

STEM Collaborative Cataloging Project
Forensics Lesson Plan

Context (InTASC 1,2,3)

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Created:

Lesson Topic: Fingerprint Analysis (Science)

Grade Level: 3rd – 5th Grade

Duration: 60 minutes

Desired Results (InTASC 4)

Purpose: The purpose of this lesson is to experiment with fingerprinting and analyze evidence to solve a classroom crime.

North Dakota Science Content Standards:

- Science Standards: Students use the process of science inquiry.
 - 2.2 (Grade 3) Ask questions directly related to a scientific investigation.
 - 2.3 (Grade 3) Record observations based on simple investigations.
 - 2.2 (Grade 4) Conduct simple investigations to answer questions based on observations.
 - 2.3 (Grade 4) Use scientific tools during simple investigations.
 - 2.2 (Grade 5) Formulate an explanation supported by data.
- Science Standards: Students understand the history and nature of science
 - 8.1 (Grade 3) Identify ways people of all ages, genders, and backgrounds use science in their careers and in daily life.

Objectives:

Students will:

1. Implement the scientific method
2. Practice problem-solving skills through forensics
3. Conduct a fingerprint analysis and record observations
4. Identify ways people use science their careers

Assessment Evidence (InTASC 6)

Evidence of meeting desired results:

- Discussion on scientific method
- Graphic organizer identifying fingerprints for each finger
- Notecards from observations
- Discussion on the role of forensic teams

Learning Plan (InTASC 4,5,7,8)

Instructional Strategy: (Check all that apply)

Direct Indirect Independent Experiential Interactive

Technology Use(s): (Check all that apply)

Student Interaction Align Goals Differentiate Instruction Enhance Lesson

Collect Data N/A

Hook and Hold:

Remove an object from the room and have students guess to identify the “stolen” item. Once the item has been identified, ask students “How can we go about investigating the crime to find out what might have happened to it?” Facilitate a discussion on the evidence that forensic teams use to solve crimes (fingerprinting). State the purpose of the lesson “By the end of this lesson, you will know more about fingerprinting and hopefully, you will be able to analyze fingerprints to find the culprit. Making observations and recording what we notice is an important part of today’s lesson. Let’s get started!”

Materials:

- “Stolen” item
- Paper
- Tape
- Pencil
- FBI for Kids website: <https://www.fbi.gov/fun-games/kids/kids-about>
- Handout of 7 fingerprint patterns
- Graphic organizer for 10 fingers (optional)
- Magnifying glasses
- Detective’s casebook
- Pre-selected fingerprint samples
- Notecards
- Poster of scientific method (optional)

Procedures:

1. Pre-select a willing and capable student. Take one hand of their fingerprints ahead of time using the steps outlined below. Copy enough of these prints so that each small group will have a copy of them.
2. If time allows, share the history of the FBI with this kid-friendly website: <https://www.fbi.gov/fun-games/kids/kids-about>.
3. From this website, stop on the 7th slide which indicates the seven different types of fingerprint patterns (loop, double loop, central loop, central pocket loop, tented arch, plain arch, plain whorl, and accidental). You could also print off copies of the seven types for students or display it on the projection screen.
4. Tell students that they will be creating and identifying their own fingerprint patterns.
5. Demonstrate how to create a fingerprint by rubbing lead from a pencil (the side of the lead tip) over a small area on a piece of paper and placing a fingertip on it. Using a piece of tape, sticky side up, students can place their fingertip on the tape and place the tape on a white piece of paper. Remind students to label which finger the print came from (Younger students may benefit from graphic organizer with 10 spots, pre-labeled with finger names).
6. Using the website or printed copies of fingerprint patterns, have students identify the

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patterns of each of their fingers and write it down on their white paper or graphic organizer. The magnifying glasses in the kit would be helpful in for this step.

7. Use the “Detective’s Casebook” in the Forensics kit for more information to share with students about Fingerprinting. There are also several other engaging activities to use with the scientific method including: toxicological, chromatographic, document, and blood group analyzes.
8. While helping one another, ensure all students have completed all 10 fingerprints.
9. Reveal the “stolen” item by having someone deliver it, going in the hallway to retrieve it, pulling it out of a cupboard, etc.
10. Tell the students, “I have lifted a few fingerprints from this object and I need your help to match the prints with someone in this class. “
11. Distribute the copies of the pre-created finger print samples (to challenge older students, remove the portion of the page that indicates which finger the print came from).
12. Allow time for students to discover who the culprit is. Have them make a hypothesis and explain who they think it might be and why (reinforce kindness in this activity). Students test their hypothesis by comparing fingerprint cards of the students in their group first. Students record observations on notecards which are discussed later.
13. Once the crime is solved, facilitate a discussion on the fact that the student was chosen, and didn’t really steal the object. Also have students share their observations recorded during the investigation, just as real forensic teams would do.
14. End by remind students why the FBI using fingerprinting analysis to solve crimes. Encourage them to think about and share how this activity related to the scientific method.

Summary: Teacher-directed statement: “In today’s Science lesson, we learned about the 7 different types of fingerprints and we analyzed those fingerprints to solve an artificial crime. Forensic teams use this strategy every day to keep us safe.”

Resource: www.educationworld.com/a_lesson/03/lp299-01.shtml

Reflection (InTASC 9)

Reflect On:

- *Preparation*
- *Planning*
- *Teaching*
- *Student Engagement and Participation*
- *Evidence of Student Learning*

Standards

Council of Chief School Officers. (2011, April) *Interstate Teacher Assessment and Support Consortium (InTASC) model core teaching standards: a resource for state dialogue*. Washington DC. Retrieved from http://www.ccsso.org/documents/2011/intasc_model_core_teaching_standards_2011.pdf

North Dakota Department of Public Instruction. (2011) *North Dakota science content standards*. Bismarck, ND. Retrieved from <https://www.nd.gov/dpi/uploads/87/science.pdf>

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