Who Took the Cookies from the Cookie Jar?

It's been a very long day on Sesame Street, and the Cookie Monster can't *wait* to get home to gobble up all of his cookies! But to his surprise, when he gets home… his cookie jar is *completely* empty. Not even a *single* crumb. As you can imagine, our dear friend the Cookie Monster is pretty upset… and pretty puzzled! Until he noticed a fingerprint on the lid of his empty jar. Can **YOU** be a crime-fighter and help the Cookie Monster figure out who stole his scrumptious sweet snacks?

Science Topic	This activity will essentially serve as a quick crash-course in what fingerprint analytics is, what fingerprint analytics are used for, who uses them, and why it's important! Children will learn about three of the most definitive fingerprint characteristics: the arch, loop, or whorl, and how these characteristics help forensic scientists solve criminal cases.
Ideal Age	This activity is designed for upper-elementary school students – I'd say between 2nd and 4th grade. This activity could be simplified to serve younger students or increased in complexity to appeal to an older crowd, but I fear that *some substance of the activity would be lost if it were simplified.* This could be done in many ways – maybe decreasing the options for 'who did it' or only teaching one or two fingerprint characteristics as opposed to all three. The beauty of this activity is that it can continually be complicated to become more puzzling for older children.
Driving Question	The goal of the activity is to determine which Sesame Street character cleaned out the Cookie Monster's cookie jar. Students will use their newfound knowledge about fingerprinting and fingerprint characteristics to analyze the fingerprint on the cookie jar and match it to the fingerprint of one of the Sesame Street characters in for questioning. **Driving Question: Which Sesame Street character cleaned out the Cookie Monster's cookie jar? Can YOU be a crime-fighter and help the Cookie Monster figure out who stole all his scrumptious sweet snacks?**
Materials Needed	+ a glass surface – ideally, a cookie jar – but could be a cup, a mason jar, etc. + sharpie marker + balloons + internet access (to find examples of characteristics of fingerprints – arch, loop and whorl)
Activity Instructions	1. To begin, first prepare the supplies – you will need a glass surface (a cookie jar, a glass cup, a mason jar, etc.) Use your fingerprint – or the fingerprint of someone else in your household to "transplant" a sample onto the glass surface. 2. Next, you will need to create "suspect files" – this can be done using the computer + a simple google search. These suspect files will be most effective if you can make them tangible, by printing them out. Depending on desired difficulty, draft 3-5 Sesame Street characters and assign them a fingerprint. Make sure ONE fingerprint matches the fingerprint characteristics of the fingerprint you've placed on the glass surface. 3. Next, invite your child to investigate the 'scene of the crime,' and read the above italicized paragraph. 4. Take a few moments to explain to your child what fingerprint analytics is – and what fingerprint characteristics (arch, loop, and whorl) are, and how they differ from each other. More information will be included below – check the **science content** section of this manual for help! 5. After a brief introduction, invite your little learner to characterize their own fingerprint! Use the sharpie marker to color in one of your child's fingertips. The easiest to examine are the thumb or index fingers.

	6. After covering your child's fingerprint with black sharpie, have your child 'transfer' their print to the surface of an un-blown balloon. Allow the print to dry for 30 seconds – 1 minute to avoid smudging.
	7. After allowing the print to dry, blow up the balloon. Your child will watch their fingerprint grow before their eyes!
	8. Have your student characterize their own fingerprint.
	9. After doing so, invite them to take a closer look at the fingerprint on the glass surface. Is their print similar to that print? Different? Use some of the **guiding questions** below to help facilitate this conversation.
	10. After determining the kind of fingerprint on the glass surface, introduce your 'suspect files' to your young fingerprint analyst. Lay each of the 'files' or 'cards' out for your child to look at closely.
	11. Ask your child which suspect they would like to 'investigate.' Be sure to ask them to narrow their search to one character.
	12. Did your student correctly identify the culprit? If so, great! If not, allow them to rethink their findings with the 2, 3, or 4 remaining suspect files.
	13. If your student enjoyed this activity, or would like to give it another try, simply transfer a different fingerprint to the glass surface and start again.
Questions	1. What are the three types of fingerprint characteristics?
	2. How do the three types of fingerprint characteristics look similar to one another? How do they look different?
	3. Why might examining a fingerprint be useful for police or forensic scientists?
	4. What is YOUR fingerprint classified as?
	5. Do all of your fingerprints have the same identifying characteristics?
Science Content	A **fingerprint** is an impression left by the **ridges** in a human finger. **Fingerprinting** is the process of taking an ink impression of someone's fingerprint to use for **analytics.** Because *every* human fingerprint is one-of-a-kind, recovering fingerprints or partial fingerprints from **crime scenes** can be especially useful for **law enforcement** or **forensic scientists** to help determined who is guilty of committing a certain crime. The process of **fingerprinting analytics** involves examining a fingerprint for defining characteristics. In fingerprint analytics, there are *many* things to look for, but the three most defining **fingerprint characteristics** are the **arch, loop** and **whorl** (pictures below)**.** Another name for fingerprint characteristics is **fingerprint ridge patterns.** **Arch:** ridges enter on one side and exit on the other. **Loop:** ridges enter on one side and exit on the same side **Whorl:** consists of circles, more than one loop, or a mixture of the two other fingerprint ridge patterns

Arches
Ridges enter on one side & exit on the other side.

Plain Arch   Tented Arch

Loops
Ridges enter on one side & exit on the same side
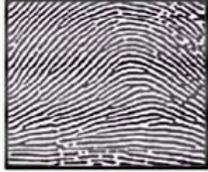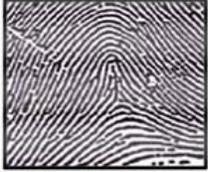
L - Radial Loop   L - Ulnar Loop
R - Ulnar Loop   R - Radial Loop

Whorls
Consists of circles, more than one loop,
or a mixture of pattern types
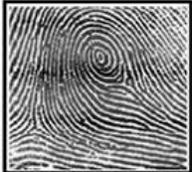
Plain Whorl   Central Pocket Whorl   Double Loop Whorl   Accidental Whorl

There are additional classifications of ridge types within each of the three – as illustrated above. But for the purpose of the activity, the further classified types can be ignored. Focus on the three main ridge types.

Process of Science	Your child is engaging in the process of science by using the **same** criteria that licensed forensic analysts use when analyzing fingerprints found at real-life crime scenes! Though there are machines and technology that can assist forensic analysts in their analysis, being able to identify the characteristics with only their eyes is the first step in being able to become a forensic analyst.
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