complete both of those before the time is up, have them write down the pattern of their fingerprint.
16. Once students have finished at least their non-dominant hand, have students briefly talk with their neighbor about what their fingerprint patterns are.
17. Bring back the class as a whole and see if there is at least one student in the class for each pattern.
18. Have students make sure their names are on their paper and turn them into the basket for grading – dismiss by table groups.
19. Pass out homework and have them get out their planners to write down all they have as homework.
Adaptations for Students with Special Needs:

Talented and Gifted students: For students who get done early, I will have them complete their other hand and write down the patterns they see from their fingerprints. These students are also given the opportunity to use higher level thinking such as application, analysis, evaluation, logic, and synthesis in the activities by applying knowledge of fingerprint patterns to their own fingerprints and those of five suspects. Students will also be encouraged to explore other sets of fingerprints for application, evaluation, and analysis of fingerprint information and patterns. This will give them a broader understanding of and more practice with fingerprint classification.

English Language Learners: In the description of the candy theft situation and my explanation of what the students are to do to solve the crime, I will speech in simple terms, reiterate main points, and accompany my descriptions and explanations with modeling and visual cues. Also, during the part of the lesson in which I teach about fingerprints, students will be provided with an information sheet that they can read and refer to. This will allow students to visually see what is being asked as well as listening to what is being asked of.

Students with Learning Disabilities: For these students, I will make my explanations, directions, and descriptions easy to understand and presentable in several formats such as visual and auditory. These students will be allowed to ask for help from their neighbors and get extra guidance from an adult and/or myself.

Closure:
Remind students to turn in their work. Tell students that as a class they need to tell me 4 to 5 facts about fingerprints in order to gain the candy from the candy jar. Call on students in the class who tend to not speak up as much as well as students who are eager to answer.

Lesson Assessment:
During the students time to do their fingerprints, I will walk around the room and make sure that the modeling I had done and is visible on the board is what they are doing. I will also assess students while they complete the fingerprint activity. Finally, assess students’ understanding be evaluation of their homework worksheets and the fingerprints worksheet.

Multiple Intelligences Address in Lesson:
Verbal/linguistic; visual/spatial; logical/mathematical; bodily/kinesthetic; intrapersonal; interpersonal.
a fingerprint
different human fingerprints
a fingerprinting recognition device
DNA fingerprinting

DNA samples from:

<table>
<thead>
<tr>
<th></th>
<th>suspect #1</th>
<th>suspect #2</th>
<th>suspect #3</th>
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</thead>
<tbody>
<tr>
<td>crime scene</td>
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application for fingerprinting

<table>
<thead>
<tr>
<th>Applicant</th>
<th>Leave Blank</th>
<th>Type or Print All Information in Black</th>
<th>Leave Blank</th>
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<tbody>
<tr>
<td>Signature of Person Fingerprinted</td>
<td>Aliases AKA</td>
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<tr>
<td>Residence of Person Fingerprinted</td>
<td>Citizenship CIT</td>
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<tr>
<td>Date</td>
<td>Signature of Official Taking Fingerprint</td>
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<tr>
<td>Employer and Address</td>
<td>FBI No. FBI</td>
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<td>Reason Fingerprinted</td>
<td>SOC</td>
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<td>Social Security No.</td>
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<td>Miscellaneous No.</td>
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<tbody>
<tr>
<td>Thumb 1</td>
<td>Index 1</td>
<td>Middle 1</td>
<td>Ring 1</td>
<td>Thumb 2</td>
<td>Index 2</td>
</tr>
<tr>
<td>Thumb 2</td>
<td>Index 2</td>
<td>Middle 2</td>
<td>Ring 2</td>
<td>Thumb 3</td>
<td>Index 3</td>
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Left Four Fingers Taken Simultaneously | Right Four Fingers Taken Simultaneously

1. Thumb | R. Thumb
right index fingerprint lifted from candy jar

*homework question about this!
the five suspects' fingerprints

Sally Stealery right index
Bradly Burglar ton right index
Colleen Caperson right index
Robbie Robberton right index
Taylor Taker right index
Fingered Felons Worksheet

Directions: Using a piece of scratch paper, a pencil and tape record your fingerprints onto the worksheet.

FINGERPRINT RECORD:

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Middle Name</th>
<th>Date of Birth</th>
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<th>Right Index</th>
<th>Right Middle</th>
<th>Right Ring</th>
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Fingered Felons Questions

Directions: Answer the following questions using complete sentences when necessary.

1. Identify the three types of fingerprint patterns.

2. Why do we leave fingerprints?

3. What are some ways we can obtain fingerprints?

4. Compare your fingerprints to that of your parent/guardian. What fingerprint patterns do they have? How do you know?

5. The term fingerprint usually refers to impressions made by:
   a. The entire finger
   b. The side of the finger
   c. The pad of the finger
   d. The index finger

6. Functions of the ridges are to:
   a. Help the person be able to grip objects
   b. Reduce the vibrations triggered when fingertips brush across an uneven surface
   c. Give the hand a smooth texture
   d. None of the above

Matching Section:
7. Tented Arch Prints
   a. Look like circles within circles.

8. Whorl Prints
   b. Look like gentle hills.

9. Arch Prints
   c. Look like lines forming curves to make patterns resembling loops.

10. Loop Prints
    d. Look like steep hills with a high arch.
Let’s Examine Fingerprints – Information

- The patterns of ridges on our finger pads are unique: no two individuals—even identical twins—have fingerprints that are exactly alike.

- We leave impressions—or prints—of these patterns on everything we touch with any pressure.

- The prints can be visible, as when our fingers are dirty or oily, or they can be latent, as when they are made only by the sweat that is always present on our finger ridges.

- Injures such as burns or scrapes will not change the ridge structure: when new skin grows in, the same pattern will come back.

- Dactyloscopy is the practice of using fingerprints to identify someone.

- Fingerprints can be classified by pattern types, by the size of those patterns, and by the position of the pattern on the finger.

COMMON FINGERPRINT PATTERNS
Let’s Examine Fingerprints

Directions: Answer the following questions using complete sentences when necessary.

1. Describe your fingerprints. Do they have loops, triangles, wavy lines? Do you see any differences between your index finger and your middle finger? Did you observe anything else?

2. What pattern do your fingerprints have?

3. What type of fingerprint pattern was found on the candy jar?

4. Who do you think took the candy, and what evidence do you have for your deduction?

5. Which suspect's fingerprints match the fingerprint pattern on the candy jar?
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Fingered Felons Questions

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1. Identify the three types of fingerprint patterns.
   Possible Answers:
   Arch, Tentarch, Right Loop, Left Loop, Double Loop, Right Pocket Loop, Left Pocket Loop, Whorl, Mixed Figure.

2. Why do we leave fingerprints?
   We leave fingerprints because they are part of our DNA and make up who we are. They tell us apart from everyone else in the world.

3. What are some ways we can obtain fingerprints?
   Through fingerprinting, DNA matching, through forensic kits that pick up fingerprints.

4. Compare your fingerprints to that of your parent/guardian. What fingerprint patterns do they have? How do you know?
   Answers will vary.

5. The term fingerprint usually refers to impressions made by:
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   Right Loop

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   Bradly Burglarton
Credits

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